UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

ISLAMABAD, PAKISTAN

IRRIGATION SYSTEMS MANAGEMENT PROJECT

PHASE II

Project Number 391-0467

QUARTERLY REPORT

Ninth Quarter, Ending 31 December 1991

HARZA ENGINEERING COMPANY
Contractor

DEVELOPMENT ALTERNATIVES, INC.
Subcontractor

ASSOCIATED CONSULTING ENGINEERS-ACE (PVT) LTD
Subcontractor

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

IRRIGATION SYSTEMS MANAGEMENT PROJECT - PHASE II

QUARTERLY ACTIVITIES REPORT
Quarter Ending 31 December 1991

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. The TA Team now comprises 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 was at full strength during the quarter. Intensive Preparations were made for the second phase of gate rehabilitation at Jinnah Barrage, to be carried out in the next quarter. Assistance was provided to the PIDs in completion of the O&M Work Plans for 1991-92. Work continued on preparation of a Surface Drainage Manual. Construction equipment utilization generally improved and mechanical workshops, except for Multan, were active in repair and overhaul of equipment. Parts and supplies were received for completing the commissioning of all mechanical workshop machines and in-depth training was provided at the NWFP Workshop. 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. All computers and associated equipment for the Expansion Program were received in country and delivery was made to some end users. 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 vacation/home leave absences by the Chief of Party and the Punjab and Balochistan Provincial Advisors.

Short-Term Assignments

Agro-Economic Impact Evaluation Expert. Dr. Shane Ryland arrived on 15 September and departed on 22 November. 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-project 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 13 September for the first of several assignments leading to the preparation of a manual for planning, design, and maintenance of surface drainage systems for irrigated areas. He completed this first assignment on 5 November.

Equipment Maintenance and Overhaul Expert. Mr. George Miller arrived in Pakistan on 17 September for a three-month assignment, primarily for activating USAID-supplied equipment in the NWFP Irrigation Department Mechanical Workshop. He carried out a similar assignment in 1990 at the Sindh PID Jamshoro Workshop. During this visit he also provided occasional assistance in the ongoing O&M Equipment Trial Program. He departed Pakistan on 17 December.

Hydraulic Evaluation Impact Expert. Dr. James Wolf, of the DAI staff, arrived in Pakistan on 4 October for a one-month assignment to assist ACOP in the Three-Year Program for Evaluation of the Impact of Rehabilitation of Canals and Drains. During this assignment, he assisted ACOP in analysis of data collected on equity and reliability of water deliveries for pre-project conditions and on preparation of pre-project conditions reports.

Barrage Gate Rehabilitation Specialist. At the request of the Punjab Irrigation Department, Mr. Chandar Sehgal, of Harza, visited Pakistan from 12 to 24 November. He reviewed designs and procedures for the rehabilitation of gate tracks at Jinnah Barrage, visited the Moghulpura and Bhalwal Workshops, and visited Jinnah Barrage and Balloki Headworks. Just prior to his departure, he participated in a final review meeting and presented his recommendations.

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, who was employed for several months in 1990 for the Jinnah Barrage gate track rehabilitation program, was re-engaged for a period of about four months to assist in foundry development in connection with the second phase work at Jinnah Barrage.

Utilization of Staff Time

	Person Time		
	Budget	Used	Remaining
Expatriate Resident	274	161	113
Expatriate Short Term	58	25	33
Home Office	62	27	35
Local Professional	539	298	241
Local Support	2112	618	1494

Provincial Activities

Punjab

Activity continued at a strong pace in all six elements of the project in the final quarter of 1991. During the first half of the quarter, four short-term expatriate specialists were given logistic support by the Lahore project office. The Provincial Advisor started home leave on 6 December.

Emphasis during the quarter was focussed on preparations for rehabilitation of gates at the Jinnah Barrage in the forthcoming closure period.

Rehabilitation/Civil Works. Strong emphasis continued on the Jinnah Barrage rehabilitation effort which is scheduled to take place during January 1992 closure. The Subcommittee under the chairmanship of Mr. Khalid Mahmood, Chief Engineer, Sargodha Zone, met several times during this quarter to plan and prepare for the upcoming work. During a Subcommittee meeting in mid-October there was uncertainty and concern over specifications relating to the manufacture of the replacement track plates, the roller trains, and the staunching plates. To resolve these concerns and clarify uncertainties Mr. C.K. Sehgal, Gates Specialist, Harza Engineering Chicago, visited Pakistan from November 12 to 24. While here he visited the Mughalpura Irrigation Workshop, the Bhalwal Irrigation Workshop, Jinnah Barrage, Balloki Barrage, and attended three meetings with the Subcommittee. On his final day in the Punjab a meeting was held in which it appeared that all the concerns involving the mechanical side of the gate repairs were resolved.

