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**UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT  
ISLAMABAD, PAKISTAN**

**IRRIGATION SYSTEMS MANAGEMENT PROJECT**

**PHASE II**

**Project Number 391-0467**

**QUARTERLY REPORT**

**Tenth Quarter, Ending 31 March 1992**

**HARZA ENGINEERING COMPANY  
Contractor**

**DEVELOPMENT ALTERNATIVES, INC.  
Subcontractor**

**ASSOCIATED CONSULTING ENGINEERS-ACE (PVT) LTD  
Subcontractor**

**Contract Number 391-0467-C-00-9830-00**

Harza Engineering Company / Development Alternatives, Inc.  
Associated Consulting Engineers - ACE (Pvt) Ltd

IRRIGATION SYSTEMS MANAGEMENT PROJECT - PHASE II

QUARTERLY ACTIVITIES REPORT  
Quarter Ending 31 March 1992

Background

The overall objective of the Irrigation Systems Management Project is to increase agricultural production through increasing the safety of water delivery and improving reliability and equity in water delivery to the watercourses. The basic charge to Harza/DAI/ACE and the ISM Project is to support and assist the institutional development of the four Provincial Irrigation Departments and the Federal Coordination Cell to build the capacity to provide sustained and proper operation, maintenance, and management of the rehabilitated irrigation system. The focus of activities is on rehabilitation/redesign of canals and drains, improved operation and maintenance of the rehabilitated facilities, and improved management and maintenance of construction equipment.

The contract for technical services was signed on 28 September 1989 and technical assistance services started on 20 October 1989. The Technical Assistance (TA) Team includes a Chief of Party and four Provincial Advisors (PAs) plus technical specialists in design, operation and maintenance (O&M), equipment and workshops (E&W), training, monitoring and evaluation (M&E), and computerization. During the quarter, the TA Team now comprised six expatriate advisors and 14 Pakistani technical staff plus expatriate and local experts on short-term assignment.

Summary of Activities

The expatriate and local technical advisory team remained at full strength during the quarter. Rehabilitation of 30 gate tracks was accomplished at Jinnah Barrage, leaving 11 to be completed, and preparations were started for rehabilitation of gates at Balloki Barrage. The O&M Equipment Trial was underway in all provinces except NWFP, and a discussion workshop on identification of problems and proposals for their resolution was held in March. A draft of the Manual for Surface Drainage was essentially completed for review in a workshop to be held in April. Construction equipment utilization improved in NWFP and Balochistan, but lagged in Punjab and Sindh. The USAID supplied equipment in all mechanical workshops except Multan has been made operational following procurement of missing parts and tools by USAID, and the workshops were active in repair and overhaul of equipment. Heavy emphasis continued on the program for evaluating the impact of rehabilitation of canals and drains, with assistance from two experts on short-term assignments. Most of the 60 computers received in the preceding quarter were installed and tested at end-user locations. Assistance continued in arrangements for in-country and off-shore training.

## Staffing

### Expatriate

Resident Staff. All resident advisors were at post in Pakistan except for short vacation absences. Mr Thomas Liston, Mechanical and Workshop Advisor, completed his resident assignment at the end of the quarter and departed Pakistan on 7 April.

### Short-Term Assignments

Agro-Economic Impact Evaluation Expert. Dr. Shane Ryland arrived on 17 January and departed on 26 February. His assignment was to advise the Watercourse Monitoring and Evaluation Directorate (WMED) and the Punjab Economic Research Institute (PERI) in management and analysis of data for pre-rehabilitation conditions for the Three-Year Program for Evaluating the Impact of Rehabilitation of Canals and Drains.

Drainage Expert. Mr. Richard Wenberg, formerly National Drainage Engineer of the U.S. Soil Conservation Service, arrived on 14 January and remained through the quarter for the second of several assignments leading to the preparation of a manual for planning, design, and maintenance of surface drainage systems for irrigated areas.

Equipment Maintenance and Overhaul Expert. Mr. George Miller arrived in Pakistan on 17 January and departed on 7 April. During this time he worked on the Project intermittently, having come to Pakistan primarily for another project. During this quarter, his activities were primarily concerned with activating USAID-supplied equipment in the Balochistan Irrigation Department Mechanical Workshop in Quetta. He carried out similar assignments earlier at the Sindh and NWFP PID Workshops.

Hydraulic Evaluation Impact Expert. Dr. James Wolf, of the DAI staff, arrived in Pakistan on 22 January and departed on 4 February as part of his continuing assistance to ACOP in the Three-Year Program for Evaluation of the Impact of Rehabilitation of Canals and Drains. During this assignment, he assisted ACOP in preparing a model pre-rehabilitation analysis report for one of the eight systems.

