UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

ISLAMABAD, PAKISTAN

IRRIGATION SYSTEMS MANAGEMENT PROJECT

PHASE II

Project Number 391-0467

END OF TOUR REPORT

NOVEMBER 1989 THROUGH OCTOBER 1992

BALOCHISTAN TA TEAM

OCTOBER 1992

HARZA ENGINEERING COMPANY

DEVELOPMENT ALTERNATIVES, INC.

ASSOCIATED CONSULTING ENGINEERS-ACE (PVT) LTD

CONTRACT NUMBER 391-0467-C-00-9830-00

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Acronyms

ACE	Associated Consulting Engineers
ACOP	Alluvial Channels Observation Project
COP	Chief of Party
CMTC	Construction Machinery Training Center
DAI	Developments Alternatives Inc.
PEA	Punjab Engineering Academy
HDC	Hydraulic Design Criteria
ISM	Irrigation Systems Management
ISRP	Irrigation Systems Rehabilitation Project
MIS	Management Information System
NWFP	Northwest Frontier Province
PRC	Planning Research Corporation
PA	Provincial Advisor
PID	Provincial Irrigation Department
PIM	Pakistan Institute of Management
PC	Provincial Coordinator
SDO	Sub Divisional Officer
SE	Superintending Engineer
TA	Technical Assistance (Consultants)
USAID	United States Agency for International Development
XEN	Executive Engineer

1. 0 EXECUTIVE SUMMARY

1. 1 TEAM

The TA Team for Balochistan ISM II Project consisted of undermentioned seven members:

- Provincial Adviser, Carlos A. Gandarillas, Harza Eng. Co.
- Design Engineer, Abdul Majid Chaudhry, ACE
- Mechanical Engineer, R. Bolbolan, ACE
- Office Assistant, Mohammad Ali, ACE
- Driver, Nadeem Bhatti, ACE
- Driver, Manzoor Hussain, ACE
- Messenger, Abdul Qayyum, ACE

1.2 TASK

The task of the team was to provide assistance to the PID in institutional development in six areas presented below:
- Design/Rehabilitation/Civil Works
- Operation and Maintenance
- Equipment Management and Utilization
- Monitoring and Evaluation
- Training
- Computerization

1.3 AREAS OF CONCENTRATION

- Design/Rehabilitation/Civil Works

* Irrigation Systems Rehabilitation Project Schemes were reviewed and in the process division level staff of PID received design training. Training was imparted to SDOs and XENs for design of lined channels, earthen channels (Manning equation and Lacey's Regime theory), outlets and flow measuring structures. The design of "proportional outlets" was explained to Pat Feeder Division for remodelling of Uch Canal.

* However, PID could not establish a Central Design Office, instead they decided to carry out the design at division level. The design training efforts were, therefore, concentrated to providing training and assistance to division level staff.

* Several spreadsheet templates and macros were developed to strengthen the design proficiency of the PID.

* Support was given to the PID in the design of structures.

- **Operation and Maintenance**

  * O & M Yardsticks were updated as of June 30, 1991. The approval of Finance Department is, however, awaited. These yardsticks cater for canal systems, drains, and small irrigation schemes.

  * The TA Team devoted great effort in "on the job training" regarding the preparation of the Annual O & M Work Plans and evaluation of the past year's plan. Substantial support was provided to PID in preparation of these Work Plans for 1990-91, 1991-92 and 1992-93.

- **O & M trial equipment**

  * Light earth moving equipment based on a standard farm tractor, together with water sprinkling tankers and supporting transport of jeeps, pick-ups, motorcycles and a truck were provided to five sub-divisions of Pat Feeder Division for maintenance of canal banks, roads and emergency repairs. The equipment has been in use by the PID on a trial basis since December 1991, for almost one year.

- **Mechanical Workshop and Equipment Utilization**

  * Technical assistance was provided for workshop equipment planning, start up and use. All the workshop machinery provided by USAID in Phase I of the ISM Project was made operational.

  * The TA Team assisted PID Balochistan to ensure optimum use of workshop facilities, and trained the staff in the operation of the various machines. Training was provided on most of the workshop machinery, with local and expatriate trainers.

  * Assisted/advised/trained PID staff of the workshop, in planning and implementation of the overhauling programme for construction equipment. Spare parts were provided by USAID and also procured by the PID.

  * Prepared spare parts requirements for reconditioning of different types of construction/ drilling /workshop equipment.

  * Assisted PID in establishing an effective warehouse system.

  * Improved the management, inventory and monitoring of the workshop, field and construction equipment, by inspecting and numbering each piece of machinery.

* Mainsaver computer program was started. This computer software provides computerized inventory of spare parts for work orders to be prepared, and for the establishment of a maintenance schedule for equipment.

- **Monitoring and Evaluation**

* Nari Canal System (main canal with two distributaries) was selected for monitoring and evaluation before and after rehabilitation to determine the effect of the work on water distribution, equity and reliability, and farm production and income. Pre-rehabilitation monitoring was carried out by ACOP and WMED. The rehabilitation work on the system could not be started by PID, although tenders were called many times; so post-rehabilitation monitoring and evaluation is in doubt.

* Hydraulic monitoring equipment has been ordered by USAID for Pat Feeder Circle (now split in two circles viz Pat Feeder and Sibi). ACOP, WAPDA has held one training course in the use of this equipment. Four training courses are still to be conducted by ACOP.

* The Purpose Level Monitoring proforma indicating the latest position for 1991-1992 is attached as Annex D.

- **Training**

* Four officials were sent on short-term overseas training courses.

* Sixty one persons attended in-country training courses in Punjab Engineering Academy.

* Twenty SDOs/ XENs attended in-country short term training courses in Pakistan Institute of Management.

* Nine SDOs/ XENs were given one week training in the design of channels and operation & maintenance of channels by TA Team at Quetta.

* Eight SDOs/ XENs were given one week training in "Computer Division Engineering Applications" by the TA Team at Quetta.

* In-house-training for clerks, draftsmen, and SDOs in the use of computer was given to twenty one persons at Quetta.

* On-the-job training in the repair and maintenance of heavy construction equipment and the use of the Mainsaver computer program was provided by the TA Team continuously through out the project period.

* Fifty two mechanics from the workshop received training at the Construction Equipment Training Center, Islamabad.

- **Computerization**

Great effort was devoted to the computerization of design and managerial activities. XENs and SDOs were trained in computer applications in engineering design. Clerks and draftsmen were trained in computer applications tailored to the needs of the PID.

* Thirteen IBM computers were provided and installed in five computer rooms, also renovated under the Project. The computer rooms are the Computer Cell, Quetta, Sibi and Loralai Circles and the Training/Common Users Room in the Chief Engineers Building.

* Two more stations of Khuzdar and Dera Murad Jamali will be provided with computers after the completion of the renovation of computer rooms.

1.4 SUSTAINABILITY

- **Design/ Rehabilitation**

The use of design templates on Lotus 123 software is sustainable.

- **Computerization**

The computer system is highly sustainable.

- **Mechanical Workshop**

The workshop is sustainable as long as funds are provided for procurement of spare parts.

- **Training**

Much of the in-country program is sustainable through established funding by the PID.

- **Preparation of Annual Operation and Maintenance** Work Plans

It is doubtful that this program is sustainable when donor assistance and requirements are withdrawn.

- **O & M Trial Equipment**

  Sustainability of the use of light equipment for routine maintenance is doubtful. An evaluation will be made at the end of the trial period.

- **Monitoring and Evaluation**

  After the equipment arrives and training is provided by ACOP, the program will be sustainable in Khirthar Division but probably not be sustainable in Pat Feeder and Sibi Divisions.

1.5 SUMMARY EVALUATION

The overall program achieved modest success in improving the design capability at division level. Success was achieved in computerizing the PID at Computer Cell and Circle levels. Great success was achieved in overhauling unused construction equipment at the mechanical workshop. Excellent results in training. The PID is enthusiastic in training personnel at the PEA; the Computer Cell has conducted courses; and the Mechanical Circle hired a permanent trainer for the Workshop. Little success was achieved in motivating the field officers to prepare the O&M Annual Plan. Up to date, modest achievement has been accomplished in the use of the O&M Trial Equipment. The channels selected for monitoring have not been rehabilitated and the hydraulic monitoring equipment has not arrived yet.

2.0 INTRODUCTION

During the first phase of the project, ISM I, many technical and institutional improvements were recommended but there was limited adoption by the PID. Large quantities of construction equipment were provided and maintenance workshops were renovated and equipped but not fully activated. In the second phase, ISM II, it was proposed that a much smaller Technical Assistance Team be provided and that the team should be located in the PIDs offices and act as catalyst for institutional development rather producing specific reports. One of the biggest challenges was to utilize all of the workshop equipment that had been purchased in the first phase. The main goal was improved management and results in operation and maintenance (O&M), efforts.

In broad terms using words from the project documents the overall objective of the ISM project was to increase agricultural production through increasing the safety of water delivery and improving the reliability and equity in water delivery to the water courses. The basic assignment to Harza/DAI/ACE and the ISM Project was to support and assist the institutional development of the four Provincial Irrigation Departments and the Federal Coordination Cell in building capacity to provide sustained and proper operation and maintenance and management of a rehabilitated irrigation system. The focus of activities was on rehabilitation/design of canals and drains, improved operation and maintenance of rehabilitated facilities, and improved management, and operation of previously provided construction equipment.

The contract for technical services was signed on 28 September, 1989 and the technical assistance services commenced on 20 October, 1989. The Technical Assistance Team included an expatriate Chief of Party, four expatriate Provincial Advisors, an expatriate Equipment Specialist and one expatriate Design Specialist, plus other local technical specialists in operation and maintenance, equipment and workshops, computerization, training, and monitoring and evaluation.

3. 0 ACTIVITIES

The activities of the TA Team in general were centered on institutional strengthening in the following six areas:

1.- Design/Rehabilitation/Civil Works
2.- Operation and Maintenance
3.- Equipment Management and Utilization
4.- Monitoring and Evaluation
5.- Training
6.- Computerization

Personnel Involved

The TA Team for Balochistan ISM II Project consisted of the undermentioned members:

- Provincial Advisor, Carlos A. Gandarillas, Harza Eng. Co.
- Design Engineer, Abdul Majid Chaudhry, ACE
- Mechanical Engineer, Abdul Hameed, ACE left on June 1991
- Mechanical Engineer, R. Bolbolan, ACE
- Office Assistant, Bashir Khokhar, ACE left on March 1992
- Office Assistant, Mohammad Ali, ACE
- Project Secretary/Computer Instructor, Ms. Shamshad Kousar, ACE left on May 1992
- Driver, Nadeem Bhatti, ACE
- Driver, Manzoor Hussain, ACE
- Messenger, Abdul Qayyum, ACE

From the Technical Advisors Team, the following personnel, provided managerial and technical support:

- Chief of Party, Jim C. Ringenoldus, Harza Eng. Co.
- Chief Design Engineer, Gene Thompson, Harza Eng. Co.
- Equipment and Workshop Advisor, Thomas Liston, Harza Eng. Co.
- Headquarter Coordinator, David Miller, Harza Eng. Co.
- Equipment Consultant, George Miller, Harza Eng. Co.
- Drainage Engineer, Richard Wenberg, DAI
- Sind Provincial Advisor, Russ Stoneman, DAI
- M&E Advisor, Shane Ryland, DAI
- Equipment & Workshop Engineer, Javaid I. Awan, Harza Eng. Co.
- Training Specialist, Adil Hasni, Harza Eng. Co.
- Equipment Engineer, Jehanzeb Afridi, ACE
- Workshop Consultant, Keith Cooper, DAI
- Budget and Accounts Officer, Maqbool Ahmad, ACE
- M&E Specialist, Mehboob Karim, Harza Eng. Co.

- Hydrologist, Khalid Jawed, Harza Eng. Co.
- Design Engineer, Khalid Masood, ACE

From the PID, the following gentlemen provided support to the Project:

- Irrigation Secretary, Mohammed Amin
- Chief Engineer, Abdul Salam Khan
- Provincial Coordinator, Shirin Khan Luni. He was transferred in April 91
- Provincial Coordinator, Munawar Khan Mandokhel
- SE Mechanical Circle, Arbab Yusuf
- Systems Analyst, Khudai Dad Khajjak

From USAID, we had the support of the following officers:

- Chief Water Resources Division, Alvin Newman
- Project Officer/Chief Water Resources Div., Jan Emmert
- Chief Engineer/Project Officer, Muzammil Qureshi
- Civil Engineer, Shamim Alam

From NESPAK, we had the input of:

- Resident Engineer, Sheik Muhammad Hussain

3.1 REHABILITATION/ CIVIL WORKS

One of the main objectives of the original project paper was the establishment of a viable design cell within the PID to conduct the redesign of problematic channels and to develop enough experience to support field staff handling difficult design problems.

The Design Cell in Balochistan was neither established nor institutionalized even though a Chief Design Engineer, several draftsmen, and office assistants were appointed. Engineering staff was never appointed to the cell and it hasn't been involved in any significant design activity. Please refer to Annex A, Monthly Memorandum Stating Things to be Done.

Based on the fore mentioned experience, the Rehabilitation/Civil Works component was redirected to provide support to the division level, where the bulk of design work is carried out. A Revised Work Plan was prepared in July 1991, where three major activities were stressed for as mentioned under:

- Design Training
- Standard designs
- Canal and drain system rehabilitation

A. Design Training

For this activity, the use of computers and spreadsheet software was stressed. Along with the TA Teams of Sind and NWFP and support from the Balochistan Computer Cell, a manual entitled "Use of Computer Spreadsheet for Division Engineering Applications" was prepared. The manual was divided into "The Participants Manual" and "The Instructors Manual". The second one provides specific guidelines for the trainer, including the schedule, additional computer applications and training aids. The following applications were developed and presented:

1.- Levelling
2.- Flow Accumulation
3.- Canal Earthwork
4.- Lacey's Silt Theory
5.- Survey Traverses
6.- Cost Estimates
7.- Manning's Equation
8.- Graphing

One course was conducted at the Punjab Engineering Academy, where the Academy's staff was trained and are conducting regular courses since. In Balochistan, a pilot course was conducted and also a follow up course. These computer applications were taught to most SDOs and XENs.

One course entitled "Design of Small Canals" was conducted by the

Balochistan TA Team with the support of the Design Advisor, Dr. Gene Thompson and the PID Computer Cell. The course focused mainly in hydraulic design, lining, and foundations of structures for channels less than 100 cusecs, abundant in this Province. A course regarding "Design of Discharge Measurement Structures" was also conducted by the same team. In this course, the importance of water measurement in the operation of canals was emphasized. The course concentrated in the design, calibration, and construction of water measurement structures, weirs, flumes, and orifices.

As part of the support needed for dependable design, training regarding surveying and estimating was conducted at the Punjab Engineering Academy, where two courses were arranged for PID Balochistan.

B. Standard Designs

A first step to standardize the design of canals and structures was the development of spreadsheet macros (spreadsheet programs) for routine computations and also the development of a spreadsheet macro subroutine and BASIC language subroutine to solve implicit equations, commonly found in engineering design. The following is a list of the macros developed:

1.- Lotus macro and BASIC program to solve implicit equations using Newton-Secant procedure.
2.- Manning's equation
3.- Froude Equation (to solve for critical flow)
4.- Numerical integrations (requested by the Sind Design Cell)
5.- Runoff using SCS Curve Number Method
6.- Surveying, calculation of closed traverses

Standard designs for vertical drops following Sarda Method have been developed for use by PID. These designs are for discharge less than 530 cusecs and for discharge more than 530 cusecs. The templates carry out the hydraulic as well as the structural design as required by the PIDs. Please refer to Annex B.

C. Canal and Drain system Rehabilitation

To support design and to provide on-the-job training, significant time and effort were devoted to the design of "Uch Canal Remodelling". It was visited on several occasions with the Design Advisor, Dr. Gene Thompson, who explained and prepared a list of data needed for redesign. Analysis of design following CADIS, Manning's equation and Lacy's Method were conducted. A meeting to discuss the design criteria to be followed was organized, to which TA Team Sind, Mr. Russ Stoneman and Mr. Khalid Masood were invited, as well as NESPAK RE, Mr. Sheik Mohammad Hussain. The XEN Pat Feeder and the TA Team Balochistan were also present. As follow up, discussions regarding the design of outlets were held

with the division engineers.