A meeting was held with the Secretary Irrigation Punjab on 12 December to inform him of the status of preparations for work at Jinnah Barrage and to obtain his support in resolving issues. These included possible extension of the closure period, arrangements for transport, logistic support for workers at the site, and security arrangements with regard to the proximity to tribal areas.

On November 5, the PA and the Equipment and Workshop Advisor (E&WA), along with other USAID Contractor representatives, attended a meeting with the U.S. Ambassador. They gave a brief summary of Project activities in Punjab with emphasis on the Jinnah Barrage work. They expressed strong concern over the condition of the irrigation barrages in the Punjab. They explained that due to the poor state of repair of the gates the potential of gate failure was very high and if such a failure should occur during high water conditions the entire barrage could be damaged. The Ambassador expressed interest in this issue and indicated that he would possibly visit the Jinnah Barrage during the repair operation in January 1992.

In addition to the Jinnah Barrage, some limited investigation will be performed at Balloki Barrage. This work will be to determine the amount of deterioration that has occurred to the gates especially the skin plates and support members. With this

information, an estimate of cost of rehabilitation work will be prepared to initiate the USAID funding process.

A rest house at the Bhalwal Irrigation Workshop was renovated and furnished by the Punjab TA Team. This will be used by the team members while assisting the Bhalwal Workshop, and during the Jinnah Barrage repair effort.

Additional details of mechanical work for rehabilitation of barrage gates are given in the section on Equipment and Workshops.

Operation and Maintenance. The Punjab Irrigation Department submitted their Operation and Maintenance Plan to NESPAK for review and to be combined with the plans from the other three provinces.

The trial of division-level O&M equipment packages based on farm tractors, which was initiated in the preceding quarter in four Punjab divisions, continued. Preliminary monitoring indicates that the program is progressing well in most locations, with slow progress in a few locations. The main reasons for slow progress appear to be delays in funds for POL reaching the subdivisions and that most of the vehicles in the equipment package have not been supplied to the subdivisions. Where equipment is being fully utilized, it appears to be very effective and highly productive in accomplishing routine maintenance of canal banks and roads.

The expatriate Drainage Expert and the local Associate Drainage Engineer, who joined the TA Team late in the preceding quarter, were supported by the office of the Provincial Advisor Punjab. Their activities are described under the Federal Office.

Equipment and Workshops. Parts purchased by USAID for rebuilding two D8K Dozers were received by the Mughalpura Irrigation Workshop. One dozer has been completely overhauled and work on the other is in progress. Work on four Wabco scrapers has been initiated and overhauling will be started on receipt of spare parts being procured by USAID.

Twenty milling machines which were manufactured last year for work at Jinnah Barrage were reconditioned and eight new machines were fabricated at the MIW. The new machines have been designed to accommodate the longer tracks of the sluice gates. Nineteen members of Bhalwal Workshop were trained at MIW for work at Jinnah Barrage. Technical assistance for casting of rollers for the barrage gates was provided by the TA Team Metallurgist.

A temporary computer was arranged for the MIW for the Mainsaver application. Two permanent computers are expected to be delivered in January. Work continued on training of personnel and inputting of parts inventory data.

Utilizing USAID funding, the foundry facilities at Bhalwal Workshop were upgraded and started the casting of ductile iron plates for replacement gate tracks for the Jinnah Barrage. Previously, the ability to cast ductile iron under the standard of quality control achieved, had not been available in any of the Irrigation Departments.

The engine overhauling section of the Bhalwal workshop, which was equipped by USAID remains idle for want of work. It has been recommended that the Excavator Division at Faisalabad send machines to Bhalwal for overhaul since USAID-supplied spare parts are available at the workshop. A PIL for fabrication of storage racks for spare parts was issued during the last quarter, but work has not started as yet. Gate fabrication for Simly Dam is a major activity at the workshop and is progressing satisfactorily.

There has been no change in the status of the Multan Workshop. Tubewell repair and vehicle repair/overhauling are the only activities being carried out. No workload or staff have been provided for construction equipment overhauling. Institutional adjustments have been recommended frequently to increase the workload, or the machines should be transferred to other locations where they would be utilized.

Construction equipment utilization remained about average during the quarter. About fifty percent of the available equipment remained idle for want of workload. Excavating equipment is working on several drainage schemes and on flood protection works on the Ravi River. It is expected that utilization will increase in the next quarter when a number of equipment oriented schemes should be undertaken. A major problem in equipment utilization is non-availability of spare parts to the equipment custodian divisions, especially for hydraulic excavators. Spare parts and special tools were supplied with the equipment but are in the custody of the workshops. Efforts are being made to improve the liaison between the equipment divisions and the workshops.