### Local Staff

Most of the local staff are provided by Associated Consulting Engineers-ACE (Pvt) Ltd under subcontract to Harza. All of the scheduled local staff were in place during the quarter. These include 10 full-time and 3 part-time engineers and over 30 supporting staff.

Three local engineers are employed as individual contractors to Harza as experts in Equipment/Workshop, Training, Monitoring and Evaluation, and Computerization. Mr. J. K. Jaffrey, Metallurgy

Expert, continued on short-term assignment, primarily for advice in casting track plates for Jinnah Barrage rehabilitation and for upgrading foundries at the Mughalpura and Jamshoro Workshops.

Utilization of Staff Time

	<u>Person Time</u>		
	<u>Budget</u>	<u>Used</u>	<u>Remaining</u>
Expatriate Resident	274	178	96
Expatriate Short Term	58	31	27
Home Office	62	29	33
Local Professional	539	347	192
Local Support	2112	724	1388

## Provincial Activities

### Punjab

Project activity in the Punjab during the first quarter of 1992 was at the highest level experienced since the project began in 1989. There was movement in all six elements of the Project, which required considerable technical assistance to the Punjab PID from the entire TA Team. In addition to the permanent local and expatriate TA staff, four short-term expatriate specialists assisting on different elements of the project were also provided logistical support by the Lahore office. One additional mechanical engineer was added to the TA staff at Mughalpura. Due to increased number of technical advisors, it was necessary to obtain additional vehicles and office space.

Rehabilitation/Civil Works. The second phase of rehabilitation of gate tracks at Jinnah Barrage was the major activity during the quarter. As reported earlier, uneven wear of the gate tracks resulted in difficult gate operation and a hazardous condition in time of flood emergency. A technique was developed using a portable milling machine to mill the gate tracks in situ to a true plane condition for the installation of wearing plates. The milling machine was designed and manufactured by the Mughalpura Irrigation Workshop and the special ductile cast-iron replacement wearing plates were manufactured at the Bhalwal Irrigation Workshop.

During the canal closure period of 13 January to 10 February, tracks of 30 gates were rehabilitated, in addition to 16 rehabilitated in the previous year. All of the rehabilitated gates are functioning satisfactorily. The remaining 10 regulating gates and one boat-lock gate will be completed in the closure period of 1993. The rehabilitation work was carried out by a combined team under the general supervision of the Chief Engineer Sarghoda. The work of milling and replacing the track plates was carried out by trained teams from the Mughalpura and Bhalwal Irrigation Workshops under the supervision of the XEN Mughalpura. River control by sandbag coffer dams was accomplished utilizing contractors under the direction of the XEN Jinnah Barrage and his staff. Gate track plates were cast at the Bhalwal Workshop and machined at the Bhalwal and Mughalpura Workshops. The TA Team assisted in planning and preparation for the work and in supervising the work at site.

A Task Force meeting was held on 19 March to discuss several issues relating to barrage repair work planned for the next 12 months. The Irrigation Department was asked to submit the estimates for the remaining work on Jinnah Barrage and, in addition, for works planned to be undertaken on Balloki Barrage. The general technique for rehabilitation of Balloki gates was agreed upon.

Operation and Maintenance. The Punjab Irrigation Department had submitted their O&M Plan for this fiscal year in the previous quarter. However, during this quarter, they have completed the

updating of the "Yardsticks" for estimating maintenance costs and have submitted them to the Finance Department for approval.

The O&M Equipment Trial Coordinator on the TA staff at Lahore continues to monitor the use and application of the trial of light mechanized equipment for canal maintenance in the Punjab as well as other provinces. During the quarter, it was found that some subdivisions are underutilizing the equipment, while others are using to the fullest extent. The equipment has proven to be quite satisfactory in its intended use for routine maintenance of canal banks and roads at those locations where it is being fully utilized. The major problem in equipment utilization appears to be unavailability of funds for operational costs.

The final batch of vehicles for the O&M Equipment Trial Program, other than the flat-bed trucks, were handed over to the Punjab Irrigation Department at a special ceremony on 10 March, in which the U.S. Consul General presented the keys to the Secretary Irrigation. The Chief of the Office of Agriculture and Rural Development of USAID Islamabad as also present at the ceremony.

The expatriate Drainage Expert and the local Associate Drainage Engineer continued work on the draft of the Manual for Surface Drainage with the support of the office of the Provincial Advisor Punjab. Their activities are described under the Federal Office.

