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INT/81/026 - FIELD 1981/83
VOL. 17

FORM NO. 635
(6–77)

CLOSE – OUT SHEET

This file is closed as of Dec 31, 1983.

For further correspondence, please see vol I 1984/86.

RECORDS MANAGEMENT SECTION

INT/81/026

December 30, 1983

Mr. Ken Mills
Testing Manager (CATR)
Harpenden Rise Laboratory
Harpenden Hertfordshire
AL5 3BJ
England

Dear Ken:

-na Re: UNDP INT/81/026 Handpumps Project

The enclosed memo from Leif Rosenhall is self-explanatory. CAAMS will have to supply much more information -- we had even asked them to get price quotations. Meanwhile could you give us some preliminary comments on the general content of the order, including:

(a) Does the equipment for CAAMS (Annex I) constitute a well-grounded set of HP lab equipment?

(b) Does it contain items which would definitely not be needed for this purpose?

(c) Is a Dual 6800 computer justified for shallow (suction) HP testing in Changsha (Annex II)?

(d) What other basic equipment would Changsha need?

Sincerely yours,

Gerhard Tschannerl
Senior Project Officer
Applied Research & Technology Div., WUD

Copies: Arlosoroff (WUD), Rosenhall (WB/Bangkok)

Enc.

GT:slj

OFFICIAL FILE COPY

INT/81/026

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HAVE SENT THE FOLLOWING TX TO MOLG AND MOWD TODAY

QUOTE

MINISTRY OF LOCAL GOVERNMENT
ATTN. MR. ODIPO
UND
MINISTRY OF WATER DEVELOPMENT
ATTN. MR. KARIUKI

RE: VIP PILOT SCHEME KISUMU, 73 65 661

PLEASE CONFIRM TO US WETHER YOUR MINISTRY HAS MADE AVAILABLE THE NECESSARY FUNDS FOR MCK TO PURCHASE THE MATERIALS AND EQUIPMENT ASKED FOR IN THEIR LETTER HDD/81/1 DATED OCT 28, 1983. WE SHOULD LIKE TO UNDERLINE THAT WE TRUST ON YOUR UTMOST COOPERATION FOR MR. WILSONS SHORT STAY IN KISUMU BEGINNING JAN 15 TO BE SUCCESSFUL. REIMBURSEMENT OF THE FUNDS WILL BE MADE OUT OF THE CURRENT LOAN FOR THE KISUMU PROJECT.

WITH BEST WISHES FOR THE NEW YEAR - KREDITANSTALT
UNQUOTE

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FORM NO. 27 - OCR (3/82)

WORLD BANK OUTGOING MESSAGE FORM Cable, Telex

INT/81/026

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BOOK OF TWO

716

1) UNDEVPRO, BEIJING, CHINA (TELEX 22314-DTPBJG)

2) GTZ, FRANKFURT, FEDERAL REPUBLIC OF GERMANY

841

(TELEX 415-230 GTZ)

END OF TEXT

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CLASS OF SERVICE: Telex TELEX NO.: See above DATE: 12/30/83

SUBJECT:

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PAGE 1 OF 2

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START HERE

FOR MANFRED KULESSA RESIDENT REPRESENTATIVE, UNDEVPRO, BEIJING, CHINA INFORMATION KLAUS KRESSE, GTZ, FRANKFURT. RE UNDP INT/81/026. OUR TELEX REFERENCE NO. 1617.

ALPHA PLEASE ORDER THREE VEHICLES (TOYOTA COROLLA STATION WAGON 1300 CC FOUR-SPEED MANUAL FLOOR SHIFT WITH AIRCONDITIONING AND PARTS KIT) TOTAL COST OF EACH AT JAPANESE YEN 1,300,000 (ONE MILLION THREE HUNDRED THOUSAND) CIF TIENJIN APPROXIMATELY U.S. DOLLARS 5,603.45 EACH AT THE RATE OF 232 OR U.S. DOLLARS 16,810 CIF TIENJIN TOTAL FOR ALL THREE.