The Verchume Storage Dam was visited many times and advice was given regarding construction quality control. Embankment stability, seepage through the embankment, spillway capacity, outlet design and freeboard among other construction parameters, were analyzed and discussed with the PID, NESPAK and USAID.

3.2 OPERATION AND MAINTENANCE

Operation and maintenance are the most important project components of ISM-II and perhaps the more difficult ones. It is widely acknowledged that operation and maintenance of the irrigation systems in Pakistan is deficient. The TA Team's efforts concentrated on the following main activities for Balochistan in the domain of O & M:

- O & M yardsticks
- Annual O & M Work Plans
- Drainage Manual
- O & M Trial Equipment

A. O & M Yardsticks

The consultants, PRC-Checchi prepared the yardsticks during the first phase of ISM Project. These were updated during ISM II, by conducting an in-depth analysis of the various schemes, by using the information provided in the Manual of Irrigation Practice, and the cost escalation. It was decided that the operation and maintenance expenses of the small schemes is about 2% of the escalated cost. Several trips were made to Dera Murad Jamali and Las Bela, to better assess the O&M needs of these schemes. Also, a large number of small irrigation schemes not included earlier were incorporated in the revised version.

The PID has forwarded the yardsticks to the Finance Department. The approval is not received from the Finance Department.

B. Annual O & M Program

The World Bank has made preparation of annual O&M Work Plans a covenant of its credit agreement. USAID has made assistance a major responsibility of the Technical Assistance Team, who have dedicated substantial time and effort to this activity. The TA Team developed a computer template for the O & M Work plan for the proposed works and evaluation of performance of the previous year. The template pro-forma was developed in a way that the PID personnel could easily identify recurring O&M requirements and special non-recurring needs arising during the year, as well as to facilitate the assessment of the previous year's plan. TA Team imparted on-the-job training to the PID staff by visiting field offices and devoted substantial effort in the preparation of the Plans for 1990-91, 1991-92 and 1992-93.

C. Drainage Manual

The preparation of a surface drainage manual reinforcing the importance of well-designed, well-maintained drains to the functioning of the irrigation/drainage system was assigned to Mr. Richard Wenberg, drainage specialist. Mr. Wenberg visited Balochistan where he briefed the PID pertaining his assignment.

The drafts prepared were reviewed by the Balochistan TA Team, who concentrated in the hydrology and the maintenance chapters. A couple of visits were made to Khirthar Division, where the main drains of the Province are located, to discuss the manual with the PID and obtain pictures and maps of the area. A couple of workshops were held, to which members of the PID attended, to discuss the contents of the manual and the adoption by the PID.

D. O & M Trial Equipment

Light mechanized equipment consisting of tractor with a dozer blade and grader blade, tipping trailer, water tanker , pick up truck and Suzuki jeep for each sub division; a tractor with loader arrangement and a chisel plough, a flat-bed truck, and a Suzuki jeep for the division have been distributed to five sub divisions of Pat Feeder Division for the maintenance of canal roads, banks and emergency repairs. Motor cycles were also provided to the Sub Engineers.

The trial was designed to appraise the suitability and effectiveness of the equipment package in maintaining the embankments of canals and drains.

The operators were trained at site by the TA Team Coordinator with the support of the suppliers and the TA Team Balochistan. One year trial commenced in December, 1991, followed by monthly visits conducted to evaluate the performance and suitability of the equipment. The more common activities in which the equipment was engaged were routine maintenance operations such as the sprinkling, grading, and repairs to the embankments. In a couple of occasions they were used in repairing breaches in Pat Feeder Canal. The final evaluation regarding efficiency and maintenance cost as compared to the manual repairs will be made at the end of the trial period in December, 1992.

3.3 MECHANICAL WORKSHOP AND EQUIPMENT MANAGEMENT

The Workshop and Equipment Management component was designed to institutionalize the management of mechanical activities and to upgrade the skills of relevant personnel so that the PID may confidently plan, organize, and carry out these activities. Improving utilization and maintenance of the equipment enables the PID to more effectively rehabilitate and maintain irrigation systems.

In the revised plan, the emphasis regarding this component was on continuing to improve the equipment management and utilization through on-the-job training, assistance in planning and reporting equipment utilization, bringing the mechanical workshop to full operational status, computerizing inventories and management operations, and maintenance and overhauling of construction equipment. Please refer to Annex C for information regarding workshop equipment.

The mechanical workshop never became fully operational prior to the launching of ISM-II. When phase II started, the spare parts provided by USAID during phase I were still in their original boxes or lying totally disorganized on shelves. Workshop machinery installation and several training programs were conducted for PID workshop staff. The provision of a repairs workload was an important first task required to make the shop operational. The following is a brief description of achievements accomplished during ISM-II:

- The warehouse has been organized using Card-Index System. Proper receipt and issuing procedure have been established, store records have been computerized.

- Repair and overhauling of fleet vehicles and construction equipment has been started and is continuing effectively, using the PID's own funds which are supplemented by spare parts provided by USAID.

- A technical library has been established.

- Diesel Laboratory was made operational. On The Job Training was provided by the TA Team Mr. Joseph Keith Cooper.

- Training for operators and mechanics at the Construction Machinery Training Center in Islamabad was organized. Workshop staff were motivated to avail the opportunity but unfortunately only five benefitted to date because of required literacy qualifications.

- To make workshop and equipment more effective, an Equipment Management Workshop was organized at Quetta on November 1990. The aim was to help solve the problems of mechanization in Balochistan. Thirty two PID officials participated.

- TA Team mechanical engineers along with PID staff visited various field locations through out Balochistan, inspecting the machines and arranging repairs.

- All the construction equipment with the PID Balochistan, which is spread through out the Province, has been inventoried, painted with code numbers, and thoroughly inspected to determine repair needs.

- A local trainer first was hired by HARZA to conduct training at Quetta Workshop. He was providing training to the machine shop staff for operation of milling, lathe, radial drill, facer etc. Later he was appointed as permanent PID worker against vacant post of machinist with the Department.

- A special "On the job training" programme was conducted by TA Team Equipment Specialist, Mr. George Miller. The training was provided on overhauling of construction equipment and operation workshop machinery.

- A computer room was renovated and two computers were provided for the Workshop, with Mainsaver computer software, a management system for mechanical workshops. It can maintain inventory, issue work orders, keep track of equipment utilization and issue preventive maintenance work orders established on a calendar basis/usage basis. XEN Mechanical was provided training on the use of this program in USA by USAID. Equipment inventories have been computerized, but the system has not as yet been used to its full potential.

Please refer to Annex C for details of workshop and equipment status report.

3.4 MONITORING AND EVALUATION

The purpose of the Monitoring and Evaluation component is to develop reliable monitoring systems that will satisfy the long term requirements of the PID and will support effective tracking and management of ISM-II. The revised work plan mentions the following objectives for the monitoring and evaluation efforts of the project:

- Monitoring within the PID
- Evaluation of impact of canal and drain rehabilitation
- Coordination of O & M Trial
- Purpose Level Monitoring, (PLM)
- Internal monitoring of Project Team

A. Monitoring within PID

The Computer Cell functions as a management information flow center, which processes and manages information compiled from the whole province. At this point the Computer Cell's importance in the data management is vast, to the point that for the PID to operate, the presence of the Cell is indispensable. The Cell is involved in the statistics handling of the following activities:

- Personal data of PID Staff
- Various types of progress reports
- Preparation of O&M Work Plan
- Inventory of Irrigation Schemes
- Economic information of projects

It was proposed that USAID will provide hydraulic monitoring equipment to Pat Feeder Circle (now split into two circles, Pat Feeder Circle and Sibi Circle). The equipment has been ordered and is awaited. The PID staff was to be imparted training by ACOP, WAPDA, and one training course was held at Dera Murad Jamali. Four training sessions are still to be held by ACOP, one of which will take place at Khirther Division, where we have great expectations.

The TA Team Balochistan with the support of Dr. Gene Thompson, Design Engineer, and the PID Computer Cell conducted one course entitled "Design of Discharge of Irrigation Structures", as is also reported under Design/Rehabilitation. The main objective was to accentuate the importance of hydraulic monitoring of canals by conducting discharge measurements and calibrating discharge measurement structures, such as gates, flow constrictions (bridges, water falls, etc.) weirs and outlets.

A lotus macro (spreadsheet program) was developed to carry out the

computations of discharge measurements using current meters. The current meter measurement by midsection method was utilized. The macro was made available to the Balochistan and Sind PIDs.

B. Impact of Canal and Drain Rehabilitation

Nari Canal system was selected for pre- and post- rehabilitation monitoring and evaluation in order to determine the effect of rehabilitation on equity, reliability of water supplies and farm income. Pre-rehabilitation monitoring related to water distribution and farm income was completed by ACOP and WMED respectively. The TA Team visited the project area on numerous occasions to help and assess the progress. A short-term expatriate monitoring specialist, Dr Shane Ryland visited the project twice. The rehabilitation work could not be started by PID, though tenders were called many times. Therefore the possibility of post-rehabilitation monitoring is in doubt. Please refer to Annex A.

C. Coordination of O & M Equipment Trial

Considerable effort was devoted by the TA Team for use of trial equipment. The area was visited many times. The equipment has been in use since December 1991 and evaluation would be made in December 1992 after one year of its use. The monitoring activities were interrupted for the last four months due to severe floods in the area and unavailability of PID staff.

D. Purpose Level Monitoring (PLM)

A Purpose Level Monitoring system was developed and implemented to report progress with respect to indicators of accomplishments of project objectives. The PLM was completed semi-annually. It indicates the progress made in design, O&M annual plan preparation and a number of other project activities. A copy of PLM is placed as Annex D. This activity was carried out for USAID.

E. Internal Monitoring of Project Team

The TA Team prepared monthly memos and quarterly progress reports. These reports were combined quarterly into a project report prepared by the Chief of Party. In this way any one can monitor the progress of the TA Team in each province. The monthly memos along with the quarterly reports kept the TA Team members informed of activities in the other provinces.

3.5 TRAINING

The training component was conceived to enable PID staff to perform key roles in the project components, by providing local and overseas education. This education emphasizes efforts to improve technical and management skills in areas related to operation and management of canal systems.

Two types of training, in-country training and overseas training were proposed in the Project. In-country training was provided as under:

* At Punjab Engineering Academy to Sub Engineers, SDOs and XENs.
* At Pakistan Institute of Management to SDOs and XENs.
* At Construction Machinery Training Center to mechanics.
* In house training at Quetta to SDOs and XENs and also clerks and draftsmen. The training was conducted by TA Team with the support of the Computer Cell.

The start of the overseas training program was seriously delayed by lag in approval of the Training Plan by the Federal Government and by cancellation of courses by one of the training institutions. The overseas training program, therefore, did not get underway until late in 1991.

The list of the persons who received overseas and in-country training is presented in Annex E.

The training institutions, courses conducted in-country, and the number of participants who attended are listed below:

TRAINING MODULES AT PUNJAB ENGINEERING ACADEMY

1.	Surveying Modules	19-31 Oct, 1991	4 Participants
2.	Estimation Module	02-14 Nov, 1991	5 Participants
3.	O&M of Canal System	23 Nov-05 Dec,1991	5 Participants
4.	Preparation of Design Strategy	07-19 Mar, 1992	2 Participants
5.	Construction Specs	25 Apr-07 May, 1992	2 Participants

DIVISIONAL ENGINEERING APPLICATION MODULES

6.	Module Session	22 Aug-03 Sep, 1992	1 Participants
7.	Module Session	05 Sep-17 Sep, 1992	1 Participants

SUB-ENGINEERS TRAINING

8.	Survey & Estimation	13 Apr-09 Jul, 1992	20 Participants
9.	Survey & Estimation	12 Sep-03 Dec, 1992	20 Participants

MID-LEVEL MANAGEMENT TRAINING AT PIM

10.	Management Course Course for Junior Executives	27 Apr-16 May, 1991	1 Participants
11.	Using the Personal Computer for Inventory Control	18-23 May, 1991	1 Participants
12.	Team Work-Getting people to work together	26-31 Oct, 1991	1 Participants
13.	Development Course for Managers	2-11 Nov, 1991	2 Participants
14.	Skills in Administration	16-21 Nov, 1991	1 participants
15.	Streamlining Admon. Procedures/Paper Work	23-28 Nov, 1991	1 Participants
16.	Problem Solving & Decision Making Skills	21-26 Dec, 1991	1 Participants
17.	Effective Letters, Reports & Presentations	28 Dec, 91-02 Jan 92	1 Participants
18.	Development Course for Managers	11-16 Nov, 1992	1 Participants
19.	Problem Solving & Decision Making Skills	25-30 Apr, 1992	1 Participants
20.	Principles of Good Management	2-7 May, 1992	1 Participants
21.	Team Work Getting people to work Together	19-24 Sep, 1992	3 Participants
22.	Problem Solving & Decision Making Skills	3-8 Oct, 1992	3 Participants

23.	Effective Letters Reports & Presentations.	10-15 Oct, 1992	2 Participants

HYDRAULIC & SEDIMENT MONITORING TRAINING BY ACOP

24.	Training Session at at Dera Murad Jamali	10 Dec, 90-2 Jan, 92	16 Participants

IN HOUSE TRAINING BY TA TEAM

25.	Design of Discharge Irrigation Structures	30 Sep-3 Oct, 1990	7 Participants
26.	Design of Small Canals	11-13 Dec, 1990	9 Participants
27.	Division Engineering Applications. Pilot Course	29 Sep-3 Oct, 1991	8 Participants
28.	DOS, Wordperfect & Lotus Training	16 Dec, 91-16 Feb 92	12 Participants
29.	DOS, Wordperfect & Lotus Training	16 Mar - 15 May, 92	9 Participants

MECHANICAL TRAINING

30.	Diesel Laboratory Technology	7-19 July, 1990	2 Participants
31.	Machinery & Equipment Management Workshop	18-19 Nov, 1990	23 Participants
32.	O & M Trial Equipment Training	14-18 Dec, 1991	16 Participants
33.	Workshop on O&M Equipment Trial	2-3 Mar, 1992	6 Participants
34.	Long Term training sessions at CMTC	Jan 91 till May 92	5 Participants
35.	On the Job training in operation of workshop Machinery. Use of special tools, tools O&M, field staff training at Dera Murad Jamali & Pishin in O&M of Lub trucks. Field staff training at Quetta and Loralai Circle in routine maintenance of construction equipment.		20 Participants

TOTAL RECEIVED TRAINING = 214

The training institutions, courses, schedules and number of participants programmed for the remaining of the Project are listed below:

TRAINING MODULES AT PUNJAB ENGINEERING ACADEMY

1.	Contract Administration	7-19 Nov, 1992	5 Participants
2.	Construction Planning	28 Nov, 10 Dec, 92	5 Participants
3.	Survey	19 - 31 Dec, 1992	5 Participants
4.	Survey	09 - 21 Jan, 1992	5 Participants
5.	**Four more; sessions from Feb-Apr 1993**		20 Participants

DIVISIONAL ENGINEERING APPLICATION MODULE

6.	Third Session	3 - 15 Oct, 1992	2 Participants
7.	Fourth Session	17 - 29 Oct, 1992	2 Participants
8.	Fifth Session	31 Oct - 12 Nov 92	2 Participants
9.	Four more Session	Dec 1992-Apr, 93	8 Participants

MID LEVEL MANAGEMENT-PAKISTAN INSTITUTE OF MANAGEMENT

10.	Principles of Good Management	21-26 Oct,1992	2 Participants
11.	Five more Sessions	Dec-92-Apr 93	10 Participants

MECHANICAL TRAINING

12.	9 Training sessions in Machine Shop Welding Shop, Auto Mechanic Shop, Transmission & Hydraulics, Elec. Shop, Auto Electrician, Fitter Shop and Draftsman training at Technical Training Centre, Quetta Nov 1992 - Apr 1993	60 Participants

COMPUTER TRAINING

13.	6 Sessions of Advance training From Nov 92-Apr 1993	30 Participants
	Total Planned =	150 Participants

3.6 COMPUTERIZATION

The computerization component was conceived to develop the PID's capability to collect, store and analyze information essential for a broad range of PID activities. The computerization program highlighted the use of computers as a management tool for inventory control, development of budgets, and allocation of resources. The program also observed the systematic long-term expansion of the PID's computer capabilities in the interior of Balochistan. Please refer to Monitoring and Evaluation for related activities of the Computer Cell.