Monitoring and Evaluation. Emphasis continued on the programs for monitoring and evaluation of canals and drains being rehabilitated under the ISM-II Project. Dr. Shane Ryland, who had arrived in September and departed in November, provided guidance and technical assistance to the Punjab Economic Research Institute (PERI), which is performing the agro-economic evaluation for three canal systems and one drain in Punjab. PERI completed the field work for the pre-project evaluation and is expected to complete the analysis and report preparation for one system in January. Dr. Ryland also assisted the Watercourse Monitoring and Evaluation Directorate (WMED), which is carrying out similar work in the other provinces.

Dr. James Wolf, of DAI, spent one month in October-November providing assistance to the Alluvial Channels Observation Project (ACOP), which is performing the hydraulic investigations for the impact evaluation in all of the provinces. Special attention was given to the Mona Bhera Drain, the only drain among the systems being evaluated.

As mentioned above under Operations and Maintenance, an initial monitoring visit was made to the divisions involved in the O&M Equipment Trial in the Punjab.

Computerization. The major effort during the quarter was concentrated on assuring that the rooms for the new computers were properly renovated. The TA staff worked closely with the PID staff

at the selected locations, informing and preparing them to receive the units. Most of the room renovation was completed by the end of the quarter, however, in most cases, the electrical grounding was inadequate. Computers for locations in the Lahore urban area were shipped from Karachi in late December, with installation expected to start in January.

A prototype computer program for irrigation revenue (abiana) assessment, billing and recording was completed by the TA staff and the Computer Cell. Arrangements were made for a pilot demonstration to irrigation officials in January. The TA Systems Analyst assisted the WMED and PERI staff in preparation of the data base for the agro-economic evaluation, described above.

Training. The Punjab Engineering Academy (PEA) began its 1991-92 series of short training courses in irrigation operations, design, and maintenance, funded and supported by USAID. In addition to courses for Punjab personnel, a series of ten courses, from October 1991 to March 1993, will be offered for personnel of the other three provinces. This program has the strong support of the Punjab Minister of Irrigation, who has attended several functions at the Academy.

In November, Ms Laurie Johnston, U.S. Counsel General, presented the PEA with a Coaster van that was purchased by USAID. The PEA also purchased several computers with its own funds to support training in computer applications associated with its engineering courses.

On-the-job training continues to be given by the TA specialists at the workshops, especially in the area of equipment overhaul. The TA Metallurgist provided training to the staff at the Bhalwal foundry for producing special ductile cast iron for the replacement track plates to be used at the Jinnah Barrage.

The Additional Secretary and the Chief Engineer for Coordination of the Punjab PID attended a two week International Seminar on Irrigation Water Management in the U.S.

Nine XENs and A/XENs attended mid-level management training courses presented by the Pakistan Institute of Management in Lahore and Karachi. Courses include:

"Teamwork - Getting People to Work Together",
"Development Course for Managers",
"Skills in Administration",
"Streamlining Administrative Procedures/Paper Work",
"Problem Solving and Decision Making Skills",
"Effective Letters, Reports and Presentations".

The TA staff are developing a plan for providing training at all of the locations where the new computer equipment is being placed. The training will be customized to meet the needs of each location. In addition, plans are being developed for a special session to be held at the Computer Cell for the purpose of demonstrating to the Chief Engineers, Superintending Engineers, and Executive Engineers ways that computers can aid them in performing

their duties. However, due to the anticipated workload during the next quarter, this may not occur until second quarter 1992.

Sindh

USAID travel restrictions in Sindh continued during the quarter and the PA was able to spend only two days in Hyderabad during this period. Another planned trip to Hyderabad had to be cancelled because of a week-long ban by USAID on all travel. A specific security impact on the project was the kidnapping in Hyderabad of the local contractor who was to install the dynamometer at the Jamshoro Workshop.

Rehabilitation Design. At the start of the quarter, the week-long trial presentation of a course for division-level engineering spreadsheet applications was completed in Quetta. The trial revealed several adjustments that should be made; the main ones were the course should be expanded from one week to two weeks and the instruction day reduced from six hours to five hours. The Balochistan PA was given responsibility to finalize a training module for the course so that it could be given to an experienced training contractor for presentation. At the end of the quarter, the USAID Training Officer visited the Sindh to review training facilities that had equipment and personnel capable of presenting a number of computer training courses; the division engineering applications course was one of those to be presented.

Operation and Maintenance. During October, the remainder of the O&M trial equipment was delivered to the three Divisions selected for the trial and week-long field training sessions on operation and maintenance of the equipment were presented at each Division. At the end of the quarter, the ISM-II Design Engineer had started the first monitoring visits to the concerned Divisions and Subdivisions to learn degree of use, problems being encountered, and effectiveness of equipment for routine canal maintenance.