BETA IN ADDITION, WE AUTHORIZE YOU TO PAY FOR LOCAL TRANSPORTATION COSTS FOR ONE OF THESE CARS TO BE DELIVERED TO CHINESE ACADEMY OF AGRICULTURAL MECHANISATION SCIENCES (CAAMS) IN BEIJING, THE SECOND CAR TO CHANGSHA AND THE THIRD CAR TO JINCHENG SPECIFYING FOR THE USE OF UNITED NATIONS VOLUNTEER (UNV) FOR UNDP HANDPUMP PROJECT NO. INT/81/026.

GAMMA PLEASE TAKE THE APPROPRIATE ACTION AND ADVISE US ANY ADJUSTMENTS IN THE AMOUNTS NEEDED. WE SUGGEST ADDING COMPREHENSIVE INSURNCE COVERAGE.

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PAGE 2 OF 2 | OFFICIAL DEPT/DIV ABBREVIATION: WUDOR | MESSAGE NUMBER | TEST NUMBER (FOR CASHIER'S USE ONLY)

START HERE

DELTA PLEASE BILL US BY INTEROFFICE VOUCHER CHARGING INT/81/026 BUDGET LINE 42.03 GTZ/CHINA. PLEASE SEND IOV AND ORIGINAL DOCUMENTATION TO NANCY HWANG.IMPORTANT TO SEND TWO COPIES OF IOV TO SAUL ARLOSOROFF WATER SUPPLY AND URBAN DEVELOPMENT DEPARTMENT ATTENTION ADMINISTRATIVE/BUDGET OFFICER REFERENCE COMMITMENT NO. GTZ/026/401.

EPSILON OPERATION AND MAINTENANCE COSTS WHEN CAR IS USED BY OUR UNV WILL BE CHARGED PRO RATA TO THE PROJECT. A LOG BOOK FOR EACH CAR WILL BE MAINTAINED AND COSTS TO BE CHARGED AS AGREED. FUEL AND MAINTENANCE MAY BE CHARGED TO LINE 51.03 OF INT/81/026 OF GTZ/CHINA.

ZETA WE ARE MOST GRATEFUL FOR YOUR ASSISTANCE. BEST REGARDS AND HAPPY NEW YEAR SAUL ARLOSOROFF PROJECT MANAGER AND FROM CHIEF OF DISBURSEMENTS II, LOAN DEPARTMENT, WORLD BANK

END OF TEXT

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CLASS OF SERVICE: Telex

TELEX NO.: See Book Page

DATE: 12/30/83

SUBJECT: INT/81/026

DRAFTED BY: CdelCastillo:aq

CdelCastillo

EXTENSION: 61469

CLEARANCES AND COPY DISTRIBUTION: cc & cleared with: Messrs. Arlosoroff, Tschannerl, WUDOR; Banfi, LOA
cc: Mr. Potashnik, UNDP, N.Y.;
Mr. Rosenhall (to wait for arrival in Washington, D.C.)

AUTHORIZED BY (Name and Signature): Gerhard Tschannerl

FOR ARLOSOROFF:

G. Tschannerl

DEPARTMENT: WUDOR

SECTION BELOW FOR USE OF CABLE SECTION

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INT/81/026

12-28-83

Back to office report

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

COPY

DATE: December 28, 1983

TO: Mr. S. Arlosoroff, Chief, Applied Research and Technology Division, WUD

FROM: David Grey, Regional Project Officer (East Africa) INT/81/026

SUBJECT: Mission to Malawi - November 9-16, 1983 - Back-to-office Report

1. As authorized in your telex No. 3899 of October 24, 1983, I visited Malawi from November 9 to November 16, 1983. The purpose of the mission was to collect together and analyse all the Handpump Performance Monitoring data that has been gathered since INT/81/026 activities commenced in Malawi in mid-1982. For that purpose I stayed in the Upper Livulezi Project Area for four days.