Equipment and Workshops. Spare parts to overhaul two D8K Caterpillar dozers were supplied to the Mughalpura Irrigation Workshop in August of 1991. Overhaul of one dozer was essentially completed in the preceding quarter and work on the second machine is in progress. Although the skills of workshop personnel appear to be quite adequate, overhaul work has progressed very slowly, primarily due to management problems. The overhauled dozer has remained idle in the workshop for three months because the owner agency does not have funds to pay for workshop labor and minor supplies. Spare parts for four WABCO scrapers have been ordered by USAID and are expected to be delivered to the workshop in the near future.

There has been little improvement in the utilization of construction equipment. Approximately fifty percent of the available equipment was utilized effectively during the quarter. The Machinery Division Lahore has been given a large earth work contract, therefore, it is anticipated that equipment utilization will soon improve.

The equipment that is available to the Punjab has for the most part exceeded its useful life and is in need of complete overhaul or replacement. The Machinery Circle is preparing lists of spare parts for a number of hydraulic excavators. The Superintending Engineer agrees with the TA Team that the Bhalwal Workshop is best suited to undertake the repair of the Excavator Division equipment. However, there is concern about timely arrival of the parts, as most of the local mechanical advisors will complete their assignments by the end of 1992.

The Multan Workshop has had no change in its operational status. It remains under utilized, with only tube well and small vehicle repair being undertaken. Although institutional arrangements for utilization of the USAID-supplied machines for overhauling heavy equipment have not been made, it is intended in the next quarter to bring all of the machines to operational condition using parts and tooling recently procured by USAID.

Monitoring and Evaluation. Oversight and technical assistance continued for the activities of the agencies carrying out the Evaluation of the Impact of Rehabilitation of Canals and Drains. The Lahore office provided logistical support for two experts on short-term assignment during the quarter; Dr James Wolf assisting ACOP in analysis of hydraulic performance data, and Dr Shane Ryland assisting PERI and WMED in data management and analysis of agro-economic information. Arrangements were made for subcontractor, ACE, to employ a computer data management specialist to assist PERI and WMED in developing standardized data bases suitable to support analysis by current standard analytical software such as SPSS. The status of this activity is described further under Federal Office.

The O&M Equipment Trial Program has been underway in the four participating divisions in Punjab for about half a year. Since the principal objective of the program to evaluate the institutional sustainability of the program, and its suitability for expansion in a situation of no technical assistance, it is considered desirable, at this time, to minimize intervention by the TA Team. Therefore, emphasis by the Trial Coordinator and the TA Team has shifted to monitoring activities.

The TA Team provided inputs for the semi-annual Purpose Level Monitoring report required by USAID to monitor the overall performance of the Project.

Computerization. Near the end of the previous quarter, all of the 36 sets of computer equipment provided by USAID for the computerization expansion program were delivered to the scheduled locations. Installation has been completed in about 80 percent of the locations. The installations at the remaining locations will be carried out when the room renovations are completed. Equipment installation is being performed by USAID contractor, EGS, and by the computer vendor, Dadi Associates, under coordination of the TA Team Systems Analyst.

The Revenue Billing prototype software application was completed and demonstrated to top officials of the Punjab Irrigation Department in January. After some modifications called for in the demonstration are completed, it is planned to demonstrate it to the Minister Of Irrigation and Power and the Minister Finance.

The development of a software package to manage and analyze canal information such as channel cross sections, outlet data, longitudinal sections, and discharge data is continuing. This program, when completed will be very useful in analyzing field data to determine where maintenance is most needed.

The IA Team Systems Analyst was assigned the additional duty of assisting WMED and PERI in developing their data management procedures for the impact monitoring. With the present responsibilities of development of needed software in response to requests received from the Irrigation Department, installation of hardware at locations throughout the Punjab, training of SDOs and XENs and their staffs at those locations, it was felt that additional technical assistance staff was needed to support the computerization program. Arrangements were made with subcontractor, ACE, to employ an Assistant Systems Analyst starting 1 April.

Training. During the quarter, extensive training was provided to the Bhalwal Workshop staff for casting and machining of special ductile cast iron for manufacture of the replacement track plates for Jinnah Barrage. Training was also provided in other elements of foundry operations. Training was given to the personnel at the Mughalpora Workshop in the use of specialized tools for overhauling the D8K dozer.

Two Executive Engineers from the Punjab Irrigation Department were provided training in Mid-Level Management through the Pakistan Institute of Management.

Two persons of the Department went to the United States for short-term training in computer applications in management. On-the-job computer training is continuing by the TA Systems Analyst, as requested and as time is available. A plan for computer orientation for SDOs and XENs has been developed and when installation of the computers is completed, the orientation training will start.

### Sindh

In late January, USAID issued a revised travel advisory for Sindh Province which reconfirmed that travel to Hyderabad and the interior of Sindh in U.S. Government vehicles continues to be strictly prohibited for U.S. nationals. However, the advanced notice of intent to travel was reduced from 13 working days to 6 working days, which makes travel arrangements a bit less inconvenient. The Provincial Advisor's travel during the quarter included only two days in Quetta, two days in Hyderabad, one day in Islamabad, and three days in Lahore.