In mid October the Drainage Specialist and the local Associate Drainage Engineer visited Karachi to interview Irrigation and Agriculture Department officials. They solicited input on the scope, format, and contents of a Surface Drainage Manual to be prepared under the Project. This was followed by more defined requests for information, and proformas were distributed to eight drainage divisions in Sindh requesting basic information on all surface drainage systems in their jurisdiction. At the end of the quarter, a sizeable amount of field drainage and precipitation data had been forwarded to Lahore for review.

Revisions were made on the computerized break down of O&M units for all irrigation divisions under Guddu Barrage and sent to the Chief Engineer there for final review. The spreadsheets indicate there are roughly 2,248 miles of irrigation channels commanded by the barrage, which is in reasonable agreement with the total given in Sindh O&M Yardsticks dated November 1988. Work continued on Kotri Barrage divisions, and it is expected that next month spreadsheets will be in good enough shape to send to that Chief Engineer for final review. Revisions were also made for nine divi-

sions from information received from Sukkur Barrage. However, field checks are still awaited for some divisions on information given to them in September, and no basic irrigation data has ever been received for Southern Dadu Division, which is now the main impediment to progress on this barrage.

Equipment and Workshops. Jamshoro workshop was reasonably active during the quarter with work continuing on fabrication of canal gates, rebuilding of hydraulic excavator buckets, crankshaft rebuilding and grinding, and fuel pump and injector repairs and calibration in the diesel laboratory. A Caterpillar D8K bulldozer was completely overhauled using spare parts received from USAID, and a John Deere model 450E bulldozer was repaired. Three older pieces of construction equipment once considered scrap were returned to active service during the quarter. This included repair of a Euclid 22 cu yd motorized scraper, repair of a Gallion model T-500 motor grader and complete rebuilding and overhauling of a Link Belt Speeder crane. USAID-procurred spare parts for two Dresser scrapers were delivered to Jamshoro in mid-December. However, problems of financial irregularities may delay returning this much needed equipment to active service.

USAID has issued a PIL for rehabilitating the large capacity cupola furnace in the foundry at the Jamshoro Workshop. The TA Team Metallurgist, who prepared the initial scope of work, will supervise the improvements.

Construction equipment utilization remained below the normal level because of non-availability of funds and low workload. However, the group of Dresser scrapers remained engaged throughout the quarter on construction of river bunds in the Guddu region. The utilization of hydraulic excavators remained high, except for the Yumbo Excavators, which require replacement of engines. Utilization of auxiliary equipment remained above normal.

Some hydraulic excavators are reported to have been transferred from custody of mechanical to civil divisions. There are concerns about the prudence of such a change of policy since control, operation, repair, and maintenance of the equipment will be scattered, and accurate utilization records may be more difficult to assemble.

The Mainsaver program seems to be working satisfactorily, with repair work orders being generated and spare parts inventory changes being made.

Monitoring and Evaluation. The construction contract for rehabilitation of the Nagnah Distributary was signed, the work order issued on 17 November, and physical work started on 12 December. The construction contract for Puran Distributary was signed and the work was issued during the quarter. These two systems are in the group that have been designated for evaluation of the impact of rehabilitation.

Computerization. Late in the quarter, the Provincial Project Coordinator presented evidence to USAID that the preconditions regarding maintenance contracts and staffing of top positions in the

Computer Cell were being satisfactorily resolved. Authorization has been given for equipment under the Computer Expansion Plan to be released to the Sindh Irrigation Department. Installation at site and testing of all computer equipment will be done by EGS Ltd under contract to USAID. The installation of new computer facilities will have to be delayed until power supply and earth connection deficiencies are corrected since these deficiencies could void equipment warranties.

A significant part of the Provincial Advisor's and the System Analyst's time during the quarter was spent in organizing and coordinating the distribution of computers and accessories received in the USAID Karachi warehouse. Each of the 62 CPUs was opened and, as a minimum, hard disc, floppy disc drive, and mouse were installed and tested. Minor items such as software, cables, diskettes, etc, were split up and repacked so boxes could be grouped for each recipient. By the end of the quarter, 244 boxes containing 49 computer systems had been shipped to the NWFP and Punjab PIDs. The 65 boxes containing the 13 computers and accessories for the Sindh PID are expected to be distributed in January.

Training. Eight Sindh PID personnel attended mid-level management training sessions given by the Pakistan Institute of Management in Karachi and Lahore during the quarter. These included:

"Teamwork - Getting People to Work Together",
"Streamlining Administrative Procedures/Paper Work"
"Problem Solving and Decision Making Skills",
"Development Course for Managers",
"Skills in Administration", and
"Effective Letters, Reports, and Presentations".