2. Following my mission, I have prepared an Aide-Memoire on discussions held with officials of the Department of Lands, Valuation and Water which I attach as Annex 1 (together with letters to UNDP and DLVW). I have also prepared, at your request, a short report on the performance of the Consallen handpumps which has already been sent to you and to Ken Mills of CATR (for onward transmission to Mr. Allen of Consallen). The main report resulting from the mission is the Handpump Performance Monitoring Report, attached as Annex 2.

3. Your attention is drawn to Paragraph 3 of the Aide Memoire, as it will be necessary to submit candidates to the Malawi Government to replace San Shwe Aung as Country Monitoring Engineer. The new CME will need to be of a high calibre and certainly a graduate engineer, as the next stage of our programme in Malawi will be demanding. Ideally the new CME should be in post by May 1984.

4. The Monitoring Report contains much detail of the Maldev pumps and is therefore long and a little indigestible. However, I consider it essential to give in full the rather complex handpump combinations within the Livulezi Project, as no-one remaining in Malawi is fully aware of the reasons and the detail. Much of it is only known to me from my time in Malawi, and my memory is fading. The information will be of value in the next stage of Maldev pump development, and therefore needs to be recorded.

5. There are clearly improvements still to be made in the Maldev design, perhaps the biggest step being the change to acetal bearings. Nevertheless the Maldev has performed well, better I think, than expected. Perhaps the most important feature is that with it we have within our grasp, in the next year or so hopefully, a truly 'VLOM' pump that could be made entirely in a small developing country. This is in contrast to the Verguet, Volanta and others, where important components will come from outside for sometime to come.

Encl:

DGrey/kwk.

AIDE-MEMOIRE

1. Introduction

The purpose of this Aide Memoire is to record points of discussion at a meeting on November 16, 1983 between Mr. Mwakikunga (Water Engineer in Chief DLVW). Mr. Chilton (DLVW), Mr. Nhongo (Asst. Resident Representative, UNDP) and David Grey (Regional Project Officer, UNDP/WB Rural Water Supply Handpumps Project INT/81/026). Results to date of the handpump monitoring in Malawi under INT/81/026 are incorporated in a separate monitoring report, which is attached.

2. Maldev Pumphead Manufacturing Consultancy

The question of the consultancy to assist in establishing efficient volume production of the Malawi borehole pumphead (Maldev) with the preparation of a full manufacturing manual was discussed. Of the individuals submitted by UNIDO for the consultancy, the Malawi Government has selected Mr. D. Unwin and that choice is strongly supported by INT/81/026. Mr. Unwin is a mechanical engineer of wide experience and, in his capacity as Chief Engineer of Consumer Association Testing and Research (CATR) in U.K. (a post from which he has just retired), he has been responsible for the last six years for the full-scale testing of about 30 handpumps from all over the World. Over the last two years he has also supervised a World Bank and ODA co-funded project whose aim has been the development of simple, lightweight down-hole components which can be locally manufactured and which would be eminently suitable for the Maldev pumphead. He has just completed the laboratory testing of the Maldev pump in the handpump test programme funded by INT/81/026, and he already has a provisional outline for the manufacturing manual, with many improvements that have resulted from both the laboratory and field trials of the pump. An example of a possible major modification is the replacement of steel ball races (used as bearings in the pumphead) by acetal bushes (which can be made in Malawi). A prototype has been closely monitored in the field in Malawi for 15 months and is showing remarkably little wear; two more prototypes were installed recently and 12 months of INT/81/026 laboratory testing under extreme conditions has perfected the acetal bush design. It is clear therefore that Mr. Unwin could make a valuable contribution in a relatively short time, and that any alternative consultant would not have the benefit of Mr. Unwins experience, which include his 2 year association with the Maldev pump and his 6 years association with the CATR handpump testing and development programme. As nothing had been heard from UNIDO regarding the consultancy for a long period, it was agreed in the discussion that UNDP would raise the question again with UNIDO and that if they were unable to resubmit Unwin then an alternative source of funding for the consultancy would be sought. INT/81/026 would assist in identifying funds, so that the consultancy can be undertaken without further unnecessary delay. Unwin proposes to undertake the assignment in 3 stages; first a preliminary identification visit to Malawi of about 2 weeks (he visited the present factory which is making the pump, in December 1982 at the time of the Groundwater Conference); secondly a period of about one month in the U.K. where he has access to workshops and a drawing office etc. and a final period of 2 to 3 weeks in Malawi. As this arrangement appears sensible and also the benefits of having Unwin supported by CATR to undertake the consultancy are considerable, it is hoped that this will be acceptable. I await confirmation from UNDP as to whether an alternative source of funding for the consultancy needs to be identified.