In the revised work plan it is stressed to adopt the following priorities in order to consolidate and reinforce the progress on the institutionalization of the computerization component:

- Supporting training of limited number of staff in computer utilization and aiding the PID in the use of computers for maintaining personnel records, budgets and other information necessary for planning and evaluation of departmental activities.
- Developing and introducing software to assist PID staff in performing design, management and administrative functions.
- Providing for maintenance and repair of hardware and procurement of supplies

A. Training in computer utilization

In-house training was conducted by the TA Team with the support of the PID Computer Cell in the use of Word Perfect and Lotus 123 software. Twenty one persons comprising clerks, draftsmen and SDO's, attended courses of two months duration. The Computer Cell visited the Circles to follow-up training and to monitor the computerization activities. Also, in the courses reported under Design/Rehabilitation, an introduction to micro-computer applications in engineering design were conducted expecting to motivate the XENs and SDOs.

B. Developing and introducing software

SDOs and XENs were provided training in the use of Lotus 123 software in "Computer Division Engineering Applications". Please refer to Design/Rehabilitation and Monitoring and Evaluation for a list of the applications developed.

The following commercial software was introduced:

1.- Word Perfect v 5.0
2.- Lotus 1-2-3 v 2.1
3.- Dbase IV
4.- Harvard Graphics
5.- FORTRAN
6.- PASCAL
7.- XENEX Operating System
8.- Paint-Brush
9.- Micro-Soft Project
10.- Ventura
11.- Sideways
12.- Fast-Back
13.- Harvard Project Manager
14.- Networking Manuals
15.- SPSS

The following hardware was provided:

1.- Two IBM PS/2 80 model micro computers
2.- Eleven IBM PS/2 55SX model micro computers
3.- Two IBM 8513 color monitors
4.- Eleven IBM 8512 color monitors
5.- Thirteen Epson LQ-1050 printers
6.- Thirteen UPS Best
7.- Thirteen IBM keyboards
8.- One Data show system
9.- One Bernoulli tape back up
10.- One HP Laser Printer
11.- One plotter
12.- One Sketch Pro (digitizer)

- One Computer was provided to each of the three circle offices at Quetta, Sibi and Loralai on the renovation of computer rooms. All the computer offices are functioning. Two computers will be provided to Pat Feeder Circle and Khuzdar Circle after computer rooms are renovated.

Required staff has been trained for these offices. Computer Cell of Chief Engineer office is fully equipped with 12 computers and sufficient strength of trained staff supervised by a System Analyst is employed by the PID.

4. RECOMMENDATIONS

A. Design

- The Lotus 123 templates and macros developed during ISM-II should be used by PID for design to be carried out at division level.

- Continue training XENs and SDOs in design as well as in the use of micro-computers. Continue with simple software until confidence and skills are obtained, before moving into more sophisticated computer programs and languages.

- Develop own library of spreadsheet templates for design.

- Training to draftsmen concerning estimates preparation, basic engineering design and drafting should be emphasized.

- The use of design manuals developed by BMIADP and Halcrow-Ulg Ltd/Euroconsult consultants should be emphasized for small schemes. For non-routine designs, private consultants might be considered.

- Provide budget for in-country training at institutions such as PEA and WAPDA Academy.

- Continue and expand engineering design.

B. Operation and Maintenance

- The preparation of Annual O & M Work Plan should be started from first May every year and demand for next year finalized by fifteenth of June. The evaluation of last year performance should be completed by first of August by Superintending Engineers who should be made personally responsible for the Plan. The Executive Engineers are supposed to send the expenditure statement for the month of June by 15 of July every year. The SEs should fix a meeting of XENs in third week of July and finalize the work plan and submit to Chief Engineer after discussion of the provisions with him the following week.

- The yardsticks should be approved from the Finance Department. These shall be updated after every two years.

- Funds for the maintenance, repairs and operation of O & M Trial Equipment should be included in the Annual Work Plan.

- The collection of Abiana charges should be computerized. The PID Punjab with the support of ISM-II is working in the computerization of this activity. Their direction may be sought. The assessment of Abiana charges have been transferred from the District Administration to the Irrigation Department. The Revenue Staff and Engineers from SDOs to SEs should be provided Revenue Training. Rules for Canal Act, Balochistan need to be framed and approved.

C. Mechanical Workshop

- Continue Equipment Task Force meetings on quarterly basis.

- All the repairs and overhauling of equipment should be done by the Mechanical Circle. The personnel have been trained and are fully capable of performing at high standards.

- Budget should be provided to operate and maintain the workshop facilities.

- Annual work plans should be prepared, identifying needs. To prepare the plan, field visits to inspect the equipment should be conducted.

- Charts for maintenance have been developed in Urdu. It is recommended that they be used.

- Continue working in the implementation of Mainsaver, by training the SDOs.

- Continue with the training by proceeding to employ one or more trainers, sending workshop staff to the Technical Training Center in Quetta, and sending selected mechanics to the Construction Machinery Training Center in Islamabad.

D. Monitoring and Evaluation

- When hydraulic equipment arrives , ACOP shall ensure that adequate training has been provided for use of the equipment. The concerned Superintending Engineer should watch that trainees receive proper training.

- Implement the pilot hydraulic monitoring component of the project.

- Calibrate the gates in the main canals and headworks for discharge measurement.

E. Computerization

- Funds for maintenance and repairs and stationery for the computers should be included in "Annual O & M Work Plan".

- The System Analyst should have overall responsibility for proper operation and maintenance of the computer system. He, through Chief Engineer, should ensure allocation of adequate funds under M & R.

- The Computer Cell should continue conducting training for PID personnel, including XENs and SDOs.

5. ACCEPTABILITY AND SUSTAINABILITY

5.1 Design/ Rehabilitation

- The concept of central design office was welcomed but it could not be manned due to institutional and political constraints as Engineers would not join it. The PID decided to have the designs carried out at division level.

- The concept of standard designs are well accepted and use of their applications will be sustained by the PID. Same way PID would continue quality control of the repair and construction work.

5.2 Operation and Maintenance

- The concept of "Annual O & M Work Plan" is not welcomed by most of PID Staff and it may not be sustained.

- The use of O & M light equipment was not well accepted. The field officers and SEs had expressed in meetings that equipment is too light. The program is most likely not sustainable. At the end of the trial period the TA Team will make an evaluation.

5.3 Mechanical Workshop

- The overhaul program and use of equipment for construction were well accepted and are sustainable as long spare parts can be obtained.

- On the job training is accepted and is sustainable by the workshop, as they have recruited a full time trainer whose performance is outstanding.

- Mainsaver software was not welcomed and may not be sustained, unless special efforts are made by the Workshop XEN.

5.4 Monitoring and Evaluation

- The pilot hydraulic monitoring program was well accepted in Khirther Division and will be sustainable in this specific division where the XEN is keen in this kind of activities. It probably will not be sustainable in Pat Feeder and Sibi Divisions.

5.5 Computerization

- The computerization component was highly welcomed and is highly sustainable. The interest demonstrated by the clerks and draftsmen is exceptional.

5.6 Training

- The training program was welcomed. The in-country approach is sustainable but funding might prove to be a problem.

- Micro-computer training is highly accepted, there is a great demand for it from clerks and draftsmen. The Computer Cell will sustain training.

ANNEX A

MONTHLY MEMO STATING THINGS TO BE DONE

On March 12-15, 1990 a Start-Up Workshop for ISM-II Project was conducted. During this workshop, it was agreed the following:

> "... the PA prepares a monthly memo to the PC stating what needs to be done, based on his observations. This monthly report will include recommendations on how to solve problems. The report is based on conversations and cooperation of PC."

APRIL 1990

DESIGN

1) An effort should be placed to help Mr. Mirza Saeed Baig, Chief Design Engineer to set up his office, and to enroll the personnel needed in the new Design Cell.

OPERATION AND MAINTENANCE

1) The operation and maintenance plan for 1989-1990 should be reviewed, according to a conversation we had on March 28. I think the following should be analyzed:

   a) An analysis of the water available and the demand of water for irrigation for this particular year.
   b) Plan the water deliveries according to the analysis performed under (a)
   c) Plan the operations of the reservoirs, barrages, weirs and other hydraulic structures wherever is possible.
   d) Plan the data collection (this is part of Monitoring and Evaluation)
   e) A plan on the maintenance activities, including manpower, equipment, time and materials used for each task should be included.

MONITORING AND EVALUATION

1) Think about the hydraulic monitoring of some of the canals. Even though the hydraulic monitoring was originally planned for large systems, some of the small ones in Balochistan should also be monitored. Balochistan might need only one unit observing the canals. This unit could be under the Design Cell.

WORKSHOP AND EQUIPMENT

1) Up to date workload of all PID machinery/equipment/transport vehicles may be collected, which will prove the bases of preventive maintenance program, repair schedules, quarterly/yearly budgets of spare parts and expendable material like POL (Petrol Oil and Lubricants) can be forecast and status of machinery/vehicles will be available for MAINSAVER Executive Control.

2) Deficiency list of workshop machinery/accessories can be revised and up dated. The list will ultimately be handed to USAID for procurement after the scrutiny of Mr. Thomas Liston, TA Workshop and Equipment.

3) First year additional requirement of Quetta workshop was enumerated in Part I of Executive Summary, Recommendations of Management Study under ISM-I. The requirements or the amount suggested can be curtailed according to our present needs. TA Harza, Mr. Hameed will assist in this respect.

4) Overhauling of equipment/machinery is a priority work of ISM-II in Balochistan. To start with it is necessary to get full information, including present status of machinery and equipment. On collection of the information, overhaul program can be drafted and spare parts requirement can be assessed for procurement. It is suggested that a circular from SE office may be issued to complete this task within a month.
   Civil Departments/Divisions must indicate priority for equipment requiring overhaul, according to the project needs.
   Equipment utilization report can elaborate the projects and equipment awaiting repair, spare parts and/or overhaul.

5) A detailed training program have been drafted with the consultation of Mr. Qahir SDO Workshop. The copies are being forwarded to Islamabad/Lahore Harza offices for final check-up and adjustments. Any observations, omissions or requirements that have been ignored may kindly be brought to our attention.

6) Although more than 60% of the spare parts have been entered in MAINSAVER Inventory Control, the balance spare parts must be entered during the month of April 1990, as it will help in putting further demand for repair maintenance and overhaul program.

7) A workshop equipment training work plan has been drafted with the consultation of Mr. Abdul Qahir SDO Workshop, and has been submitted to Mr. Thomas Liston for checking and finalization. SE Mechanical can allot the priorities.
   (Detailed overhaul program will form part of this work plan after receipt of necessary information).

8) Workshop/Store Staff are reluctant to follow the prescribed procedures and avoid filling of forms. Besides an effective executive tool through MAINSAVER, it will lead to audit objections. Moreover in latter stage it will be quite impossible to trace the number of spare parts booked against the vehicle/equipment.
   TA Harza, Mr. Hameed is there to assist and guide the workshop staff.

9) In the Management Study Part I Executive Summary, Recommendations, annexes pages 71-77 by PRC/CHECCHI, a list of service and repair manuals of equipment available with PID Workshop Quetta were indicated. The manuals should be collected and placed in the Workshop Library. The manuals that are essential for service and repair if not available will be provided after tracing the PRC/CHECCHI records in Islamabad.

10) The vacancies need to be filled up by the induction of experienced staff. Personnel selected and recommended are awaiting orders from establishment secretariat. It should be expedited.

MAY 1990

DESIGN

1) An effort should be placed to help Mr. Mirza Saeed Baig, Chief Design Engineer to set up his office, and to enroll the personnel needed in the new Design Cell.

2) Since we are planning to hire a Design Engineer during this month, please assign some body to start collecting information about the design of the more common type of structures found in projects under ISM-II.

OPERATION AND MAINTENANCE

1) For the O&M annual plan meeting on May 13, please have ready a list of the works already performed during the fiscal year 1989-1990.

2) Also for the meeting, please have the literature followed by the PID in the preparation of O&M budgets.

MONITORING AND EVALUATION

1) Think about the canals that should and can be hydraulic monitored.
2) Think about how to develop monitoring and inspection capability in the PID.

WORKSHOP AND EQUIPMENT

1) Further to PC letter addressed to all Circle/Divisions of Balochistan, a program is being prepared to visit all divisions of Balochistan in May/June 1990 to inspect the vehicle equipment/machines for assessment of spare parts, establishing the status, recommending overhaul condition of unserviceable equipment and its disposal, checking of routine maintenance, advise equipment utilization and discuss related problems of repair, training, etc. A competent Sub-Engineer from the Workshop should accompany along with a mechanic to complete the mission.

2) As advised by Mr. Thomas Liston, T.A. Workshop and Equipment, at least four items of machine/equipment may be brought to the Workshop for correct estimation and spare parts requirements after closely inspection of the said items of machinery. Mr. Qahir, SDO Workshop has already worked on a dozer and the estimate is being typed. The remaining three may be completed during the month of May 1990.

3) Progress of entering the spare part list after staking and given allocation reference in MAINSAVER Computer Inventory have been completed 70 %. The remaining work may be completed in May 1990. For central store safety steel grills should be fixed in the ventilators as early as possible.

4) Major Hammed, TA Workshop and Equipment Quetta, visited Harza Islamabad office and collected 79 items of instructional manuals, catalogs, part lists and other related material which will be put in the Workshop Library along with the existing manuals, presently held in the Workshop Central Store and Inspection Office. Mr. Hammed may be given necessary assistance to establish this library, which will ultimately contribute to smooth running of the Workshop.

5) TA Harza Quetta office was completed with the laying of carpet and fixing of the AC. However MAINSAVER computers could not be shifted due to expected dust during a wall repair work which we expect USAID/Quetta to complete early this month. Once the room is ready, it is advisable to shift a micro-computer for executor control in the Workshop.

6) A program for service and maintenance of Quetta Circle/Division vehicles including Civil Circle office vehicles had been prepared for May 1990. The necessary POL and expendable material has been arranged, and it is hoped that with the cooperation of the officers concerned, the program will have a successful start.

JUNE 1990

DESIGN

1) We need to make a real effort this month to have the "Design Cell" adequately functioning. HARZA, through the Associated Consulting Engineers (ACE), has advertized the position of a Design Engineer and has also interviewed several candidates. I am optimistic that within two weeks our TA Design Engineer will be in Quetta.
Please request that the personnel already assigned take action. Also, please allocate personnel to all the positions sanctioned, for the smooth running of the cell.

2) I have been studying about the different field discharge measuring structures that will best suit the Balochistan schemes under ISM-II. The BMIDP Project has a couple of portable Cutthroat Flumes and a Broad Crested Weir near Quetta, which I would like to visit together because, the two of them are very easily constructed in the workshop and in the field, as well as easily calibrated. Either or both of these structures should be consider as a standard design in the Design Cell.

OPERATION AND MAINTENANCE

1) I personally feel that we are doing very well in this regard and, if all the Superintending Engineers bring to the June 13 meeting their 89-90 progress and expenditure report, we will have succeeded finalizing the preparation of the O&M Plan, as well as the training of the PID personnel in this concern. The meeting agenda clearly explains the other goals pursued in the topics related to the O&M.

MONITORING AND EVALUATION

1) I have learned that ACOP has been hydraulicaly monitoring some of the schemes under ISM-II. Unfortunately they do not keep the data here in Quetta, but in Lahore instead. I have also learned that ACOP has worked in the Pat Feeder Canal and I would assume that there is a report about it. Since ACOP is supposed to train PID personnel in this arena, we should start collecting their information, as well as becoming familiar with their work in the field. I would suggest to request them to inform the XENs the dates when they visit the ISM-II schemes and the XENs should work with them.
I would also like to suggest that a person is nominated to coordinate the training and smooth transition of hydraulic monitoring from ACOP to the PID.