Forty Sindh PID personnel attended training modules given at the Punjab Engineering Academy at Lahore. Eighteen attended "Surveying", 17 attended "Estimating", and five attended "Operations and Maintenance" sessions.

Northwest Frontier Province

Rehabilitation Design. During the quarter, the TA Team Civil Engineer reviewed the design prepared for the Kot Hafiz Distributary and provided comments to the PID.

Newly arrived software on channel hydraulics and flood hydrology was installed on the Design Cell computer and the Civil Engineer studied the documentation in preparation for instructing PID personnel on its use.

The Drainage Specialist, Richard Wenberg, visited the NWFP during the quarter. He briefed members of the PID staff of plans for preparing a manual for design and maintenance of surface drains. During this visit a trip was made to inspect the recently-completed Landrai Drain.

The Provincial Advisor for Balochistan visited the NWFP and made an inspection of small irrigation structures in the Mardan SCARP. The purpose of the visit was to determine the applicability

of modernized standard designs for small irrigation structures to the irrigation systems in Balochistan.

Operation and Maintenance. During the quarter the O&M Manual was reviewed and revised. A final draft was prepared and quotations of printing cost were received from five printers. The quotations were passed on to USAID for arranging of financing the printing of 300 copies.

A draft O&M Work Plan for 1992-93 was completed during the quarter. Final corrected values for O&M requirements were not received from some subdivisions, so the plan could not be finalized. It is projected that it will be finalized in early January.

The O&M Yardsticks which were prepared and submitted to the PID last year were discussed with the Chief Engineer. An additional copy of these yardsticks was submitted to him and he was requested to get the use of these yardsticks approved. These yardsticks require updating each year.

The O&M trial equipment was delivered during the quarter. A seminar concerning the use of this equipment was held in Peshawar. A one-week demonstration and training programs on the actual use of the equipment in the field was held in Bannu.

Equipment and Workshops. An Equipment Task Force meeting, chaired by the Secretary Irrigation, was held on 26 November. The substantial progress made in activating the NWFP Irrigation Workshop was reported and the Secretary indicated his support for continuing expansion of workshop activities.

The Heavy Equipment Overhaul Specialist, Mr. George Miller, was stationed in Peshawar during most of the quarter. He supervised commissioning of workshop machines and training of personnel in machine operation and equipment overhaul. Prior to departure, he submitted a draft report with a summary of his activities, recommendations for improvements in the workshop, and a list of additional equipment required to make the workshop fully functional. A final report will be provided after obtaining additional information in the U.S.

Spare parts for three D8K dozers, a Broomwade air compressor, and a Caterpillar 225 hydraulic excavator, procured by USAID, were received. One D8K dozer and the air compressor were successfully overhauled before the end of the quarter. A Fiat-Allis motorized scraper, which was standing idle for the last 12 years was repaired, commissioned, and deployed at Gandiali Dam, where it is working productively. A consignment of machine tools, general purpose tools, hydraulic hoses and fittings, spares for lubrication trucks, and service station items, procured by USAID, was received during the quarter. Many of these items were used in the commissioning of workshop machines and the training provided by the Equipment Overhaul Specialist.

Fabrication of two gates for the Warsak Gravity Canal was completed during the quarter. Work on seven more gates is continuing. Three more small gates were fabricated for other sites. The XEN

Mechanical, along with the TA Team Mechanical Engineer, met with the Harza Gates Specialist, Mr. Sehgal, in Lahore. The purpose of the meeting was to discuss special training in gate design and fabrication that could support expansion of the gate manufacturing activities at the NWFP Irrigation Workshop.

Construction of two tubewells at Akora and Bababar was completed during the quarter. The Workshop has the capacity to drill up to 12 tubewells per year. It is projected that more tubewell construction work will be assigned to the workshop in the future. Three hollow-shaft electric motors were rewound for the Tubewell Division, Peshawar.

A PIL for construction and equipping an equipment maintenance/service facility at D.I. Khan was issued by USAID. Arrangements were made for contracting the work. The D.I. Khan Mechanical Subdivision will use this facility for maintaining construction and maintenance equipment assigned to the area around D.I. Khan.

The World Bank has proposed that construction equipment provided to maintain the Mardan Scarp Project be handed over to the PID. This equipment was inspected by the TA Team during the quarter.

The utilization rate for construction and maintenance equipment increased during the quarter. Equipment utilization reports continued to be prepared routinely. The use of the workshop equipment is increasing and utilization rates are improving.