Rehabilitation Design. Current planning is to present the division engineering spreadsheet application course only at the Punjab Engineering Academy, which has good facilities and qualified instructors. The USAID Training Officer is negotiating a schedule with the PEA and it is hoped that the first course can be started in May.

Operation and Maintenance. During mid-February, the O&M Equipment Trial Coordinator and the Sindh Design Engineer inspected all of the divisions and subdivisions in the Sindh O&M Equipment Trial Program to review equipment usage and problems being encountered. This was followed by a mid-term evaluation workshop for the program held in Lahore on 2-3 March. The workshop is described under Federal Office.

Late in the quarter, the nine imported flat-bed trucks to be assigned to each of the O&M Equipment Trial divisions arrived in Karachi and were being distributed to the respective locations.

The Drainage Engineer and the Associate Drainage Engineer visited Hyderabad in the latter part of February to obtain inputs from numerous PID, WAPDA, and Sindh agricultural organization officials for preparation of the Manual for Surface Drainage. It is anticipated that the first draft of the Manual will be distributed for comments in early April.

Early in the quarter, revised O&M-unit spreadsheets for all irrigation divisions under Kotri Barrage and part of the divisions under Sukkur Barrage were sent to the respective Chief Engineers for final review and corrections. The spreadsheets for all the divisions under Guddu Barrage were submitted last quarter. At the end of this quarter, no response has been received from any of the three offices. Although repeated requests have been made, no basic irrigation data has ever been received for Southern Dadu Division under Sukkur Barrage, which is the only one of the 32 irrigation division for which it has not been possible to start a spreadsheet. The program is nearly completed except for this division.

Equipment and Workshops. At the beginning of the quarter, there was a heavy demand for canal gate repairs normally associated with the annual canal closure. Several gate parties were dispatched from the workshop with supplies for maintenance and repair at the sites. This increase in activity was short lived due to the normal two to three weeks of closure time, then activity plummeted. It was soon apparent and was pointed out during the Equipment Task Force meeting held on 10 February, that the workload in Jamshoro Workshop was at a lower level than it had been for some time. To alleviate this condition, the PPC issued instructions to all Chief Engineers to perform all fabrication and repair of gates and gearing at the workshop, encouraged the repair and overhaul of equipment at that facility, and directed the preparation of annual equipment use plans. Rebuilding the workshop workload is usually a slow process but an encouraging start has been made.

In late February, an equipment utilization meeting for Sindh was held in Islamabad. The new Superintending Engineer Mechanical Circle was complimented on bringing all the equipment utilization reports up to date for the last six months. His guidance and initiative will do much to institutionalize the equipment utilization report process so it can become an effective planning and management tool. Utilization of scrapers and bulldozers was low but of hydraulic excavators was good.

The upgrading of the foundry facility at Jamshoro Workshop has been started. The foundation of the old cupola furnace has been removed and a new foundation has been constructed. Completion may be postponed until after Eid.

After considerable delay because of lack of funds to purchase minor materials and supplies, the USAID furnished spare parts for two Dresser scrapers are being utilized. Overhaul of one of the

units has been completed and the engine is being tested; work is well advanced on the other. Once the spare parts have been used, USAID will consider ordering parts for other machines.

Monitoring and Evaluation. Dr. James Wolf completed his latest impact evaluation assignment with ACOP in early February. A review of data analysis and draft report was prepared for Nagnah Distributary subsystem in Sindh. After final review of this report, it will be used as a model for ACOP to prepare reports for the remaining seven subsystems.

Rehabilitation work is progressing satisfactorily on the Nagnah Distributary and was estimated to be about 40 percent complete; physical work was reported to have started on Puran Distributary in mid-February, however, no estimate of progress is available.

Computerization. The thirteen computers and auxiliary equipment designated for Sindh under the Computerization Expansion program were delivered to the Secretariat and the six field offices during the quarter. EGS Ltd and Dadi Associates have completed their work of unpacking, installation, and testing of the equipment, and the software furnished has been installed. Computer furniture was delivered to all locations, leaving air conditioners the last major item yet to be furnished.

Computers are under a PID maintenance contract and are in working condition. The Grade 17 and 18 supervisory computer positions are still unfilled but efforts continue to regularize the positions and select suitable candidates.

Training. Three XENs, five A/XENs and 12 Sub Engineers from Sindh attended training sessions on "Design Strategy" at the Punjab Engineering Academy, Lahore, from 7 to 19 March.