3. Country Monitoring Engineer (UNV)

San Shwe Aung, the INT/81/026 Country Monitoring Engineer stationed in Kandeu (Livulezi Project HQ), arrived in Malawi at the beginning of September 1982 and will be finishing his assignment in June 1984. With the planned integrated groundwater programme and the mass production of handpumps that will be necessary to accompany it, there is much benefit in continuing the detailed monitoring programme. This is particularly so due to the installation during 1984 of many prototype 'down-hole component' sets, in preparation for manufacture of these in Malawi. I would therefore propose that a further INT/81/026 mechanical engineer be appointed to replace San Shwe Aung, and that he takes up the post by May 1984 to allow adequate overlap. There will be benefit if the new Country Monitoring Engineer be posted to and housed in Lilongwe, so that monitoring can be extended to Dowa West and he can have greater involvement in handpump production quality control and further development of the shallow well handpump.

San Shwe Aung's work is currently greatly hampered by his lack of transport. He has a caravan and a motorcycle provided by INT/81/026 and the motorcycle is adequate for his routine monitoring work. But, as he has several junior staff members with him and often needs to remove, install or repair pumps he is actually transporting pumps, pipes, rods and people on his motorcycle, which is both impractical and possibly dangerous. It would be greatly appreciated if a small pickup could be made available for this work. San Shwe Aung has been given a small imprest by INT/81/026 to enable him to procure small items to minimise delays with his work (e.g. spares for his motorcycle) and to fund minor prototype activities (particularly to test small improvements to the shallow well handpump).

4. National Rural Water Supply Handpump Engineer

Again, with the planned expansion of the integrated groundwater development programe and the consequent very large number of handpumps to be installed, there is a need for a national counterpart to the INT/81/026 Country Monitoring Engineer, to assume responsibility for the design and development, manufacture and quality control, and installation and maintenance of rural water supply handpumps. There are already probably 7 or 8,000 handpumps already providing protected water supplies to up to 2 million of Malawi's rural population, and this figure will perhaps double in the next few years. The task is therefore a very important one. A suggested job description for this post is attached as Annex 1.

5. Handpump Performance

Handpump performance details are in the November 1983 Handpump Performance Monitoring Report for Malawi. In general terms, of the borehole pumps the production Maldev pumpheads and the India MK II pumps are performing well and the Consallen pumps are performing poorly. 5 of these latter pumps (of which there are now only 12 operating) will be removed in early 1984 and be replaced with improved Consallens (modified by the manufacturer as a result of the Malawi trials). Of the shallow well handpumps, the Pipe Extruders 'Madzi' pump is performing fairly well (although its popularity is questionable) and the Mark V pump is performing poorly. A number of improvements to the MK V have been incorporated in the last few months and these pumps will be watched closely. There is a clear need to improve the reliability of the shallow well unit.