Computerization. The Systems Analyst attended a computerization meeting in Islamabad in November. Discussions were held on the procedures for shipping and installing the computers procured by USAID, and on the requirements that must be met in rehabilitation of computer rooms. Subsequent to the meeting, all of the sites for computer installation were visited. During the quarter six project computers arrived in Peshawar, four for the Chief Engineer's computer cell one for the Design Center and one for the Provincial Coordinator's Office. These computers were jointly installed by an EGS/Dadi Team.

During December the USAID System Analyst was on one-month sick leave.

A U.S. Corps of Engineers hydrologic/hydraulic engineering software package, HEC 1 and 2, was received. This software was installed on the design cell computer and the TA Team Civil Engineer studied the documentation in preparation to instructing PID personnel.

Monitoring and Evaluation. As part of his assignment advising ACOP on monitoring for the impact of canal rehabilitation on reliability and equity, Dr. James Wolf visited the Chowky Distributary system. ACOP will carry out analysis and report writing for the Chowky system as a model for the other eight systems in the impact monitoring program. He was accompanied by the TA Team Civil Engineer.

Training. Seven XENs attended mid-level management training courses given by the Pakistan Institute of Management in Lahore and Karachi. The course titles are listed in the Punjab narrative above. Four engineers attended a module on surveying, four a module on Estimation, and five a module on Operations and Maintenance, all presented at the Punjab Engineering Academy in Lahore.

One mechanic completed a three-month operator training course at the Construction Machinery Training Center in Islamabad. Two more mechanics joined a three-month mechanic's training course at the Center in November.

A one-week training session was held at Bannu in late November on use and maintenance of the O&M trial equipment.

One officer attended a four-week course in Irrigation System Rehabilitation at Colorado State University in the U.S.

The TA Team Civil Engineer continued to provide training to PID engineers in the use of Lotus 123 software.

Balochistan

The Technical Assistance Team functioned with full activities throughout the quarter, except for few days in October when curfew was imposed in Quetta city. However. the activities in the mechanical workshop remained suspended for about 50 percent of the time due to a strike by PID staff. Because of political disturbances and law and order problems, travel was restricted to some areas of the province.

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.

The remainder of the condition survey of the Uch Canal, not done by ACOP, was been performed jointly by the Pat Feeder Division and NESPAK. Since this a "problematic channel", observation of its detailed hydraulic and sediment data was completed by ACOP in September 1991. The TA Team visited Dera Murad Jamali and discussed the condition survey and procedure for the redesign of the channel with the SE and XEN Pat Feeder. Several requests were made to ACOP for the survey results and analyses. Now it is expected that a report from ACOP will be provided in January. As a result, work on the design has been delayed. The design will be prepared with the support of the Provincial Advisor Sindh, who has extensive experience in design of alluvial channels.

The Provincial Adviser and TA Civil Engineer visited Mardan SCARP in NWFP to observe the design and construction of small standard structures. The Mardan SCARP is a major drainage and canal system modernization project. It was noticed that the structures were working satisfactory without any erosion or scour. Consideration will be given to recommending that the design criteria followed in Mardan SCARP be adopted in Balochistan.

Operation and Maintenance. All out support was provided to the PID in preparation of the "Annual O&M Program 1992-92." The Program has been completed and sent to the World Bank after review by NESPAK.

The "Compendium of Yardsticks and Budget Estimates For Operation and Maintenance of Irrigation Systems In Balochistan" has been updated as of June 1991 by the TA Team Civil Engineer and forwarded to the Chief Engineer for necessary action and for approval by the Finance Department.

The Civil Engineer gave maximum support to the PID in preparation of working paper requesting the Balochistan Finance Department for additional non-development funds for O&M of irrigation systems during the current year, in order to meet the covenant of ISRP-II Loan and the Yardsticks, which had been updated to June 1991.

Equipment and Workshop. About 50 percent of the time was lost during the quarter due to a strike by the PID workshop staff and curfews imposed because of law and order problems. On resumption of word, activities gradually picked up momentum.

Spare parts for overhauling one D7G dozer and two Fiat-Allis dozers, procured by USAID, were received. Also, a sizeable consignment of hydraulic hoses and fittings, machine tools, missing items for previously supplied workshop machines, servicing/lubrication equipment, and safety items were provided by USAID.

During the quarter, the workshop accomplished the overhauling of one D6D dozer engine, repair of a torque convertor for a Fiat-Allis 14C dozer, and sevicing/repair/maintenance of government vehicles.

The TA Team Mechanical Engineer along with the XEN Workshop visited Quetta, Loralai, and Sibi Circles to allocate/print inventory code numbering and to physically inspect each machine assigned to these circles. This inspection revealed condition, repair/overhauling needs, spare parts requirements, etc. About 70 pieces of equipment were inspected and a draft report prepared. After visiting Makran Circle, a final report will be prepared for use in planning the repair and overhauling of construction equipment.