2) As we discussed before, please collect information on the PID availability of current meters, field measuring discharge structures and gates, constrictions or any other structures calibrated to measure flowrates. These information will be very useful to plan the Hydraulic Monitoring Unit.

TRAINING

1) The TA Chief Design Engineer, Dr. Gene Thompson and my self, could give a course on selection and design of discharge measuring structures, as well as on the field calibration of these structures. Lets please discuss the possible dates and the subjects that should be covered.

WORKSHOP AND EQUIPMENT

1) The spare parts entered in MAINSAVER Program is about 90%. During a meeting in your office it was decided that the MAINSAVER computer be shifted to the workshop for its effective executive control. The recently renovated office by USAID for the TA Harza Quetta will be used for this purpose.

2) The library books/manuals/instructions and technical literature/report item 87 were received from Islamabad. Similar material had also been sorted out by Mr. Aslam, Store Keeper. Your goodself agreed to white wash the library room in the workshop and also to provide one bookshelf. A librarian in charge might also be nominated for its proper and smooth running.

3) Mr. Arbab Yousef, SE Mechanical, is now taking personal interest in workshop routine activities. Attendance and gate security has been tight. Workshop problems, management, and procurement are being supervised by Mr. Yousef. During his checking in the store, a pedestal grainder was uncrated and its being installed in the machine shop.

4) During Mr. Liston and Mr. Javed visit, the following was conducted:

a.- All the tools, instruments, accessories were laid down and a list made was forwarded to Mr. Liston for checking and further procurement. Another list indicating tools/accessories requirements of the fuel ignition laboratory and workshop machinery was also forwarded for early procurement.

b.- Mr. Liston asked the names of two skilled persons to be trained in Diesel Laboratory in MIW Lahore and six Diesel/Hydraulic Mechanics for a three months training in the Japanese Technical Institute in Islamabad. The letters to these effect have already been issued to the concerned offices.

c.- Mr. Liston was requested to send the Harza expert coming from the United States to Quetta Workshop after his arrival in Pakistan to impart training and prepare demand of additional workshop machinery/accessories.

d.- Mr. Liston informed us that Harza Mechanical Engineer, Mr. Abdul Qadir will come to Quetta for commissioning of Gleason Crankshaft rebuilt machine and to impart training to the workshop staff and workers.

e.- Mr. Liston asked the SE Mechanical to send him the list of spare parts required for overhauling four pieces of earth moving equipment. Assessment of spare parts for one Case Dozer had been made and sent to Mr. Liston for processing. Please arrange the remaining three spare parts list for procurement.

AUGUST 1990

1. **DESIGN**

An effort would be made to enroll the personnel needed in the new Design Cell. The existing personnel may start work on the assignment entrusted to the cell.

2. **OPERATION AND MAINTENANCE**

Information for Annual O&M work plans for the year 1990-91 has since been obtained from Superintending Engineers. It requested that the work plans may be sent to the F.C.C in the first week of August, 1990.

3. **MONITORING AND EVALUATION**

(i) ACOP has been hydraulically monitoring Nari Canal since January, 1990. It is requested that Executive Engineer, Sibi may keep Liaison with ACOP, Quetta so that his field staff accompanies during observations of the data. ACOP have to install Bench Marks and gauges which are required to be protected.

(ii) Information regarding available discharge measuring equipment, levelling/surveying instruments, field measuring structures, gates, constrictions or any other structures calibrated to measure flow rates may be collected. The demand for additional equipment may also be sent.

4. **COMPENDIUM OF YARD STICKS FOR O & M OF IRRIGATION SYSTEMS IN BALOCHISTAN.**

The compendium of yardsticks has already been sent to PID for comments and necessary action to get approval of Finance Department, Government of Balochistan. It is requested that action may be expedited to get it approved during the month.

5. **TRAINING OF WORKSHOP PERSONNEL**

Training of six workshop personnel is scheduled to be held in Japanese Technical Institute, Islamabad by the end of August, 1990. Arrangements are being made by our HARZA Islamabad office. It is requested that participation of candidates may be ensured even if the strike continues.

6. **COMMISSIONING OF CRANKSHAFT REBUILD MACHINE**

Mr. Liston deputed Mr. Ghulam Qadir Harza engineer from Lahore for commissioning of crankshaft rebuild machine. Workshop staff may be directed to provide manpower and other workshop facilities like electric and compressed air to complete the job. Training on this machine stands promised to be carried on during the month of August, 1990.

7. **WORKSHOP TECHNICAL LIBRARY**

Workshop technical library had been organized in HARZA office Mainsaver room. A Sub engineer in charge of the library may please be nominated to take over the books. Moreover manuals from Central Store are also required to be shifted to the library. An additional book rack and almirah is needed to stack the books.

8. **STRIKE OF WORKSHOP WORKERS**

Due to strike of workers some of the urgent works of overhaul equipment, spare parts lists, purchase of tools for which PIL had already been issued, sending of lubrication truck and workshop van to field units and inspection of Balochistan equipment/machinery and establishing the status thereof are pending. On calling off of the strike, these points may be expedited.

SEPTEMBER 1990

1. **DESIGN CELL**

It is requested that appointment orders of twelve Assistant Executive Engineers are being issued by PID as recommendations of Balochistan Public Service commission have since been received for their recruitment. It may therefore be ensured that two Assistant Design Engineers are posted in the Design Cell. An Executive Engineer may also be got posted in the Design Cell to work as Deputy Director Design.

2. **MONITORING AND EVALUATION**

(i) It was requested last month that Executive Engineer, Sibi Division must have close Liaison with ACOP who have been entrusted the job of Hydraulic Monitoring of Nari Canal but such Liaison does not exit. Request is made again for this activity.
ACOP was previously asked for monitoring of Nari Main canal. According to Mr. M.I. Chisti, Chief Advisor, WRS/ARD memo No. Nil dated August 20, 1990, monitoring of Kurak Branch shall also be done by ACOP. It is requested that Executive Engineer Sibi may be informed.

(ii) Information detailing available as well as additional demand for discharge measuring equipment, levelling/surveying instruments along with the data of field measuring structures, gates constrictions or any other structures calibrated to measure flow rates is being demanded since June, 1990 but it has not been received. It is requested that it should be sent in the first week of September at the latest.

3. **COMPENDIUM OF YARDSTICKS FOR O&M OF IRRIGATION SYSTEM IN BALOCHISTAN.**

As also requested last month, necessary action may be taken to get approval of the yardstick from Finance Department.

4. **TRAINING**

(i) TRAINING IN CALIBRATION OF STRUCTURES BY HARZA ENGINEERING COMPANY.

As discussed, it is proposed to train about ten personnel in discharge measurement/calibration of structures. The training shall be held at Quetta from 30th September to 3rd October, 1990. Nominations of proposed participants may be finalized accordingly and their attendance endured on the above dates.

(ii) TRAINING IN HYDRAULIC MONITORING BY ACOP

As discussed in the meeting held with ACOP on 12th August, ACOP will train Sub Engineers and Engineers in hydraulic monitoring as provided in the scope of work of the agreement. It is requested that nominations of suitable personnel may be finalized during the month and intimated to ACOP, USAID and this office.
Superintending Engineer Pat Feeder may also be requested to have close Liaison with ACOP who were to start the monitoring of UCH Dirty from August, 1990. The field staff must accompany ACOP personnel during measurements.

5. **WORKSHOP TECHNICAL LIBRARY**

We would like you to request the Computer Cell to write a data base computer program for the management and inventory of technical books and equipment manuals.

6. **WORKSHOP AND EQUIPMENT**

Please give instructions for the preparation of the lubrication trucks and send them to provide service to the existing equipment in the field.

NOVEMBER 1990

1. **DESIGN CELL**

Neither Design Engineer nor Assistant Design Engineers had been posted in the Design Cell so for. In order to arrive at some conclusion about the Design Cell, it has already been proposed to hold a meeting with the Secretary to Government in Irrigation and Power Department on 15th November, 1990. The meeting is proposed to be attended by Senior Officer of Provincial Irrigation Department and the Chief of Party HARZA Engineering Company will also attend the meeting.

2. **MONITORING AND EVALUATION**

ACOP has been making observations on UCH distributary since August, 1990 for "Detailed Data Collection ". It is essential that L- section of the channel should be observed by Provincial Irrigation Department and one copy supplied to this office during the month.

3. **COMPENDIUM OF YARDSTICK FOR O&M OF IRRIGATION SYSTEM IN BALOCHISTAN.**

Request is repeated for necessary action to get approval of the Yardstick from Finance Department.

4. **O & M PLAN**

It is proposed to hold one day O & M workshop at Quetta on 15th November, 1990. It is requested that Chief Engineer, all the Superintending Engineers and a few Executive Engineers will attend the workshop to decide the different aspects involved.

5. **EQUIPMENT/MACHINERY**

(i) An equipment workshop is scheduled to be held at Quetta on the 18-19 November, 1990 for which participation of all concerned may be ensured.

(ii) All field Divisions are supposed to bring complete machinery/equipment data which would ultimately help in planning repair and overhaul purposes and spare parts demand.

(iii) Mainsaver training is scheduled to be held on the 20-21st November, 1990. It is hoped that all concerned would be benefitted.

(iv) Ten courses for training of mechanics of workshop and operators in field are scheduled in the year 1991 in Japanese Technical Institute at Islamabad workshop. Nominations of personnel may be made for further processing.

(v) CAT truck Dozer D7G spare parts requirement may be finalized for onward submission to USAID for PIL.

(vi) Tools/accessories may be purchased against the sanctioned PIL in November.

(vii) Crankshaft rebuild machine would be commissioned in November and workers would be imparted training.

DECEMBER 1990

1. **DESIGN CELL**

Request is again made; that , Design Meeting, scheduled for December 10, 1990 at 13.30 hrs in the Conference Room is attended by the following officers of Irrigation Department:-

Secretary, Irrigation
Chief Design Engineer
Superintending Engineers
Senior Executive Engineers

Agenda for the meeting has been supplied to your office vide this office memorandum dated November 25, 1990.

Mr. Jim C. Ringenoldus, Harza Chief of Party, Dr. Gene Thompson, Harza Chief Design Engineer and a USAID Senior Official shall be attending the meeting.

2. **MONITORING AND EVALUATION**

a) As also requested last month, one copy of long section Uch Distributary as observed by Provincial Irrigation Department may kindly be supplied.

b) ACOP will conduct training with effect from December 11, 1990 in MONITORING AND EVALUATION Participation of maximum number of official/officers may be ensured.

3. **COMPENDIUM OF YARDSTICKS FOR O&M OF IRRIGATION SYSTEM IN BALOCHISTAN**

It was promised by Provincial Irrigation Department that Yardstick shall be sent to Finance Department for approval. Status of its approval may be intimated.

4. **ANNUAL O&M PLAN**

It is essential that ,Workshop on O&M Planning scheduled for 3-4 December 1990 at Rawalpindi is attended/participated by four Senior Officers of PID viz Secretary Irrigation, Chief Engineer and two Superintending Engineers.

5. **IN SERVICE TRAINING**

Four days training in Design of Irrigation Structure etc, was imparted during October, 1990 to seven engineers of PID. Next course of training in Design of Small Channels is proposed to be held from December 11 to 13, 1990. It is requested that about 12 Engineers may attend this training.

6. **MICRO COMPUTER TRAINING**

Mr. Adil Hasni, Harza Training Specialist will conduct 3 days training from 16 to 18 December, 1990 at Quetta. Main objective of the course is to familiarize the Computer Cell personnel with the use of Plotter. Computer cell may be advised for the same.

7. **WORKSHOP EQUIPMENT**

Workshop and field divisions should nominate the personnel for ten courses of 3-5 months duration being held at Japanese Training Institute Islamabad during the year, 1991.

All the field division should send us through the Provincial Coordinator full information about the equipment and machines working under them, for planning of spare parts and overhauling.

Mr. Liston, Equipment and Workshop Advisor, Harza will arrange team for commissioning of Crankshaft rebuild machine and on the job training. Please advise the workshop personnel to make the arrangements.

Necessary actions are expected from all the concerned on the agreement and decision taken in Equipment/Workshop. workshop held on 18-19 November, 1990. We will submit the report in the third week of December, 1990

JANUARY 1991

1. **DESIGN CELL**

Meeting regarding Design Cell was held on 18th December, 1990. Further action in this behalf may kindly be finalized during January, 1991.

2. **MONITORING AND EVALUATION**

L Section and X Section of UCH Distributary are to be observed by Provincial Irrigation Department for redesigning this problematic channel. Request for the same was made in the memorandum of November and December, 1990. ACOP has since taken number of hydraulic observations. It is, therefore, essential to observe the L section and x sections and supply one set to T.A. team in January, 1991. Geometry, sill level and working head of each outlet shall also be observed along with L section by Provincial Irrigation Department.

3. **GENERATOR**

A generator was received in December, 1990. It may kindly be installed.

4. **COMPENDIUM OF YARDSTICK FOR O & M OF IRRIGATION SYSTEM IN BALOCHISTAN.**

Steps may be taken to get approval of the yardstick from Finance Department.

5. **EQUIPMENT/WORKSHOP**

i) Nomination of workshop personnel for ten (10) courses of operators and mechanics is still to be forwarded to Islamabad for the training which is likely to start in March, 1991.

ii) Commissioning and on the job training on crankshaft rebuild machine would be arranged by the Lahore HARZA office.

iii) Equipment workshop reports already vetted by Provincial Coordinator and Mr. Thomas A. Liston, having been printed at Islamabad would be circulated shortly to the participants from all the Divisions and Circles. It is expected that implementation on the agreements would start immediately.

iv) A request for PIL to USAID would be made for purchases/procurement of spare parts for D7G dozer standing in the workshop.

v) A working paper suggesting the activation of workshop, on the job training and commissioning of workshop machinery would be forwarded to HARZA/USAID for approval.

vi) Utilization of lubrication truck and site repair of equipment by mobile workshop van would start functioning in January, 1991.

vii) Purchase of tools for which PIL had already been sanctioned may be completed in January, 1991 to activate workshop effectively.

viii) Workshop machinery may be commissioned by purchasing the necessary tools/accessories either by PIL already sanctioned or funds arranged by Government of Balochistan.

ix) Translation in Urdu of operation and service manuals are under preparation in Lahore office. On receipt of it will be circulated to all concerned by HARZA office.

x) Planning of future requirements of spare parts, major/minor assemblies for next three years for Balochistan Equipment.

FEBRUARY 1991

1. **DESIGN CELL**

Meeting regarding Design Cell was held on 18th December, 1990. Further action by Provincial Irrigation Department may kindly be finalized if not done so far and intimated.

2. **REDESIGN OF UCH DISTRIBUTARY**

Request was made to observe (i) L - Section (ii) X -Section (iii) Geometry, sill level and working head of each outlet during the month of January, 1991. One set of observations may kindly be supplied.

3. **WORLD BANK REVIEW MISSION NOVEMBER 4 TO DECEMBER 6, 1990 AIDE MEMOIRE.**

Action may kindly be taken on Chief Resident Mission, World Bank memo dated December, 23 1990 as requested vide this office memo No.126 dated January 13, 1991.

4. **GENERATOR**

The generator received in December, 1990 may kindly be installed.

5. **EQUIPMENT/WORKSHOP**

(i) Purchase of tools for which PIL had already been issued may be completed to activate workshop.

(ii) Workshop machinery may be commissioned by purchasing the necessary tools/accessories either under PIL already issued or funds arranged by Government of Balochistan.

(iii) Mr. Said Mohammad Mechanic shall report in "Construction Training School, Islamabad " on February 2, 1991 for 5 months training in "CHASSIS COURSE". He should reach Islamabad on February 1st, 1991.