#### Northwest Frontier Province

Rehabilitation Design. The TA Design Engineer carried out consultations with the Design Cell staff during the quarter concerning the suitability of various soils for use in the construction of flood embankments.

A proposal was prepared by the Design Engineer to carry out a sample trial design on the Michni Branch of the Kabul River Canal to demonstrate the Hydraulic Design Criteria (HDC) design procedure developed in Phase I of the ISM Project. ACOP has been requested to perform the hydraulic observations and carry out sediment and bed-material sampling for data required in this procedure.

Field visits to provide guidance in a construction quality control program were made during the quarter at the following sites:

Kandar Dam  
Shadi Khel Distributary  
Daulat Minor  
Gidar Minor

Old Indus Branch  
Manki Minor

Concrete cubes were collected, slump tests were carried out, and soil density samples were collected. Tests on samples were made at the laboratory at Peshawar University. In connection with this program, a portable concrete strength testing instrument called a "Swiss Hammer" was ordered from the U.S. This instrument can be used to test the compressive strength of concrete in place.

Study of the Corps of Engineers HEC 1 and 2 software packages continued during the quarter. Sample solutions were carried out. This software will be used to determine flood runoff and channel water surface and backwater profiles.

Operation and Maintenance. During the quarter, the O&M Manual underwent final revision. Final draft copies were prepared and funds requested from USAID to print 300 copies of the Manual.

The Annual O&M Workplan for 1991-92 was revised after comments from NESPAK, and the revised Workplan was submitted to the World Bank.

An O&M Equipment Trial workshop was held in Lahore. In connection with the equipment trial program, two trips to Bannu were made by the Provincial Advisor. During these visits, it was decided to shift one set of equipment to the Bannu Canal Division and another set to the Paharpur Canal Division. A training session for tractor operators is tentatively scheduled by the tractor and implement manufacturers in late April.

Equipment and Workshops. One D8K dozer was overhauled using USAID supplied spare parts and is now working at Bannu Canal Division, and a second D8K dozer has been brought to the workshop for a major overhaul. Overhauling of a Cat 225 hydraulic excavator for which spare parts were provided by USAID has started and is progressing satisfactorily.

The work of servicing, repairing and overhauling of department vehicles remained a regular activity in the workshop. Moreover, repair and maintenance of field equipment and very effective workshop support to field machinery at site continued throughout the quarter. Because of the workshop support, 95 percent of the equipment with the NWFP PID is in working order. In addition, repair of tubewell machinery and rewinding of electric motors continued as routine activities.

The fabricating gates at the Peshawar workshop is expanding. Five small and four large gates were manufactured, and installed at three locations during the closure period. Two gate hoist systems were successfully manufactured. Two additional orders for five gates each have been received from units of the Irrigation Department.

An inventory of heavy field construction equipment being transferred to the PID from the Mardan SCARP was prepared. Prepa-

ration of this inventory required many trips to Mardan to examine the equipment.

Work is underway for renovation of the equipment and vehicle servicing facility at D.I. Khan. The procurement of tools and equipment is in process. The D.I. Khan Mechanical Subdivision has been activated and is handling responsibilities for operation and maintenance of equipment in the southern areas of the province. The PA, as well as the SE Central Circle, travelled to D.I. Khan once during the quarter to judge the progress of this work.

Equipment utilization improved during the quarter. In January, the utilization rate was 81 percent, the highest achieved during the Project period.

During the quarter, all workshop work orders continued to be generated on the Mainsaver system. Spare parts lists for ten pieces of heavy construction equipment were prepared and submitted through the Federal Coordinator's office to USAID for procurement.

The expatriate Workshop and Equipment Advisor made his last visit to the NWFP Workshop during the quarter. His completion report, with recommendations, was received and circulated in the Department.

Computerization. Computers were installed at sixteen locations at PID offices throughout the Province. At each location, startup training was provided. At four locations, computer defects were rectified. Twenty five boxes of computer paper as well as ribbons arrived from the U.S. These supplies were distributed to the various locations. Two scanners and five math co-processors were ordered by USAID for the Province.

In a meeting at the P&D Department in early January, approval was given to hire computer persons for each computer location in the Irrigation Department. The Systems Analyst attended a computerization meeting in Islamabad during the quarter.

The Computer Cell prepared the following outputs during the quarter:

- Fortnightly progress report on the Chief Minister's directives
- Audit reports on the Flood Damage Restoration Program
- Expenditure statement for the Flood Damage Restoration Program
- Revised Establishment Budget for 1991-92
- Monthly Expenditure Statement for Budget Section
- O&M Workplan for 1992-93
- Non Development Budget for 1992-93
- Mid year review of Annual Development Program
- Statement showing increase/decrease in culturable commanded area since 1947.