A very useful Equipment Task Force meeting was held on 8 December under the chairmanship of the Chief Engineer. This meeting was attended by all SEs, Workshop XEN, and USAID and Harza representatives. Many decisions were made concerning improvement in qualitative and quantitative progress of workshop activities, construction equipment utilization, computerization, and training. A progress review and workshop planning meeting was also held with the SE Mechanical by the Equipment and Workshop Advisor.

Spare parts received through USAID for the overhauling program were entered into the computerized inventory under the Mainsaver program. Other computerization activities remained suspended because of the law and order situation.

Monitoring and Evaluation. The pre-rehabilitation survey for equity and reliability of Main Nari Canal and Kurak Branch has been completed by ACOP. As decided in the meeting held on 7 July, WMED has started monitoring of two tail outlets of Sibi Branch in place of outlets of Nari Main Canal.

Construction work for rehabilitation of the Nari Canal System has not started because tendered cost exceeded administratively approved cost by more than 15 percent. Thus, rehabilitation work cannot be completed by the end of June 1992. Post rehabilitation evaluation will be possible for only one season (Rabi 1992-93) if PID finishes rehabilitation by August 1992, which also appears unlikely. This constraint has been brought to the attention of the Provincial Coordinator and the Chief Engineer.

Detailed data collection for the Uch Canal was completed by ACOP in September, as described above in" Rehabilitation Design"

Computerization. The computer room in the Chief Engineer's Building at Quetta has been renovated and five computers have been installed. The remaining 8 computers will be installed once the computer rooms at Sibi and Loralai are rehabilitated and the personnel are fully trained.

Training of eight personnel, comprising six junior clerks, one stenographer, and one draftsman, was started on 16 December at Quetta. The course is planned for two months in which the trainees will first learn DOS, Word Perfect, and Lotus and then will conduct practical work in the PID computer cell under the supervision of the Systems Analyst. Training is being conducted by PID Computer Cell staff with the support of the TA Team.

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. Training in use of the O&M trial equipment was conducted at Dera Murad Jamali for the staff of Pat Feeder Division from 14 to 18 December.

Six irrigation officers participated in six training sessions conducted by the Pakistan Institute of Management in Karachi and Lahore. The training session subjects were as listed under Punjab and Sindh, above.

Four subengineers attended a training session based on the "Surveying" module at the Punjab Engineering Academy in Lahore. Five SDOs attended the "Estimation" module, and five SDOs attended the "O&M", both also presented at the PEA.

One equipment operator from the Civil Subdivision, Dera Murad Jamali, completed a three-month operator-training course at the Construction Machinery Training Center in Islamabad. Arrangements were made for two participants to attend an operator-training ses-

sion at the Center, but they were not accepted because of late arrival.

The TA Team reviewed and updated the manual developed for Division-Level Engineering Computer Applications Training. An instructors' manual was prepared, following the same outline as the training modules prepared under ISM-I.

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 26 subdivisions, under nine divisions, in all four provinces. The Program will be monitored and an evaluation will be prepared.

The delivery of O&M Trial equipment, which started in the preceding quarter, was successfully completed in all the four provinces. The trial program, started in Punjab in the preceding quarter, was started in Sindh, NWFP, and Balochistan. One-day seminars were held in each of the three provinces to familiarize the Project Coordinator and his staff, along with participating SEs and XENs, with the purpose and goals of the trial program. Following the seminars, pre-training visits were made to the participating divisions by the O&M Coordinator and the TA Civil Engineer of the province. Following this, a one week training program for personnel each division. Representatives of the tractor supplier, Millat, and the implement supplier, JECO, assisted in the training.

With the completion of the start-up tasks, the one-year trial has now started in all the provinces. The monitoring program is being developed, and visits will be made to each subdivision (total of 26) in January-February 1992 to collect initial information on the progress. An O&M Trial Equipment Workshop will be scheduled in he first week of March 1992. The purpose of the workshop is to identify current institutional and field problems and find ways to resolve them.

Hydraulic Monitoring Equipment. A report, "Assessment of Hydraulic Monitoring Equipment Needs of Provincial Irrigation Departments", which evaluates equipment needs for full operation for the provinces and various alternative lower levels, including a pilot project, was submitted to USAID in November. The purpose of this report was to assist USAID in determining appropriate funding levels for procurement of equipment. Another report, "Implementation and Operation of Pilot Hydraulic Monitoring Project", was put in final form in December but publication is being deferred until a final decision on funding level is made by

USAID. This report describes equipment to be provided and how it is to be used.