MARCH 1991

1. **WORLD BANK**

It is suggested that action may kindly be taken on Chief Resident Mission World Bank memo dated December 23, 1990 as requested vide this office memo No. 126 dated January 13, 1991

2. **DESIGN CELL**

Decision of the Government regarding Design Cell in lieu of meeting held on 18th December, 1990 may kindly be informed.

3. **GENERATOR**

It is requested that Generator may kindly be installed in office compound.

4. **WORKSHOP/EQUIPMENT**

(i) Report on equipment/workshop held on 18th November, 1990 already circulated to all participants. It is suggested that action on the agreement may be taken accordingly.

(ii) Some date for quarterly equipment Task Force meeting may be fixed after month of Ramzan, by that time Mr. Carlos and Mr. Liston can attend.

APRIL 1991

1. **WORLD BANK REVIEW MISSION NOVEMBER 4 TO DECEMBER 6,1991**
AID MEMOIRE

It is suggested that action may kindly be taken on Chief Resident Mission World Bank memo dated December 23, 1990 as requested vide this office memo No. 126 dated January 13, 1991.

2. **DESIGN CELL**

Decision of the Government regarding Design Cell in lieu of meeting held on 18th December, 1990 may kindly be informed.

3. **GENERATOR**

It is requested that Generator may kindly be installed in office compound.

4. **EQUIPMENT/WORKSHOP**

Report on equipment/workshop held on 18th November, 1990 already circulated to all participants. It is suggested that action on the agreement may be taken accordingly.

Some date for Quarterly Equipment Task Force meeting may be fixed in May, 1991. Mr. Liston may like to attend.

JULY 1991

1. ANNUAL O & M PLAN

Evaluation of Annual O & M plan 1990-91 and preparation of O & M Plan 1991-92 is requested to be finalized. The TA Team will be available for maximum support both in the field and in Quetta.

2. DESIGN OF REMODELLING OF UCH DISTRIBUTARY.

The scheme has been returned to Superintending Engineer, Pat Feeder Circle who may take necessary action and resubmit it to NESPAK. A letter with comments regarding common design practices was sent to Superintending Engineer, Pat Feeder. The T A team along with Resident Engineer, NESPAK will be available any time convenient to Executive Engineer/Superintending Engineer for discussion and technical support.

3. RENOVATION OF THE MICRO-COMPUTER ROOMS

The micro-computer rooms need to be completed before we can start training personnel.

4. TRAINING

The FY-1991, Participant Training Plan has already been circulated. Please prepare the list of names of the candidates for training.

AUGUST 1991

1. ANNUAL O & M PLAN

Evaluation of annual O&M plan 1990-91 and preparation of O&M plan 1991-92 is requested to be finalized. The TA team will be available for maximum support both in the field and in Quetta.

2. DESIGN OF REMODELLING OF UCH DISTRIBUTORY

The scheme has been returned to Superintending Engineer, Pat Feeder Circle who may take necessary action and resubmit it to NESPAK. A letter with comments regarding common design practices was sent to Superintending Engineer, Pat Feeder. The T A team alongwith Resident Engineer, NESPAK will be available any time convenient to Executive Engineer/Superintending Engineer for discussion and technical support.

3. TRAINING

(i) ACOP has scheduled two courses in Hydraulics and Sediment Monitoring of Allivial Channels. Please advise them of the place (Dera Murad Jamali/Sibi) where it should be conveyed. Please also select the candidates for the training.

(ii) Please select the course to be conveyed to Sub Engineer, regarding "Survey and Estimation Course " and intimate the decision to the Federal Coordinator.

SEPTEMBER 1991

1. **ANNUAL O & M PLAN**

Evaluation of annual O & M Plan 1990 and preparation of O & M Plan 1991-92 is requested to be finalized after obtaining last years expenditure. This may be sent to NESPAK by September 15, 1991 for its submission to World Bank by September 30th, 1991. The T.A team will continue to be available for maximum support.

2. **RENOVATION OF COMPUTER ROOMS**

The Micro Computer Rooms need to be completed before we can start the training of personnel. It was planned to start training this month.

3. **GENERATOR**

The generator needs to be installed before we can start Computer Training.

4. **TRAINING**

ACOP had scheduled two courses in Hydraulics and Sediment Monitoring of Alluvial Channels. Please advise them of the place (Dera Murad Jamali/Sibi) where it should be conveyed. Please also select the candidates for the training.

OCTOBER 1991

1. Annual O&M Plan.

   The Plan has been compiled last month. It may be sent to NESPAK for review and then passed to the World Bank.

2. Renovation of Computer Rooms.

   The computers have arrived to Quetta more than nine months ago, please complete the renovation of the rooms.

3. Generator.

   The winter season is coming and with the winter the "load shedding". Please have the generator installed.

4. Training.

   (a) You are to nominate five Sub Engineers for training at the Punjab Engineering Academy. The training is a refresher course in surveying.

   (b) The SE Pat Feeder has nominated eight people for training in "Hydraulic and Sediment Monitoring" to be conducted by ACOP at Dera Murad Jamali. The total number of trainees is to be 15 (10 sub-engineers and 5 junior engineers) who may be nominated.

5. Monitoring and Evaluation.

   Pre rehabilitation M&E on Sibi and Kurak Branches of Nari Canal System is near completion. It is imperative to complete its rehabilitation by March 92 in order to be able to carry out the post rehabilitation program. This aspect needs special attention of PID

6. Design and Rehabilitation Progress.

   It was suggested by Dr. Jan Emmert that a progress report of the schemes under ISM/ISRP should be presented the same day the Equipment Task Force meets. Please advise the SE's regarding this subject.

7. Workshop and Equipment.

   On September 24 it was agreed that the next Equipment Task Force Meeting was going to be held the third week of October. Please fix the date and let us know about it.

NOVEMBER 1991

1. Renovation of Computer Rooms.

The computers have arrived to Quetta more than ten months ago, please complete the renovation of the rooms.

2. Generator.

It is hoped that Generator room shall be completed by middle of this month as "load shedding" might start .

3. Training.

(a) Punjab Engineering Academy shall conduct training in "Operation & Maintenance" from Nov 23 to 5 Dec, 1991. Nominations of five SDOs/XEns may please be intimated at the earliest to Principal P.E.A., Lahore with copy to Mr Adil Hassni & this office.

(b) The SE Pat Feeder has nominated eight people (seven Sub Engineers & one XEn) for training in "Hydraulic and Sediment Monitoring" to be conducted by ACOP at Dera Murad Jamali. The total number of trainees is to be 15 (10 sub-engineers and 5 junior engineers) who may please be nominated.

4. Monitoring and Evaluation.

Pre rehabilitation M&E on Sibi and Kurak Branches of Nari Canal System is near completion. It is imperative to complete its rehabilitation by March 92 in order to be able to carry out the post rehabilitation program. This aspect needs special attention of PID

5. Design and Rehabilitation Progress.

The Equipment Task Force meeting is being held on Nov 12 ,1991. It is requested that S.E.s will also present Progress Report of ISRP/ISM Schemes in the meeting. Please advise the SE's regarding this subject.

6. Workshop and Equipment.

Dr. Jan Emmert and Mr Muzammil Qureshi, from USAID as well as Mr. Jim Ringenoldus and Mr. Tom Liston from Harza will be coming to attend the Equipment Task Force meeting on November 12. Please inform the SEs regarding this meeting.

DECEMBER 1991

1. Renovation of Computer Rooms.

The computers have arrived to Quetta almost a year ago, please complete the renovation of the rooms. Training Program is held up.

2. Generator.

It is hoped that Generator room shall be completed by middle of this month as "load shedding" might start.

3. Training.

(a) Punjab Engineering Academy shall conduct training in "Design Strategy " from March 07-19 , 1992. Nominations of five SDOs/ XENs may please be intimated to Principal P.E.A. Lahore with copy to Mr Adil Hasni & this office.

(b) Pakistan Institute of Management will conduct Training Course in "Effective Letters, Reports and Presentations" at Lahore from 28, December, 1991 to 02 Jan, 1992. It is requested that nomination of one XEN/ SDO may be intimated to Mr Adil Hassni with copy to this office at an early date.

(c) The SE Pat Feeder has nominated eight people (seven Sub Engineers & one XEN) for training in "Hydraulic and Sediment Monitoring" to be conducted by ACOP at Dera Murad Jamali. The total number of trainees is to be 15 (10 sub-engineers and 5 junior engineers) who may please be nominated.

(d) Computer Training as per attached "Training Plan"is proposed to be started as soon as Computer rooms renovation work is completed.

4. Monitoring and Evaluation.

Pre rehabilitation M&E on Sibi and Kurak Branches of Nari Canal System is near completion. It is imperative to complete its rehabilitation by March 92 in order to be able to carry out the post rehabilitation program. This aspect needs special attention of PID.

5. Workshop and Equipment

Dr. Jan Emmert and Mr Muzammil Qureshi, from USAID and Mr. Tom Liston from Harza will attend the Task Force meeting on December 8. All the SEs of PID will attend the meeting.

6. Design and Rehabilitation Progress.

The Equipment Task Force meeting is being held on December 8 ,1991. It is requested that Ses will also present Progress Report of ISRP/ISM Schemes in the meeting. Please advise the SE's regarding this subject.

7. O&M Trial Equipment Seminar & Training Activities.

The Seminar will be held at Quetta on December 9, 1991. It is requested that it shall be attended by Chief Engineer, P.C., SE Pat Feeder, XEN Pat Feeder, SDOs Pat Feeder ,Dera Allah Yar, Ustah Mohammad, Hairdin Sub Divisions & Sub Engineers of these four sub Divisions.

JANUARY 1992

1. Renovation of Computer Rooms.

Training of clerks and draftsmen in the Chief Engineer's Building computer training room has started. The training will be completed by February 16, when the computers should be installed in the computer field offices. Please remind the concerning circles regarding the renovation of the computer rooms.

2. Generator.

It is hoped that Generator shall be installed by middle of this month as "load shedding" has started.

3. Training.

(a) The SE Pat Feeder has nominated eight people (seven Sub Engineers & one XEN) for training in "Hydraulic and Sediment Monitoring" to be conducted by ACOP at Dera Murad Jamali. The total number of trainees is to be 15 (10 sub-engineers and 5 junior engineers) who may please be nominated.

4. Monitoring and Evaluation.

Pre rehabilitation M&E on Sibi and Kurak Branches of Nari Canal System is near completion. It is imperative to complete its rehabilitation in order to be able to carry out the post rehabilitation program. This aspect needs special attention of PID.

5. O&M Monitoring of Trial Equipment.

Please advise Pat Feeder Circle regarding our visit the second week of this month for monitoring the use of the O&M Trial Equipment.

FEBRUARY 1992

1. Renovation of Computer Rooms.

Computer training of clerical staff in the Chief Engineer's Building computer training room has started and will be completed on February 16. It is therefore, that computer rooms should be ready in the Circle Offices of Sibi and Loralai by this date. Please remind the concerned circles to renovate the computer rooms by the above date.

2. Redesign of Uch Canal

The design of Uch Canal has to be completed at the earliest for submission of the schemes to IDA. The field data pertaining to outlets/structures is being verified by field staff. The SE/XEN may kindly complete the observations of field data at the earliest.

3. Generator.

It is hoped that Generator shall be installed by middle of this month as "load shedding" has started.

4. Training.

The SE Pat Feeder has nominated eight people (seven Sub Engineers & one XEN) for training in "Hydraulic and Sediment Monitoring" to be conducted by ACOP at Dera Murad Jamali. The total number of trainees is to be 15 (10 sub-engineers and 5 junior engineers) who may please be nominated.

5. Monitoring and Evaluation.

Pre rehabilitation M&E of Nari Canal System has been completed. It is imperative to complete the rehabilitation work of Nari Canal system in order to be able to carry out the post rehabilitation program. This aspect needs special attention of PID.

6. O&M Monitoring of Trial Equipment.

Please advise Pat Feeder Circle regarding our visit in the third week of this month for monitoring the use of the O&M Trial Equipment.

APRIL 1992

1. Renovation of Computer Rooms.

One batch of clerical staff has already been trained in the Chief Engineer's Building computer training room and the second batch is already being trained . It is therefore essential, that computer rooms should be fully operational in the Circle Offices of Sibi, Loralai and Quetta this month. Please remind the concerned circles to complete renovation of the computer rooms.

As we have previously discussed, please have the computer tables delivered in the Circle Offices.

An air conditioner needs to be installed in the Loralai Computer Room.

2. Redesign of Uch Canal

The design of Uch Canal has been finalized on March 9, 1992, in joint discussion held among PID, NESPAK and TA Team. The scheme may be prepared by the field staff as early as possible and submitted to The World Bank through NESPAK.

3. Generator.

It is hoped that Generator shall be installed by middle of this month as "load shedding" continues.

4. Training.

The SE Pat Feeder has nominated eight people (seven Sub Engineers & one XEN) for training in "Hydraulic and Sediment Monitoring" to be conducted by ACOP at Dera Murad Jamali. The total number of trainees is to be 15 (10 sub-engineers and 5 junior engineers) who may please be nominated.

5. Monitoring and Evaluation.

Pre rehabilitation M&E of Nari Canal System has been completed. It is imperative to complete the rehabilitation work of Nari Canal system in order to be able to carry out the post rehabilitation program. This aspect needs special attention of PID.

6. O&M Annual Plan 92-93.

The SEs may be remained to supply the information needed immediately. We will be available for discussion in order to institutionalize the operation and maintenance of the systems.

MAY 1992

Now that the curfew is being relaxed, the main items I would like to suggest we emphasize this month are the following:

1. Renovation of Computer Rooms.

   One batch of clerical staff has already been trained in the Chief Engineer's Building computer training room and the second batch is already being trained . It is therefore essential, that the Quetta computer room should be fully operational this month. Please remind the concerned circle to complete the electrical work in order to install the computers.

   An air conditioner needs to be installed in the Loralai Computer Room.

2. Generator.

   It is hoped that Generator shall be installed this month.

3. Training.

   The SE Pat Feeder has nominated eight people (seven Sub Engineers & one XEN) for training in "Hydraulic and Sediment Monitoring" to be conducted by ACOP at Dera Murad Jamali. The total number of trainees is to be 15 (10 sub-engineers and 5 junior engineers) who may please be nominated.

   Five officers among XENs and SDOs need to be nominated for training in "Operation and Maintenance of Canal Systems", to be held at the Punjab Engineering Academy. The course will be conducted from May 30 till June 11.

4. Monitoring and Evaluation.

   Pre rehabilitation M&E of Nari Canal System has been completed. It is imperative to complete the rehabilitation work of Nari Canal system in order to be able to carry out the post rehabilitation program. This aspect needs special attention of PID.

5. O&M Annual Plan 92-93.

   The SEs may be remained to supply the information needed immediately. We will be available for discussion in order to institutionalize the operation and maintenance of the systems.

JUNE 1992

1. Renovation of Computer Rooms.

Now that all computer rooms have been renovated, you might want to request USAID/Islamabad for the reimbursement of Rs.81,450.00 (Rs.27,150 for each computer room) for the rehabilitation expenses incurred in Loralai, Sibi and the Chief Engineer's Building. Please submit the reimbursement request for PIL # 264 dated September 04, 1990, through the Federal Coordinator, Mr. Usmani.

I would like to point out that an air conditioner still needs to be installed in the Loralai Computer Room.

2. Training.

Hydraulic and Sediment Monitoring.

The SE Pat Feeder has nominated eight people (seven Sub Engineers & one XEN) for training in "Hydraulic and Sediment Monitoring" to be conducted by ACOP at Dera Murad Jamali. The total number of trainees is to be 15 (10 sub-engineers and 5 junior engineers) who may please be nominated.

Computer training for clerks and draftsmen.

As you already know, the TA Team with the support of the PID Computer Cell have conducted two courses of two months duration each, regarding DOS, Word Perfect and Lotus. It is suggested that 6 more gentlemen are nominated for training in the fore mentioned subjects, being one from each circle. The training will commence on July 11 and will continue until September 10.

3. Monitoring and Evaluation.

Pre rehabilitation M&E of Nari Canal System has been completed. It is imperative to complete the rehabilitation work of Nari Canal system in order to be able to carry out the post rehabilitation program. This aspect needs special attention of PID.