Monitoring and Evaluation. A field visit was made by the Provincial Advisor and the Design Engineer to judge the condition of two projects that had previously been rehabilitated. The USAID

Purpose Level Monitoring form was reviewed and revised to reflect project achievements since October 1991.

Training. One XEN attended a mid-level management training course entitled "Effective Letters, Reports and Presentations" held at the Pakistan Institute of Management. Two SDOs attended a presentation of the "Design Strategy" training module at the Punjab Engineering Academy. Two SDOs attended the O&M Equipment Trial workshop at the PEA in March. Three participants attended courses at the Construction Machinery Training Center in Islamabad.

Training was provided by the Design Engineer to SDOs in the use of Lotus 123 for the following applications:

- Computation of internal rates of return,
- Design of retaining walls,
- Channel design using Manning's formula.

### Balochistan

The Technical Assistance Team functioned with full activities throughout the quarter. A mechanic was hired to conduct training in the Mechanical Workshop, who subsequently was engaged by the PID as a permanent employee. The Project Assistant, Mr Khokhar resigned on 19 March and was replaced by Mr Mohammed Ali, who joined the project on 25 March.

Rehabilitation Design. There has been no change in the status of the Design Cell, with no appointments of technical staff except the Chief Engineer Design. An Assistant Engineer was posted, but soon after was transferred out.

The TA Team visited Dera Murad Jamali and discussed the condition survey and procedure for the redesign of the Uch Canal with the SE and XEN Pat Feeder. The design of the channel was decided in a joint meeting attended by XEN, Resident Engineer NESPAK, and TA Team. A detailed note for design of outlets, prepared by the TA Design Engineer was handed over to the XEN, who will prepare the scheme for "Remodelling of Uch Canal".

The Verchume Dam Project was visited by the TA Team and an inspection note was sent to the Provincial Coordinator for necessary action. It is the opinion of the TA Team that the structural stability of the dam and the capacity of the channel should be evaluated.

The PID re-invited tenders for the Nari Canal Rehabilitation scheme because the cost rates in previous tenders exceeded "Administrative Approval" by more than 15 percent. No tenders have been received for Sibi Branch, whereas tenders received for other channels are still under process in the PID. It does not appear that the execution of the rehabilitation work can be completed in time to allow for post rehabilitation monitoring during the USAID project period.

A visit was made to "Pathan Kot Rehabilitation Schemes, Loralai". The quality of work was found to be satisfactory, but there is need for improvement in the design of falls. The TA Team discussed this matter with the SE and the XEN Loralai.

Operation and Maintenance. The Superintending Engineers have been requested through the Provincial Coordinator to supply information for preparation of the "Annual O&M Program 1992-93". The TA Team believes that the Computer Cell is now fully qualified to compile the data from the field, but considerable effort is required at the Circle levels to make sure that the data is reliable. There is some confusion between the expenditures that can be incurred under annual maintenance and under extraordinary replacement and rehabilitation expenses.

The Secretary Irrigation, Provincial Coordinator, XEN Pat Feeder, and three SDOs attended the workshop on the O&M Equipment Trial held in Lahore on 2-3 March to identify problems and suggest remedial measures. Field visits were made monthly by the TA Team to Pat Feeder Division to evaluate the progress of the program and to guide the field staff. Monitoring information was sent to the O&M Coordinator in Lahore.

Equipment and Workshop. Impressive progress was made by the Quetta Workshop during the quarter. Mr George Miller, short-term advisor for Workshops and Heavy Equipment Overhaul spent about one month at the workshop, assisted by the Provincial TA Mechanical Engineer and a TA Mechanical Engineer on special assignment from Lahore. Excellent support was provided by the SE Mechanical.

Electrical faults in the Giddings & Lewis radial drill were rectified and the machine was brought into operation. A cutting blade was obtained from Lahore for the Rigid metal hacksaw and that machine was made operational. The milling machine was brought into service and gears are now being manufactured using this piece of equipment. The valve grinding machine and head shop, which were previously installed in the engine shop, were moved to the machine shop to allow them to be used with proper safety precautions. Stones were obtained from Lahore to bring the surface grinding machine into operation. An Ingersol Rand air compressor, supplied by USAID during ISM-I, that had not been unpacked, was installed and operationally tested.

One Fiat Allis dozer of the Pishin Division was overhauled with USAID supplied spare parts and overhauling of two more units is in progress. One D6D Caterpillar dozer engine was overhauled at Pishin and inspected by the TA mechanical staff. One J.I. Case dozer is being overhauled under the supervision of the Case service engineer, providing good on-the-job training to the workshop staff. Overhauling work has been started on one D7G Caterpillar dozer and is progressing satisfactorily. Based on inspection of the machines, spare parts lists were prepared for three Fiat Allis 14C dozers, one J.I. Case 1450-B dozer, and two Fiat Allis 361-B scrapers and forwarded to USAID for procurement.