Surface Drainage Manual. Work on a manual for surface drainage in irrigated areas was initiated in mid-September with the arrival of Mr. Richard Wenberg on short-term assignment. A retired official of the Punjab Irrigation Department with substantial drainage experience, Mr. Zafar Burki, was engaged by subcontractor, ACE, to work with Mr. Wenberg, and in his absence, as Associate Drainage Engineer. The drainage team visited the Provincial Coordinators and engineers concerned with surface drainage in each of the Provincial Irrigation Departments, except Balochistan. Field visits were also made to representative drains systems in Punjab. Forms were prepared for recording data of irrigation surface drain systems and sent to each of the PIDs. An outline of the manual was prepared and estimates of costs of reproduction were obtained. Mr. Wenberg departed on 5 November and is scheduled to return to Pakistan on 14 January 1992. A visit to the Balochistan PID is scheduled for shortly after his return.

The drainage team also provided expert advice on the monitoring and evaluation of the impact of rehabilitation on the Mona Bhera Drain system. During Mr. Wenberg's absence, Mr. Burki collected information on the Mona Bhera Drain and on other drain systems in Punjab.

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. A meeting was held with the USAID Office of PDM to submit the annual Purpose Level Monitoring Report. Major accomplishments in the Project were shown in the areas of irrigation system maintenance, equipment utilization, and canal and drain system rehabilitation. Some landmarks were also achieved in the institutional development component. Issues that were raised by the PDM office included status of the impact evaluation study and the reliability of data collection. PDM also requested more information on indicators of financial sustainability.

Two short-term consultants advised the local agencies carrying out the study for evaluation of the impact of rehabilitation of canals and drains. ACOP completed a first-draft analysis of the pre-project conditions of equity and reliability of the Chowky Distributary in NWFP, following a format provided Dr. James Wolf. This draft was sent to Dr. Wolf in the U.S. for review.

Dr. Shane Ryland worked closely with the agencies carrying out the agro-economic evaluation, PERI for Punjab and WMED for the

other provinces. Both agencies were to complete a model analysis and report on one canal system by the end of December. A draft analysis of the Nari Canal system in Balochistan was made by WMED and sent to Dr. Ryland for review in December. PERI was unable to complete a model analysis of the Pakpatten Canal system by the end of December because of inadequate computer facilities.

O&M Equipment Trial Program. Major achievements were made in the program during the quarter. The delivery of maintenance equipment, which started in the preceding quarter, was successfully completed in all the four provinces. The trial program, started in Punjab in the preceding quarter, was started in Sindh, NWFP, and Balochistan. One-day seminars were held in each province to familiarize the Provincial Coordinator and his staff, along with the participating SEs and XENs, of the purpose and goals of the Program. Following that, pre-training site visits were made by the O&M Trial Coordinator and the concerned TA Team Civil Engineer. One week training programs for personnel of the participating divisions, were conducted at each division site.

With the completion of the above tasks, the one-year trial program has now started in all provinces. A first draft of monitoring forms was completed and will be tested in January. Visits will be made to each subdivision (26) in January-February to collect initial information on the progress. An O&M Equipment Trial Workshop will be held in early March to identify and discuss institutional and field problems and seek ways to resolve them.

Computerization. A landmark was achieved during the quarter with the delivery to the USAID Karachi Warehouse of all of the computers, peripherals, and software, totalling 60 sets, for the Computer Expansion Program. A meeting was held in Islamabad of the TA Systems Analysts, representatives of USAID, and representative of EGS and Dadi Associates to coordinate shipping and installation procedures. EGS is the USAID contractor responsible for installation of the computers and Dadi Associates is the agent of AST Systems, the computer supplier, who will implement the warranty. The equipment was checked and sorted into end-user packages by the Provincial Advisor and Systems Analyst for Sindh and Dadi Associates at the Karachi Warehouse. Some shipments were received by end-users in NWFP and Punjab by the end of the quarter.

A temporary restriction was placed on delivery to Sindh end-users until it was established in a meeting with the Provincial Coordinator and the USAID Project Officer on 12 December that preconditions would be met.

Highlights of Planned Activities in Next Quarter

The TA Team, including Mechanical Engineers assigned to other provinces will assist the Punjab Irrigation Department in performing the rehabilitation of gate tracks at the Jinnah Barrage during the canal closure period.

Monitoring procedures will be established for the O&M Equipment Trial and a discussion workshop will be held in March.

The participating agencies will be encouraged and assisted to complete the pre-rehabilitation analyses and reports for the Impact Evaluation.

The delivery and installation of computers supplied under the Expansion Program will be completed.

First draft materials for the Surface Drainage Manual will be prepared and distributed for review, in preparation for a discussion workshop to be held in early April.

In-depth, hands-on training will be provided to staff of the Quetta Irrigation Workshop by the Construction Machinery Overhaul Specialist. Similar training has been provided in the Jamshoro (Sindh) and Mughalpura (Punjab), and NWFP Workshops.

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.