4. O&M Annual Plan 92-93.

The material supplied by some of the SEs is missing some information in the last three columns (Funds allocated 1991-1992; Repairs executed as on 30-06-92; and remarks) of the Annual O&M pro-forma. This month they might have the information available, which might kindly be forwarded to us. We will be available for discussion in order to institutionalize the operation and maintenance of the systems.

5. Workshop and Equipment.

Please remind the SEs regarding the Equipment Task Force Meeting to be held on June 17 at 9:00 am at the Chief Engineers Office.

JULY 1992

1. Renovation of Computer Rooms.

I would like to point out that an air conditioner still needs to be installed in the Loralai Computer Room.

2. Construction Rehabilitation.

The construction work of Verchume Storage Dam needs special attention, as was emphasized by USAID/ISM-II Project officer, Mr. Muzammil Qureshi on a letter to the Irrigation Secretary, dated May 18, 1992, attached for your convenience.

The rehabilitation works of Saliaza Weir also needs special attention, because as I understand, the construction is still to commence. As you know in order to be reimbursed by USAID, the civil works must be completed before the end of the project. Please refer to a letter from Mr. Qureshi to Mr. Usmani, dated June 7, 1992 "Reimbursement Under Project Implementation Letters" of which you were addressed a copy.

3. Monitoring and Evaluation.

Pre rehabilitation M&E of Nari Canal System has been completed. It is imperative to complete the rehabilitation work of Nari Canal system in order to be able to carry out the post rehabilitation program. This aspect needs special attention of PID.

4. O&M Annual Plan 92-93.

The material supplied by some of the Ses is missing some information in the last three columns (Funds allocated 1991-1992; Repairs executed as on 30-06-92; and remarks) of the Annual O&M pro-forma. This month they might have the information available, which might kindly be forwarded to us. We will be available for discussion in order to institutionalize the operation and maintenance of the systems.

From July 18 until the end of the month, Mr. Majid Chaudhry and my self will visit the field offices to discuss with the Ses and XENs the preparation of the O&M Plan.

5. Workshop and Equipment.

Please remind the Ses regarding the Equipment Task Force Meeting to be held on July 22 at 9:00 am at the Chief Engineers Office.

AUGUST 1992

1. Renovation of Computer Rooms.

The Federal Coordinator, Mr. Usmani has agreed to have transferred the budget for the renovation of two computer rooms in Balochistan. I would like to remind you that the budget allocated is Rs.27,150.- for each room. Please advise the concerned SEs to immediately start with the renovation work, because as you already know, it needs to be completed before the end of October, when I leave the project. Also, the contract of EGS, the company hired for the installation of the computers, is soon to be expired. Please find enclosed the "Check list for reimbursement inspection" form, devised by USAID.

The air conditioners will be delivered once I inspect the renovation works.

2. Construction Rehabilitation.

The USAID/ISM-II Project Officer, Mr. M. Qureshi, would like to inspect the construction work of Verchume Storage Dam on August 13. He would like you to accompany him in order to exchange opinions in relation to this scheme.

3. Monitoring and Evaluation.

Pre rehabilitation M&E of Nari Canal System has been completed. It is imperative to complete the rehabilitation work of Nari Canal system in order to be able to carry out the post rehabilitation program. This aspect needs special attention of PID.

4. O&M Annual Plan 92-93.

We have visited and obtained the data from most of the Divisions, which have been forwarded to the PID Computer Cell for processing. We will be available for discussion in order to institutionalize the operation and maintenance planning exercise.

5. Workshop and Equipment.

Please remind the SEs regarding the Equipment Task Force Meeting to be held on August 12 at 9:00 am at the Chief Engineers Office.

6. O&M Trial Equipment.

We have visited Dera Murad Jamali on July 20-22 in connection also with the monitoring of the O&M Trial Equipment. The XEN Pat Feeder did not have the data for the month of June because they were busy on a breach work in Pat Feeder Canal. Please remind the concerned XEN to kindly send us the data.

SEPTEMBER 1992

1. Renovation of Computer Rooms.

Please advise the concerned SEs that the third week of September, we plan to visit their offices for inspection of the renovation work, because as you already know, it needs to be completed before the end of October, when I leave the project. Please emphasize the importance of the electrical wiring, specially the earth (ground) connection, which was the major problem we had in the other circles.

2. Monitoring and Evaluation.

Pre rehabilitation M&E of Nari Canal System has been completed. It is imperative to complete the rehabilitation work of Nari Canal system in order to be able to carry out the post rehabilitation program. This aspect needs special attention of PID.

3. O&M Annual Plan 92-93.

The data received from the Divisions, is being processed by the PID Computer Cell. We estimate that the work will be completed by September 5. The demand of funds and expenditure during last year need to be approved by PID. The plan may be sent early to NESPAK for review and then forwarded to the World Bank before the end of the month.

We will be available for discussion in order to institutionalize the operation and maintenance planning exercise.

4. O&M Trial Equipment.

We have visited Dera Murad Jamali on July in connection also with the monitoring of the O&M Trial Equipment. The XEN Pat Feeder did not have the data for the month of June because they were busy on a breach work in Pat Feeder Canal. During the month of August there were floods, which unable us to visit the Circle Headquarters. At this point we do not have data corresponding to the last three months. Please remind the concerned XEN to kindly send us the data.

5. ACOP Hydraulic Monitoring Training.

ACOP will conduct training the latter part of the month of October, regarding hydraulic and sediment monitoring. The training will take place in Usta Mohammad and 15 trainees between SDOs and sub-engineers need to be nominated. I will inform you the details as soon as I have them.

OCTOBER 1992

As you already know, this is my last monthly memo, as I will leave the project at the end of this month.

1. Renovation of Computer Rooms.

   Please advise the SE Pat Feeder to inform us as soon as the computer room is ready. We will inform Mr. Shamim from USAID/Karachi for inspection of the renovation work. Please emphasize the importance of the electrical wiring, specially the earth (ground) connection, which was the major problem we had in the other circles.

2. Monitoring and Evaluation.

   Pre rehabilitation M&E of Nari Canal System has been completed. It is imperative to complete the rehabilitation work of Nari Canal system in order to be able to carry out the post rehabilitation program. This aspect needs special attention of PID.

3. O&M Annual Plan 92-93.

   The plan may be sent to NESPAK for review and then forwarded to the World Bank before the end of the month. We are already beyond the dead line.

4. O&M Trial Equipment.

   We have requested the XEN and SDO Pat Feeder Division for the data regarding the O&M Trial Equipment numerous times. The XEN Pat Feeder did not have the data for the month of June because they were busy on a breach work in Pat Feeder Canal. During the month of August and September there were floods, which unable us to visit the Circle Headquarters. At this point we do not have data corresponding to the last four months. Please remind the concerned XEN to kindly send us the data before the end of the month.

5. ACOP Hydraulic Monitoring Training.

   ACOP will conduct training the latter part of the month of October, regarding hydraulic and sediment monitoring. The training will take place in Usta Mohammad and 15 trainees between SDOs and sub-engineers need to be nominated. I will inform you the details as soon as I have them.

6. Transfer of ISM-II Property.

   Please send the request for transferring ISM-II equipment and household effects to the Federal Coordinator with a copy to me as soon as possible. I have already submitted to you a copy of the inventory and a draft of the request for ISM-II office equipment and furniture.

ANNEX B

SPREADSHEET STANDARD DESIGN SAMPLES

Samples of the standardization efforts are presented:

1.- Spreadsheet template for the design of Sarda Falls for discharges larger than 15 cumecs (530 cusecs).

2.- Spreadsheet macro (program) for the solution of Manning's equation. Newton-Secant Method was used for the solution of implicit equations, as is the case with Manning's equation.

HARZA/USAID - PID BALOCHISTAN

CAG/92

SARDA TYPE VERTICAL FALL

FLOWS LARGER THAN 15 CUMECS (530 CUSECS)

English System --> L = feet T = Seconds F = Pounds
International System --> L = Meters F = Kilo-force

Refer to: Irrigation & Water Power Eng. by B.C.Punmia & Pande B.B.Lal pg.723

$Q = 0.449*(2*g)^0.5*Bcrt*H^1.5*(H/Lcrt)^(1/6)$

The author, Harza and USAID accept no responsibility. Use it for training purposes only.

L = B1
E = H + V^2/2g
h = D1 + V^2/2g - H
d = h + HL
B = 0.55*(d+H)^0.5
B1 = L+(d+x)*(1/3+1/8)
Ruww = 5 to 6 *H
b = See Khosla's Equation -->
Ld = 2*(D1+k1) + HL
ES k1=4 ft; SI k1=1.2 m
Lu = b - Ld
Lc = 5*(E*HL)^0.5
x = k2*(E*HL)^(2/3)
ES k2=0.25; SI k2=0.17
Ldbp = 1.3*k3*e^(2.1*H/k3)
ES k3=3.28; SI k3=1.
g = Gravity (ES= 32.2 ft/s^2; SI= 9.8 m/s^2)
Gamma w = Water Weight (F/L^3)
Gamma c = Concrete Weight (F/L^
Ftk u/s = Floor thicknes u/s (L) (0.3 to 0.4 m)
Ftk d/s = Floor thicknes d/s (L) (0.4 to 0.6 m)
fb = Free Board (L)
d2 = Height d/s Cutoff Wall (L)
d1 = Height u/s Cutoff Wall (L)
P = Static Pressure Head (L)

Q = Discharge (L^3/T)
L1 = Bottom With Upstream (L)
D1 = Water Depth Upstream (L)
L2 = Bottom With Downstream (L)
D2 = Water Depth Downstream (L)
m = Channel side slope
H = Head Over Crest (L)
L = Crest Lenght (L)
HL = Hydraulic Drop (L)
h = Height of Crest Above Upstream Bed Level (L)
d = Height of Crest Above Downstream Bed Level (L)
B = Crest Width (L)
B1 = Crest Bottom Width (L)
Ruww = Upstream Wing Wall Radius (L)
b = Total Floor Lenght (L)
Ld = Impervious Floor Length d/s of toe crest wall (L)
Lu = Impervious Floor Length u/s of toe crest wall (L)
Lc = Length of Cistern (L)
x = Depth of Cistern (L)
Ldbp = Length of Downstream Bed Pitching (L)
Lwarp = Warped Wings d/s (L)
Ywarp = Projection Warp Wing (L)
T = Floor Thickness (L)

-------- Khosla's Equation -------

Ge = H/(π*d*F^0.5)
Ge = Exit Gradient
H = Head difference accros the structure (d)
d = Depth of d/s cutoff (d2)
F = 0.5*(1+(1+(b/d)^2)^0.5)

Khosla's Recommended Safe Exit Gradient

Very fine sand or silt	7.5
Fine sand	6.5
Medium sand	6
Coarse sand	5.5
Fine gravel	5.5
Medium gravel	5.5
Coarse gravel including cobbles	5.5
Boulders with some cobble and gravel	5.5
Soft Clay	3
Medium clay	3
Hard clay	2.5
Very hard clay or hardpan	2

FREE OVERFALL FLOW

Input

Q =	50
HL =	1.5
L1 =	30
D1 =	2
L2 =	30
D2 =	2
m =	1
g =	9.81
1:Khosla	4.5
fb =	0.5

-*- Trial & Error -*-

Ftk u/s =	0.4
Ftk d/s =	0.6
d1 =	1
d2 =	1.7 <--

Output

L =	30.00
H =	0.90
E =	0.93
h =	1.10
d =	2.60
B =	1.03
B1 =	2.51
Ruww =	5.0
b =	14.5
Ld =	7.9
Lu =	6.6
Lc =	5.9
x =	0.31
Ldbp =	11.6
Lwarp =	7.1
Ywarp =	2.5
d2 min	1.60

Gamma w =	1000
Gamma c =	2240
Khosla's b	14.49

-*- Khosla's Pressure -*-

Lambda u/s =	7.77
C1 % =	76.64
D1 % =	83.67
Corr. C1% =	79.45
Lambda d/s =	4.79
E2 % =	30:20
D2 % =	20.94
Corr. E2% =	26.93

** Press F10 **

--*-- Energy Dissipators --*--

Friction blocks

dc =	0.66
length =	1.3
width =	0.7
height =	0.7
location	1

from toe of crest

Cube Blocks

length =	0.2
width =	0.2
height =	0.2

two rows

--*- Floor Pressure & Thickness -*-

d/s toe crest		half cistern	
P =	1.76	P =	1.48
T =	1.42	T =	1.19
end cistern		after cistern	
P =	1.20	P =	0.79
T =	0.97	T =	0.64

overlaid by .2 m thick brick pitching

USAID/HARZA – PID BALOCHISTAN CAG/91

Newton–Secant MACRO to Solve MANNING'S Equation

Units: ->	ES		
Manning's Variables	Value	Newton Var.	Value
Discharge Q (cusecs) =	100	Upper Limit Güess, xn	3.481353
Manning's n =	0.016	Lower Limit Guess, xp	3.481356
Side Slope m =	1		
Bottom Width b (ft) =	6	# Iterations	8
Channel Slope s =	0.0004		
Water Depth d (ft) =	NKNOWN	Fxn	-0.00012
Units Constant =	1.486	Fx	0.000000
Gravity g (ft/sec^2) =	32.2		
Froude Number =	0.33	Solution -->	3.481356
Velocity (ft/sec) =	3.030		

To call MANEQ menu, press ALT–M

Steps to Modify MANEQ for other Implicit Equations:

Add the necessary lines, defining the various parameters and its units in Column A.

Write the MACRO commands to input in Column B, the values for the parameters defined in Step (1). Start from CELL W65.

Write the Function equation in the Newton–Secant form (fx = 0) using the values of the cells defined in step (2).
The equation Should be written Twice, in CELLS X68 and X72.
*** the unknown value should be assigned to cell E15 ***
The MACRO should have the following form:

{LET Fx, the equation you want to solve :VALUE}

Make sure your MACRO has the following LABELS:

Label	Cell
XN	E7
XP	E8
ITERATIONS	E10
FXN	E12
FX	E13
X	E15
OUT	X78
NEWTON	W62
LOOP	X71
\M	V61

ANNEX C

WORKSHOP AND EQUIPMENT STATUS REPORT

PID BALOCHISTAN MECHANICAL WORKSHOP

EQUIPMENT STATUS REPORT

No.	Description	Equipment Number	Working Condition		Parts		Operators	
			Operative	Inoperative	Available	Unav.	Trained	Untr.
1	Radial Drill	40-011-001	*		*			* 1
2	Lathe	40-009-001	*		*		*	
3	Lathe	40-009-002	*		*		*	
4	Lathe	40-009-003	*		*		*	
5	Valve Grinder	40-010-001	*		*		*	
6	Surface Grinder Sanford	40-010-002	*		*		*	
7	Tool Grinder	40-010-003	*		*		*	
8	FMC Shoe Grinder/Brake Lathe	40-010-004	*		*		*	
9	Milling Machine Wells Index	40-01?-001	*		*		*	
10	Grinder	40-010-005	*		*		*	
11	Ridgid Hack Saw	40-015-001	*		*		*	
12	Drill Machine	40-015-002	*		*		*	
13	Master Head Shop	40-030-00?	*		*		*	
14	Hydraulic Press 50 Ton	40-033-001	*		*		*	
15	Track Master Hydraulic Press	40-033-002	*		*		*	
16	ARC Welding Machine	40-017-001	*		*		*	
17	Crank Rebuilt Machine	40-017-002	*		*			* 1
18	Generator Test Bench	40-021-001	*		*			* 2
19	Processor Washer	40-027-001	*		*		*	
20	Processor Washer	40-027-002	*		*		*	
21	Typhoon Washing Machine	40-027-003	*		*		*	
22	Compressor Ingersoll	40-019-001	*		*		*	
23	Compressor Ingersoll	40-019-002	*		*		*	
24	Compressor Ingersoll	40-019-003	*		*		*	
25	Fuel Injection Pump Calibrator	40-030-001	*		*		*	
26	Fuel Console (PT) Panel	40-030-002	*		*		*	
27	Injector Calibrator	40-030-003	*		*		*	
28	Bishman Tyre Remover	40-030-004	*		*		*	
29	Philadephia Overhead Crane	40-029-001	*		*		*	

* 1 Training is being arranged at Jamshoro Irrigation Workshop

* 2 Operator will attend training at Technical Training Center in Quetta.