Two lubrication trucks that were provided during ISM-I were made operational. One was handed over to Dera Murad Jamali Divi-

sion and one to Pishin Division. The TA Mechanical Engineer, in later visits, observed that each of these trucks is being effectively utilized.

Construction equipment utilization remained very satisfactory during the quarter. There are many ongoing schemes in the province, and the available equipment cannot meet all of the needs. Furthermore, most of the equipment is old and in need of repair/rehabilitation. An inventory and inspection of construction equipment is being carried out with the assistance of the TA Mechanical Engineer, and a comprehensive report is being prepared.

Monitoring and Evaluation. Pre-rehabilitation monitoring for hydraulic and agro-economic conditions has been completed for the Nari Canal system by ACOP and WMED, but reports have not been received. As noted above, delays in implementation of rehabilitation work on the Nari system will not allow time for full post-rehabilitation monitoring to be carried out during the USAID project period.

Detailed data collection for redesign of the Uch Canal has been completed by ACOP and their report was received.

The provincial TA Team is continuing to assist in the monitoring of the O&M Equipment Trial, as described above.

Computerization. Five computers are already installed in the Computer Room in the Chief Engineer's Building in Quetta. One computer was transferred to Loralai but could not be installed due to problems with the electricity supply. There is a problem in locating the air conditioner which was supplied by USAID for installation at Loralai. At the end of the quarter, renovation of the computer room at Sibi had not been completed, but the computer and the air conditioner have been delivered to Sibi on the understanding that the computer room will soon be ready.

A two-month training course for the first batch of 12 administrative personnel was completed on 16 February by the TA Team with support of the Computer Cell. They were given training in DOS, Word Perfect, and Lotus. The training of the second batch of nine persons started on 1 March and will be completed 16 May.

Implementation of the Mainsaver program has been started in the Quetta Workshop. The data for the equipment being inspected has been entered into the program. Data for spare parts received from USAID for overhauling of two dozers has been entered and work orders for the dozers have been generated.

Implementation of the Mainsaver program has been started in the Quetta mechanical workshop. The data for the construction equipment being inspected has been fed into the program. Data for spare parts received from USAID for overhauling of two dozers has been entered and work orders for these dozers have been generated.

Training. One XEN attended a mid-level management training session entitled "Effective Letters, Reports and Presentations" at the Pakistan Institute of Management, Lahore. Two Assistant Engi-

neers attended a session of the training module, "Design Strategy" at the Punjab Engineering Academy in Lahore. One participant started a three-month course at the Construction Machinery Training Center, Islamabad.

The PID Systems Analyst attended a short-term overseas training session entitled "Computer Applications in Management" in the U.S. He is expected to return in the next quarter.

A substantial amount of hands-on training was provided for the workshop and mechanical personnel. Mr George Miller, short-term advisor, gave training in operation of workshop machines, use of special tools and gauges, tool room operation and management, and overhauling of construction machinery. A local trainer was hired by the TA Team for training in operation of workshop machines; he was subsequently taken on by the PID as a permanent employee. Field personnel in Dera Murad Jamali and Pishin were given training in operation and maintenance of the lubrication trucks. Field staff in Quetta and Loralai Circles were given training in routine maintenance of construction equipment.

### Federal Office

The office of the Chief of Party continued in its primary responsibility to support the functioning of the Provincial offices. These include liaison with the Federal Coordination Cell and with USAID, coordination with subcontractors, DAI and ACE, arrangements for specialists on short term assignment, USAID contract administration, and all financial management.

O&M Equipment Trial Program. The Program comprises a one-year trial of the use of light mechanized equipment, based on a standard farm tractor, for routine maintenance of canal banks by irrigation subdivisions. The Program is being implemented in 27 subdivisions, under nine divisions, in all four provinces. The Program is being monitored and an evaluation will be prepared.

The trial program remained in progress during the quarter, except in NWFP where it has been decided to reassign the equipment to different subdivisions in April, along with the necessary orientation and training. Utilization of the equipment was monitored by the O&M Trial Coordinator in Punjab and by the TA Civil Engineers in the other provinces. The equipment has been found to be generally suitable for the intended routine maintenance and for minor repairs of canal banks, however, level of utilization varies considerably among the participating divisions. The main reason for low utilization in some divisions is difficulty in obtaining funds needed for operations.