October 28, 1992

JULY 1992

BALOCHISTAN EQUIPMENT INVENTORY SHEET
EQUIPMENT STATUS REPORT.

S.NO	NUMBER	DESCRIPTION	MACHINE			H.P	ENGINE		S.M.D	TRANSMISSION		HYDRAULIC	REGISTATION	YEAR		OWNING	
			MANUFACTURER	MODEL	SERIAL NO		MAKE/MODEL	SERIAL NO	WORKED	No	No	CONTROL No	No	PURCHASED	LOCATION	DIVISION	REMARKS
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	TRACK TYPE DOZER																
1	40-103-001	DOZER, TRACK	J.I.CASE	1450B	8383035	140	A504BDT	10668886	836								
2	40-103-002	DOZER, TRACK	J.I.CASE	1450B	8383040	140	A504BDT	10368860	N.A					1987	LORALAI	LORALAI	OPERATIONAL
3	40-103-003	DOZER, TRACK	J.I.CASE	1450B	8383042	140	A504BDT	10368869	N.A					1987	SALIAZA	LORALAI	OPERATIONAL
4	40-103-004	DOZER, TRACK	J.I.CASE	1450B										1987	QUETTA	D.M.JAMALI	UNDER REPAIR
5	40-103-005	DOZER, TRACK	CATERPILLAR	D6D	231X03003	140	3306D	10Z04961	5054	7JA02478	7G4245			1987			
6	40-103-006	DOZER, TRACK	CATERPILLAR	D6D	231X02478	140	3306D	10Z02835	2647	7JA01789	7G4245	37X3060			DOLLAT GORI	D.M.JAMALI	OPERATIONAL
7	40-103-007	DOZER, TRACK	CATERPILLAR	D6D	231X02577	140	3306D	210Z03301	N.A					1983	DARO TOGHI	PISHIN	OPERATIONAL
8	40-103-008	DOZER, TRACK	CATERPILLAR	D6D	231X02500	140	3306D	210202999	N.A					1983	ZIARAT	SIBI	OPERATIONAL
9	40-103-009	DOZER, TRACK	CATERPILLAR	D6D	231X03007	140	3306D	210204966	N.A	7JA02460	7G4245			1983	KACHHI	KACHHI	OPERATIONAL
10	40-103-010	DOZER, TRACK	CATERPILLAR	D6D	231X02437	140	3306D	210202673	N.A	7JA01242	7G4245			1983	BAGHTAIL	USTA MOHD	OPERATIONAL
11	40-103-011	DOZER, TRACK	CATERPILLAR	D6D	231X03009	140	3306D	210Z05026	N.A	7JA02482	7G4245	38X3723		1983	TOOTH	MUSTUNG	OPERATIONAL
12	40-103-012	DOZER, TRACK	CATERPILLAR	D6D	231X03008	140	3306D	210Z04967	1236					1983	DERA ALLAH YAR	D.M.JAMALI	OPERATIONAL
13	40-103-013	DOZER, TRACK	CATERPILLAR	D6D	231X03004	140	3306D	210Z04692	7603	7JA02475	7G4245	38X03726		1983	SAMAK KARAZ	LORALAI	OPERATIONAL
14	40-103-014	DOZER, TRACK	CATERPILLAR	D6D	211X03010	140	3306D	210205027	2203	7JA02480	7G4245	37X3062		1983	BAGH HEAD	USTA MOHD	OPERATIONAL
15	40-103-015	DOZER, TRACK	CATERPILLAR	D6D	20X04733	140	3306D	13Z08919	N.A	7JA02325	7G4246			1984	NARACHI	LORALAI	OPERATIONAL
16	40-103-016	DOZER, TRACK	CATERPILLAR	D6D	20X04741	140	3306D	13208918	2676	2JA02331	7G4246	17X05041		1983	GARRUK	KHARAN	UNDER REPAIR
17	40-103-017	DOZER, TRACK	CATERPILLAR	D6D	231X02528	140	3306D	210X03130		7JA01847	7G4245	37X03154		1983	NARACHI	LORALAI	OPERATIONAL
18	40-103-018	DOZER, TRACK	CATERPILLAR	D6D	20X04707	14C	3306D	13Z08540	122					1984	TORA MURGHA	PISHIN	OPERATIONAL
19	40-103-019	DOZER, TRACK	CATERPILLAR	D6D	20X04730	140	3306D	13208887	4784	2JA02335	7G4246	17X05044		1983	QUETTA W/S	PISHIN	OPERATIONAL
20	40-103-020	DOZER, TRACK	CATERPILLAR	D6D	231X02472	140	3306D	10202829	4975	7JA01790	7G4245	37X3063		1984	SHARAN MANDA	PISHIN	UNDER REPAIR
21	40-103-021	DOZER, TRACK	CATERPILLAR	D6D	231X02835	140	3306D	210203898	N.A	7JA02178	7G4245	37X03395		1979	NUSHKI	QUETTA	OPERATIONAL
22	40-103-022	DOZER, TRACK	CATERPILLAR	D6D	231X03600	140	3306D	210203333	N.A	7JA01929	7G4245	37X3278		1983	ZIDI	KHUZDAR	OPERATIONAL
23	40-103-023	DOZER, TRACK	CATERPILLAR	D6D	231X03006	140	3306D	210204964	6405	7JA02477	7G4245	37X3719		1983	UTHEL	BELA DIV	OPERATIONAL
24	40-103-024	DOZER, TRACK	CATERPILLAR	D6D	231X02470	140	3306D	210202825	449					1983	BELA	BELA DIV	OPERATIONAL
	TRACK TYPE DOZER														PANJGUR	TURBAT	OPERATIONAL
25	40-104-001	TRACK, TYPE	FIAT ALLIS	14C													
26	40-104-002	TRACK, TYPE	FIAT ALLIS	14C	15611	200	8205-02	531-012533	N.A						PUSHTOONABAD	QUETTA	UNDER REPAIR
27	40-104-003	TRACK, TYPE	FIAT ALLIS	14C	15610	200	8205-02	531-012528	N.A						VIALA	ZHOB	OPERATIONAL
28	40-104-004	TRACK, TYPE	FIAT ALLIS	14C	15647	200	8205-02	531-011840	N.A						KULAK	PISHIN	OPERATIONAL
29	40-104-005	TRACK, TYPE	FIAT ALLIS	14C		200				INFORMATION NOT AVAILABLE					QUETTA W/S	PISHIN	UNDER REPAIR
30	40-104-006	TRACK, TYPE	FIAT ALLIS	14C	15190	200	8205-02	531-012743	336						QUETTA W/S	PISHIN	UNDER REPAIR
31	40-104-007	TRACK, TYPE	FIAT ALLIS	14C	15666	200	8205-02	531-	356						SALIAZA	ZHOB	OPERATIONAL
32	40-104-008	TRACK, TYPE	FIAT ALLIS	14C	NIL	200	8205-02	NIL	N.A	INFORMATION NOT AVAILABLE					RAKNI	LORALAI	OPERATIONAL
33	40-104-009	TRACK, TYPE	FIAT ALLIS	14C		200	8205-02								SIKADAR SHEIKH	USTA MOHD	OPERATIONAL
34	40-104-010	TRACK, TYPE	FIAT ALLIS	14C		200	8205-02								CHATI DNI	USTA MOHD	OPERATIONAL
35	40-104-011	TRACK, TYPE	FIAT ALLIS	14C	15612	200	8205-02	531-012510	505						TURBAT	TURBAT	UNDER REPAIR
36	40-104-012	TRACK, TYPE	FIAT ALLIS	14C	15607	200	8205-02	531-	70						FAIZABAD	USTA MOHD	OPERATIONAL
37	40-104-013	TRACK, TYPE	FIAT ALLIS	14C	01568	200	8205-02	531-	N.A						MITHERI	KACCHI	OPERATIONAL
38	40-104-014	TRACK, TYPE	FIAT ALLIS	14C		200	8205-02		N.A						BALAN SHAKH	D.M.JAMALI	OPERATIONAL
39	40-104-015	TRACK, TYPE	FIAT ALLIS	14C					N.A	INFORMATION					MASTUNG	MASTUNG	OPERATIONAL
40	40-104-016	TRACK, TYPE	FIAT ALLIS	14C	15708	200	8205-02	531-012732	N.A	NOT					ZIDI	KHUZDAR	UNDER REPAIR
41	40-104-017	TRACK, TYPE	FIAT ALLIS	14C						AVAILABLE					HUB	LASBELA CIR	UNDER REPAIR
42	40-104-018	TRACK, TYPE	FIAT ALLIS	14C	015787	200	8205-02	531-012732	N.A						PUNJGUR	TURBAT	OPERATIONAL
43	40-104-019														DUKI I.O	LORALAI	OPERATIONAL
44	40-104-020	TRACK, TYPE	FIAT ALLIS	14C	015660	200			N.A								
45	40-104-021	TRACK, TYPE	FIAT ALLIS	14C	015651	200	8205-02	531-011970	N.A						D.M.JAMALI	D.M.JAMALI	UNDER REPAIR
46	40-104-022														VERCHUM	SIBI	UNDER REPAIR
47	40-104-023	TRACK, TYPE	CATERPILLAR	D7G	65V2005	200	3306	44V14938	N.A.						QUETTA W/S	BELA	UNDER REPAIR
48	40-104-024	TRACK, TYPE	CATERPILLAR	D7G	65V2004	200	3306	44V14934	1203						GOGVLEHRI	KACCHI DIV	OPERATIONAL

S.NO	MACHINE					H.P	ENGINE		S.M.D	TRANSMISSION		HYDRAULIC	REGISTATION	YEAR		OWNING	REMARKS
	NUMBER	DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO		MAKE/MODEL	SERIAL NO	WORKED	No	No	CONTROL No	No	PURCHASED	LOCATION	DIVISION	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	EXCAVATOR																
49	40-302-001	TRACK TYPE	CATERPILLAR	225	51U05153		3208	79V11027	1972						DOHRI DISTRICT	USTA MOHD	OPERATIONAL
50	40-302-002	TRACK TYPE	CATERPILLAR	225	51U05167		3208	79V10911	3902						BAGH HEAD	USTA MOHD	OPERATIONAL
51	40-303-001	TRACK TYPE	GRADALL	G880B	N.A	230	281808A	8120009508	N.A						LORALAI	LORALAI	OPERATIONAL
52	40-353-001	WHEEL TYPE	GRADALL	G880C	NP393745-264	230	281808A	8420008853	N.A						LORALAI	LORALAI	OPERATIONAL
53	40-353-002	WHEEL TYPE	GRADALL	G880C	NP393744-219	230	281808A	08G0141648							MOMMUL DERO	D.M.JAMALI	OPERATIONAL
	FRONT END LOADER																
54	40-254-001	WHEEL TYPE	J.I.CASE	W30	9159608	153	A504DBT	10369195	479						HUB	LASBELA	OPERATIONAL
55	40-254-002	WHEEL TYPE	J.I.CASE	W30	9159607	153	A504DBT	10368902	1729						PISHIN.I.O	PISHIN	UNDER REPAIR
	PUSH-TYPE MOTORISED SCRAPER																
56	40-601-001	SCRAPER	FIAT ALLIS	261-B	30C01059	250			N.A	3G9376				1980	D.M.JAMALI	D.M.JAMALI	UNDER REPAIR
57	40-601-002	SCRAPER	FIAT ALLIS	261-B	30C01060	250			N.A	3G9372				1980	D.M.JAMALI	D.M.JAMALI	UNDER REPAIR
	TRACTOR AND TRAILER																
58	40-005-001	PRIM-MOVER	MACK		R606RST-1082								QAB-4986	2/79	QUETTA	QUETTA	OPERATIONAL
59	40-005-002	PRIM-MOVER	MACK		R606RST-1078								QAB-4985		D.M.JAMALI	D.M.JAMALI	OPERATIONAL
60	40-005-003	PRIM-MOVER	MACK	RM688RS	1M25206CX									1988	LORALAI	LORALAI	OPERATIONAL
					KW001043	270	E6-270	8L1456	017940								
61	40-005-004	PRIM-MOVER	MACK	RM688RS		270	E6-270							1988	QUETTA W/S	QUETTA	OPERATIONAL
	MOBILE LUBRICATION TRUCK																
					IHTLFHXN					COMPRESSOR							
62	40-004-001	MOBILE LUB-TRUC	INT. HARV	S1800	7GHA30898	130			1541	ENGINE-KOHEER		MODEL NO:-K3825	SR.NO.152	805865	PISHIN	PISHIN	OPERATIONAL
					IHTLFHXNO												
63	40-004-002	MOBILE LUB-TRUC	INT. HARV	S1800	GHA30886	130			1488	" " "		MODEL NO:-K3825	SR.NO.152	155525	D.M.JAMALI	D.M.JAMALI	OPERATIONAL
	MOBILE WORKSHOP																
					4160-117-70			0353-940									
64	40-095-001	MOBILE WORKSHO	MERCEDES	MATRA	-021681	110	1977	10-456810	3055				OAA-9372		QUETTA W/S	QUETTA	OPERATIONAL
	CRANE																
65	40-856-001	CRANE 40 TON	LORAIN	MCH-400	12026				72						QUETTA WORKSH	QUETTA	UNDER REPAIR
	DUMP TRUCK DUMPER																
66	40-700-001	DUMP TRUCK	INTR. HARV	1754RHD	EHA24294				NIL					1984	D.M.JAMALI	D.M.JAMALI	OPERATIONAL
					IHTLYHYN3												
67	40-700-002	DUMP TRUCK	INTR. HARV	1754RHD	EHA24165									1984	ZHOB	ZHOB	OPERATIONAL
68	40-700-003	DUMP TRUCK	INTR. HARV		GHA21662				NIL					1984	USTA MOHD	D.M.JAMALI	OPERATIONAL
	FLAT BED TRUCK																
69	40-009-001	FLAT BED TRUCK	INT HARV	4700	IHTSCNK												
					NH413812	DT-360	107248	761						1992	D.M.JAMALI	D.M.JAMALI	OPERATIONAL
	WATER TANK/FUEL																
70	40-003-001	TANKER WATER	INT HARV	S1800	GHA28931										D.M.JAMALI	D.M.JAMALI	OPERATIONAL
71	40-003-002	TANKER WATER	INT HARV	S1800											QUETTA	QUETTA	UNDER REPAIR
72	40-003-003	TANKER WATER	INT HARV	1854	IHTLFHYRO										KILLA SAIFULLAH	ME&WDIS	OPERATIONAL
73	40-003-004	FUEL TANK	INT HARV		GHA 28752				DRIVER NOT AVAILABLE						DERA ALLAH YAR	D.M.JAMALI	OPERATIONAL
	TRACTOR WHEEL TYPE																
74	40-800-001	TRACTOR	BALARUS					596057					ND-779			USTA MOHD	OPERATIONAL
75	40-800-002	TRACTOR	BALARUS					592548					166-364		HUB	LASBELA	OPERATIONAL
76	40-800-003	TRACTOR	MASEY FERGUSON		0224-66			3976-T	254						D.MJAMALI	D.MJAMALI	OPERATIONAL
77	40-800-004	TRACTOR	MASEY FERGUSON		0227-31			4149-T	99						D.MJAMALI	D.MJAMALI	OPERATIONAL
78	40-800-005	TRACTOR	MASEY FERGUSON														
79	40-800-006	TRACTOR	MASEY FERGUSON		0226-76			3883-T	447						PATFEEDER	D.M.JAMALI	OPERATIONAL
80	40-800-007	TRACTOR	MASEY FERGUSON		0232-66			4899-T	24						GOTH TAGIA CAN	USTA MOHD	OPERATIONAL

ANNEX D

PURPOSE LEVEL MONITORING INDEX

A system was developed to indicate project accomplishments to USAID.

CRITICAL EVENTS AGENDA

TARGET	FY ACCOMP.	STATUS	CRITICAL EVENT
COST RECOVERY			
Apr 90	(89-90)	complete	Submittal to GOP of ACE report containing recommendations for improved irrigation system cost recovery.
May 90	(89-90)	complete	Acceptance of ACE report and its recommendations by GOP.
July 90	(89-90)	complete	Acceptance of ACE report and its recommendations by Provincial Govts.
Dec 90		Agreed by all provinces	Implementation of ACE report at provincial level.
Jan 92		No increase up to June 92.	Increase of water rates to IBRD acceptable level.
May 92	(91-92)	Actvity initiated on pilot project basis in Punjab only.	Divestiture of tubewells in fresh groundwater areas.
HYDRAULIC MONITORING CAPABILITY			
Sep 90	(90-91)	On-going	ACOP to start training PID staff in hydraulic monitoring.
Dec 90	(91-92)	Procurment in process	Completion of transfer of hydraulic monitoring capability to PIDs.
OPERATION AND MAINTENANCE			
Sep 90	(91-92)	Delivered	Procurement of O&M trial equipment.
Feb 91	(90-91)	Accomplished	PIDs using project recommended O&M yardsticks.
Jul 91	(90-91)	Complete 90-93.	PIDs prepare annual O&M program of work.
Aug 91	(91-92)	In progress	One year O&M trial begins.
Aug 92	(91-92)	Bal. making progress	PIDs updating O&M yardsticks annually.
	IN PART		
COMPUTERIZATION			
Mar 91	(91-92)	Accomplished	Establishment of computerized capability for personnel and training sections of PIDS.
Dec 91	(91-92)	Accomplished	Computerized capability introduced in the secretariate,s admin offices.
TRAINING			
Jul 90	(91-92)	complete	Develop in-country and overseas training schedule.

DRAFT
PLM-1 (Sept 1992).
Data.

IND. #	THRU 1989	89-90	90-91	91-92	TARGET
1) Critical Events Agenda	-	3 (Accumulative score)	6 (Accumulative score)	12 (Accumulative score)	16
*	P S N B	P S N B	P S N B	P S N B	
2) Organizational Str. Agenda	- - - -	7 7 6 7	16 15 15 13	23 22 25 23	35
3) O&M Effectiveness					
a) %age SAR Targets met by annual O&M budget for canals and drains	79 74 109 82	68 74 112 82	69 67 112 62	82 62 116 98	100%
b) %age annual O&M budget covered by water charges	128 59 20 19	120 58 19 19	112 63 23 25	81 66 16 22	100%
4) Use of O&M equipment for preventive maintenance	- - - -	- - - -	- - - -	40 42 11 59	100%
5) %age of KMs rehabilitated works sampled that recieved adequate maintenance					
a)canals	- - - -	- - - -	75 63 91 31	80 68 67 85	100%
b)drains	- - - -	- - - -	75 79 98 -	70 70 69 -	100%
EQUIPMENT MGMT.					
6) Avaerage %age of Hrs Routine Equipment used compared to recommended norms	57 64 8 55	67 - 55 -	100 55 50 35	60 55 65 75	100%

*

P = Punjab
S = Sindh
N = N.W.F.P.
B = Balochistan

REHAB. WORKS

7) Annual KMs of Rehablitated works																			
a)canals																			
-Financed by AID	251	288	156	-	-	38	-	-	-	6	-	-	-	2	-	-			948
-Financed by other doners	8335	4765	1468	325	12.5	-	35	3	12.5	74	126	10.5	95	49	19	28			27207
b)Drains																			
-Financed by AID	2199	345	39	-	-	7	-	-	68	17	-	-	68	56	-	-			2981
-Financed by other doners	887	453	119	-	-	-	-	-	-	-	15.4	-	-	-	1.6	-			1917
REHABL. IMPACT																			
8)canal performen.																			
a)Reliability average % of days planned planned water was available to canal outlets																			
Head _____	-	-	-	-	-	-	-	-	-	-	-	-	-	94	88	-			100%
Tail _____	-	-	-	-	-	-	-	-	-	-	-	-	-	88	86	-			100%
b)Equity-% of water flow to tail compared to head outlets	-	-	-	-	-	-	-	-	-	-	-	-	-	43	44	-			85%
9) Productivity of selected watercourses																			
a)cropping intensity	-	-	-	-	-	-	-	-	-	-	-	-	145%	103%	144%	100%			200% Max
b)total command area(Ha)	-	-	-	-	-	-	-	-	-	-	-	-	3057	1774	413	956			-

PLM SEP. 1992
ORGANIZATIONAL STRENGTH INDEX

CATEGORY	SUB CATEGORY	Max	Rating			
		pts	PUNJ	SIND	NWFP	BAL
Training	PID training plan prepared and approved	1	1	1	1	1
	Traning sections with computerized capability	1	1	0	0	1
	Admin. sections with computerized capability	1	1	1	1	1
	Staff fully trained in admin. & training sections	1	0	0	0	1
O&M Mannual	Manuals developed	1	1	1	1	1
	Manuals revised to reflect the provincial differences	1	*	1	1	*
	Mannual used by PIDs	1	0	0	1	0
	Mannual of drainage maintenance developed	1	0	0	0	0
O&M Planning	O&M funding yardsticks developed	1	1	1	1	1
	Annual workplan for O&M/rehab prepared	1	1	1	1	1
	Annual O&M workplan,s targets institutionalized	1	1	1	1	1
	Monitoring/inspection capability developed	1	1	1	1	0
Design Capabilities	Design training at divisional level initiated	1	1	1	1	1
	Computerized design application introduced	1	1	0	1	1
	Improved design capabilities acquired by PIDs	1	0	0	1	0
	Design capability succesfully institutionalized	1	1	0	0	0
Mechanized O&M Program (canals)	O&M equipment delivered	1	1	1	1	1
	O&M trial begins	1	1	1	1	1
	O&M trial equipment used effectively	1	0	0	0	1
	Mechanized program institutionalized	1	0	0	0	0
Construction Equipment	Equipment task force effectively used	1	1	1	1	1
	Utilization plan prepared and adopted	1	1	1	1	1
	Overhauling program initiated	1	1	1	1	1
	O&M in-service training plan adopted	1	1	1	1	1
Workshops	Adequate workshop machinery available	1	1	1	1	1
	Workshop facilities used effectively	1	1	1	1	1
	Warehouse org. established and used effectively	1	1	1	1	1
	MAINSAVER program fully operational	1	0	1	1	0
Computerization	Main computer cell functioning with [illegible]equate staff	1	1	1	1	1
	Comp. applications in regular use a[illegible]c. level	1	1	1	1	1
	Comp. applications in regular use a[illegible]/field level	1	1	1	1	1
	Comp. applications in regular use at [illegible]/XEN level	*	*	*	*	*
Pilot Hydraulic Monitoring Program	Adequate equipment provided to PID's	1	0	0	0	0
	Staff adequately trained on M&E capabilities	1	0	0	0	0
	System of data collection and analysis initiated	1	0	0	0	0
	Data collection and analysis adequate for monitoring	1	0	0	0	0
		35	23	22	25	23

* Activities dis continued due to funding cuts

ANNEX E

LIST OF PID PERSONNEL TRAINED IN ISM-II

IRRIGATION SYSTEMS MANAGEMENT PROJECT - II

LIST OF BALOCHISTAN PID PERSONNEL RECEIVED TRAINING

TRAINING MODULES AT PUNJAB ENGINEERING ACADEMY

SURVEYING MODULE 19-31 OCT, 1991

1. Sub Engineer Abdul Jabbar
2. Sub Engineer Qasim Shah
3. Sub Engineer Mumtaz Ali
4. Sub Engineer Shafi Mohammad

ESTIMATION MODULE 2-14 NOV, 1991

5. SDO Sher Afghan
6. SDO Mohammad Karim
7. SDO Mohammad Riaz
8. SDO Nazir Ahmad
9. Sub Engineer Sardar Khan

O&M OF CANAL SYSTEM 23 NOV - 05 DEC, 1991

10. SDO Nadir Shah
11. SDO Mohammad Ayub
12. SDO Sikandar Sheikh
13. SDO Muhammad Umar
14. Asst Engineer Qamar Zaman

PREPARATION OF DESIGN STRATEGY 7-19 MAR, 1992

15. Asst Engineer Khalid Mehboob
16. Asst Design Engineer Qamar Zaman

CONSTRUCTION SPECIFICATIONS 25 APR - 7 MAY, 1992

17. SDO Umar Shah
18. SDO Azhar Jabbar Khan
19. SDO Abdul Razzaque

DIVISIONAL ENGINEERING APPLICATION MODULES

20. A/XEN rshad Ali Jamali
21. A/XEN attar Lakhti

SUB-ENGINEERS TRAINING

SURVEY & ESTIMATION SESSION 18 APR - 09 JUL, 1992

22. Sub-Engr Abdul Hafeez
23. Sub-Engr Zulfiqar Ahmad Sherazi
24. Sub-Engr Gul Hassan
25. Sub-Engr Sardar Mohammad

26. Sub-Engr Zaman Ali
27. Sub-Engr Sharafat Ali
28. Sub-Engr Abdul Manan
29. Sub-Engr Mohammad Azim
30. Sub-Engr Ahmad Yar
31. Sub-Engr Arshad Ali
32. Sub-Engr Noor Ahmad
33. Sub-Engr Ghulam Mohammad
34. Sub-Engr Khalid Javed
35. Sub-Engr Ahmad Khan
36. Sub-Engr Akal Khan
37. Sub-Engr Nasib Khan
38. Sub-Engr Muhammad Subghat Ullah
39. Sub-Engr Ejaz Ud Din
40. Sub-Engr Fazal Mohammad
41. Sub-Engr Yar Mohammad

SURVEY & ESTIMATION SESSION 12 SEP - 03 DEC, 1992

42. Sub-Engr Ashraf
43. Sub-Engr Masood Ahmad
44. Sub-Engr Mohammad Jamil
45. Sub-Engr Ghulam Sarwar
46. Sub-Engr Wahid Mahmood
47. Sub-Engr Aman Ullah
48. Sub-Engr Allah Rakhia Jamali
49. Sub-Engr Abdul Shakoor
50. Sub-Engr Amir Mohammad
51. Sub-Engr Muhammad Alam
52. Sub-Engr Abdullah Khan
53. Sub-Engr Muhammad Shahryar Khan
54. Sub-Engr Khair Muhammad
55. Sub-Engr Sultan Ahmad
56. Sub-Engr Abdul Haie
57. Sub-Engr Syed Amir Ali
58. Sub-Engr Muneer Ahmed
59. Sub-Engr Mohammad Saleem

MID-LEVEL MANAGEMENT TRAINING AT PIM KARACHI & LAHORE

60. A/XEN Sheikh Sikandar Khan
61. XEN Abdul Qahir
62. XEN Mohammad Asla Murree
63. XEN Pervez Bukhari
64. SDO Asadullah
65. Dy Secy Mohammad Ilyas
66. SDO Aziz Zehri
67. XEN Saifullah Khan
68. System Analyst Khuda Dad Khajjak
69. S.E. Arbab M. Yousaf
70. SDO Zahir Shah
71. XEN Nadir Ali
72. XEN Surat Khan
73. SDO Ismail Rind

74. SDO Abdul Razaq
75. SDO Khalid Nazeer
76. SDO Anwarul-Haq
77. SDO Bashir Khan Tareen
78. Project Manager Naeem Baloch
79. SDO Nasir Majeed.

HYDRAULIC & SEDIMENT MONITORING TRAINING BY ACOP
10 DEC, 1990 - 02 JAN, 1991

80. SDO Azizullah
81. SDO Abdul Hameed
82. SDO Shoib Nadim
83. SDO Abdul Sattar
84. SDO Nazir Ahmed
85. Sub-Engr Mumtaz Ali
86. Sub-Engr Abdul Hameed
87. Sub-Engr Mohammad Nasir
88. Sub-Engr Abdul Karim Luni
89. Sub-Engr Amir Mohammad
90. Sub-Engr Allah Diwaya
91. Sub-Engr Mohammad Ibrahim
92. Sub-Engr Mohammad Azim Luni
93. Sub-Engr Abdul Shakoor
94. Sub-Engr Mohammad Azim Mangal
95. Sub-Engr Irshad Ali

IN HOUSE TRAINING BY TA TEAM

DESIGN OF DISCHARGE IRRIGATION STRUCTURES 30 SEP-3 OCT, 1990

96. XEN Syed Abaidullah
97. SDO Abdul Aziz
98. SDO Mohammad Ismail Rind
99. SDO Abdul Sattar
100. SDO Hashim Khan
101. SDO Nazir Ul Hasnain
102. SDO Surat Khan

DESIGN OF SMALL CANAL

103. XEN Mohammad Aslam Mari
104. XEN Sher Zaman
105. Project Engineer M.K. Chaudhry
106. SDO Nazir Ul Hasnain
107. SDO Mohammad Karim
108. SDO Irshad Ali Jamali
109. SDO Azhar Jabbar
110. SDO Sikandar Khan
111. SDO Imran Durrani

DOS, WORDPERFECT & LOTUS TRAINING 16 DEC, 1991-16 FEB, 1992

112. Draftsman Gul Mohammad
113. Steno Typist Fida Hussain
114. Tracer Nizam-ud-Din
115. Junior Clerk Mohi-ud-Din Sabir
116. Steno Typist Raza Mohammad
117. Junior Clerk Liaqat Ali
118. Junior Clerk Qadir Dad
119. Junior Clerk Murad Khan
120. Junior Clerk Mubarak Khan
121. Data Entry Operator Rehan Ahmed
122. Data Entry Operator Nasir Rasheed
123. Steno Typist Masood Aslam

DOS, WORDPERFECT & LOTUS TRAINING 16 MAR - 15 MAY, 1992

124. Junior Clerk Mohammad Noor
125. Junior Clerk Said Ali
126. Junior Clerk Mohammad Ashraf
127. Junior Clerk Mohammad Yunus
128. Junior Clerk Hazoor Bukhsh
129. Steno Typist Mohammad Ibrahim
130. Steno Typist Mohammad Salman
131. Typist Fateh Khan
132. Computer Aminullah

MECHANICAL TRAINING

DIESEL LABORATORY TECHNOLOGY 7-19 JULY, 1990

133. Mechanic Abid Ali Baig
134. Mechanic Mohammad Hashim Khan

MACHINERY & EQUIPMENT MANAGEMENT WORKSHOP 18-19 NOV, 1990

135. S.E. Munawar Khan Mandokhel
136. S.E. Shirin Khan Luni
137. S.E. Fazal Din Khan
138. XEN Mohammad Ibrahim Rind
139. XEN Sher Zaman Khan
140. XEN Mohammad Bashir
141. XEN Abdul Qahir Khan
142. XEN Ali Mohammad Shah
143. XEN Ahmad Khan Dumpal
144. XEN Noor Mohamma
145. XEN Obeidullah Shah
146. XEN Nadir Ali
147. SDO Mureed Khan
148. SDO Abid Mahmood
149. SDO Hashim Khan
150. SDO Nazir Ul Hasnain
151. SDO Sayed Zahir Shah
152. Sub-Engr Khalil Ur Rehman

153. Sub-Engr S.S. Hussain Shah
154. Sub-Engr Abdul Hammed
155. Sub-Engr Saeed Ahmad
156. Sub-Engr Abid Ali Baig
157. Store Keeper Mohammad Aslam

OPERATION & MAINTENANCE PLANNING WORKSHOP 3-4 DEC, 1990

158. S.E. Shirin Khan Luni
159. S.E. Haji Zainuddin Khan
160. S.E. Ghulam Usman Babai
161. Dy Provincial Coordinator Khudda Dad Khajjak

LONG TERM TRAINING SESSIONS AT CONSTRUCTION MACHINERY TRAINING CENTER , ISLAMABAD JAN 1991 TILL MAY 1992

162. Mechanic Abdul Ali
163. Helper Mohammad Asif
164. Driver Mohammad Umar
165. Operator Mohammad Salim
166. Operator Rustam Ali