A discussion workshop was held at the Punjab Engineering Academy on 2-3 March. The objectives of the workshop were to have participating field personnel identify problems in implementation of the program and to have them, and high level PID officials, propose means for resolution of the problems. The workshop strategy was to have the junior officials (SDOs and XENs) actually involved in the Trial Program attend the first day to identify

their problems and propose solutions in a free discussion atmosphere, and to have senior officials (XENs, SEs, and CEs) attend the second day to consider and endorse the proposed solutions. The workshop was attended by 23 SDOs, 8 XENs, 9 SEs, 3 Chief Engineers, and Secretary Irrigation, Balochistan. A report on the workshop was under preparation at the end of the quarter.

Arrangements are being made by USAID to procure some additional equipment for the Trial Program. One additional set of tractor and implements each will be provided to Punjab, Balochistan, and NWFP. Motorcycles will be supplied to sub-engineers in some trial divisions to evaluate their effectiveness for increasing mobility.

Hydraulic Monitoring. Procurement of hydraulic monitoring equipment to equip 13 circles for a pilot program is in process by USAID. A report "Implementation and Operation of Pilot Hydraulic Monitoring Project", which had been prepared earlier and held pending commitment of the procurement, was distributed to all divisions in the participating circles. Arrangements were made by USAID with ACOP to provide 20 sessions of hydraulic/sediment monitoring training to PID personnel, with emphasis on the circles that are scheduled to receive the equipment. Arrangements were made to draft a training manual in Harza's home office.

Surface Drainage Manual. The Drainage Engineer on short-term assignment, returned on 14 January, after a two-month absence. He and the Associate Drainage Engineer made a visit to Balochistan, having visited the other provinces earlier. In the remainder of the quarter work was concentrated on preparing the draft of the Manual for Surface Drainage. First and second drafts were reviewed by the Chief of Party and other members of the TA Team and revisions and additions were made. The drainage manual team continued liaison with the Irrigation Departments and other agencies concerned with surface drainage. Preparations were started for a discussion workshop on the draft manual, to be held in April.

Training. The Training Specialist continued to assist the Federal Coordinator in facilitating overseas training, to provide liaison between provincial offices and federal agencies on status of training nominations, and to work closely with the USAID Training Engineer in making arrangements for in-country training. In order to facilitate financial arrangements, Harza continued to administer payment of travel and subsistence costs for in-country trainees, on the basis of a Purchase Order issued by USAID.

Details of specific training activities are given in the reports of provincial activities.

Monitoring and Evaluation. Information was collected and assembled for preparation of the USAID Purpose Level Monitoring Report for the period October 1991 - March 1992.

Two short-term consultants advised the local agencies carrying out the study for evaluation of the impact of rehabilitation of canals and drains. Dr James Wolf assisted ACOP in analysis of data collected for the Nagnah Distributary system and prepared a report

format to be used as a model. Dr Shane Ryland worked closely with the agencies carrying out the agro-economic evaluation, PERI for Punjab and WMED for the other provinces. Because of non-standard construction of the data bases by both agencies, his efforts were concentrated on preparing procedures for revising the data bases so that analysis can be carried out by current standard software. It was decided to add a computer specialist to the Lahore TA Team staff, primarily to assist the agencies in preparation of the data bases.

Computerization. Delivery of the 60 sets of computer equipment of the computerization expansion program to the end-users was completed. Most of these were installed and tested during the quarter by EGS, the USAID contractor responsible for installation, and Dadi Associates, the agent of AST Systems, who will implement the warranty, under the coordination of the provincial TA Teams.

During a visit to Pakistan by David Steele, Vice President of J B Systems, the supplier of the Mainsaver software, an agreement was reached on modifying the software to accommodate the special needs of the provincial mechanical workshops. Agreement was also reached on the content and schedule of Mainsaver training to be provided in the U.S. in July 1992.

Specific computerization acuities are described in the provincial reports above.

### Highlights of Planned Activities in Next Quarter

Intensive liaison will be maintained with the involved agencies of the Punjab PID on preparations for rehabilitation of gates and other facilities at Balloki Barrage and completion of rehabilitation works at Jinnah Barrage.

Assistance will be provided for renovation of the foundry facilities at Jamshoro Workshop in Sindh, and in installation of the engine dynamometer.

General emphasis of technical assistance at workshops will be on utilization of USAID-supplied spare parts in overhaul of construction machinery.

The O&M Equipment Trial will be re-started in NWFP and routine monitoring of the program in all provinces will continue.

Assistance will be provided to WMED and PERI in organization of the pre-rehabilitation data bases to be suitable for standard analytical procedures.

A draft of the Manual for Surface Drainage will be reviewed in a discussion workshop to be held in April.

On-going technical assistance activities will continue. These include assistance in canal system design improvement, assistance in O&M planning, mechanical workshop training and assistance in equipment repair and overhaul, assistance in computerization, monitoring and evaluation activities, and assistance in the off-shore and in-country training programs.