6. Village Caretaker Training

Village caretaker training started in the Livulezi Project in mid 1982. It was very clear from observations during my recent stay in Kandeu that the impact of the training courses is very high. Almost all waterpoints are clean and well cared for. At many waterpoints, village caretakers greeted us and showed us their universal spanners which they use monthly to tighten nuts and bolts on the Maldev pumphead and also their caretaker diaries, properly filled in. A major reason to expect continued good performance from the Maldev pumpheads within the Livulezi Project is the regular attention they receive from the village caretakers.

However, caretaker training has not started in the Dowa Project due, apparently, to lack of funds and, similarly, planned refresher courses in the Livulezi have had to be cancelled pending identification of funds. The caretaker training programme may prove fundamental to the success of the integrated groundwater development programme and as such deserves maximum support. We discussed the possibility of creating a small caretaker training unit which would be responsible for planning and implementing a programme of initial and refresher courses for village volunteers in water collection and use, water point care and handpump maintenance. The training unit could be supported by a project which would provide transport and funds for training materials and running costs. I have informally discussed this with the Senior Programme Officer of the UNDP Division for Global and Inter-regional Projects in New York (Mr. M. Potashnik) who has seen and is impressed with the training materials and details of the Caretaker training programme that has so far been implemented by Miss Mauluka. He told me that UNDP would look very favourably on such a project submission from the Malawi Government, to be funded under INT/83/003 which is an interregional project entitled 'Women and the Water Decade'. If you consider this proposal to be of benefit I suggest that a short project proposal be prepared to include procurement of a vehicle, vehicle running costs for two years and costs for preparation of training materials (printing, etc.) and running of training courses. I expect that the required input from INT/83/003 for a 2 year project would be about US$40-50,000. The proposal could then be submitted to UNDP for transmission to Potashnik in New York.

7. During our discussions I made the point that during the last 12 months I have visited rural water supply projects in many countries in Africa and Asia and there is little doubt in my mind that the Malawi programme is one of the most impressive of these. There has been some gloom over the Dowa West Project where costs of boreholes have been up to almost twice those of the Livulezi Project due to the use of drilling contractor, the greater average depth of the holes, the need to abandon a large number of boreholes due to unforeseen water quality problems, and the high cost of imported down-hole handpump components. Nevertheless, the all-in cost of MK3,000 (US$2,500) is very low indeed in the East Africa region. When the total costs of boreholes in a rural water supply project commonly range between US$4,000 and US$10,000. A rural water supply project proposal for Kenya currently being appraised cites direct costs for 15m dug wells with handpumps at US$8,000 each, with the indirect technical assistance cost component doubling this figure to US$16,000 per well. Clearly this is no reason for complacency regarding the costs in Malawi, as keeping them as low as possible and using an appropriate figure for project planning are essential. Nevertheless, the achievements so far are considerable and, as a government-planned and government executed programme, unique in the region.

Draft Job Description for National Rural Water Supply Handpump Engineer

Qualifications:

Degree in Mechanical Engineering preferred but diploma or degree in general engineering acceptable.

Experience:

Some previous experience in rural water supply construction and maintenance would be an advantage, but not essential. Considerable interest in rural water supplies and sound mechanical ability essential.

Terms of Reference:

Act as Government's representative in national handpump testing and development programme whose aim is the selection of handpump units which can be maintained at village level, be manufactured in Malawi and be introduced as standard units throughout the country.

Specific tasks will include:-

A. Together with the UNDP/World Bank Country Moinitoring Enginner, installation, maintenance and monitoring (of performance, utilisation, costs) of test handpumps in the Upper Livulezi Integrated Project for Rural Groundwater Supplies.

B. Coordination of handpump monitoring in other integrated projects and elsewhere in the country.

C. Cooperation with handpump design and development work at Blantyre Polytechnic and in the Private Sector as well as with the UNDP/World Bank and other handpump activities all over the world.

D. Study of handpump maintenance, development of maintenance tools and training materials and assistance with training of maintenance crews and village caretakers.

E. Organisation of handpump manufacture and establishment of quality control.

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

Regional Mission in Eastern Africa
Reinsurance Plaza, Taifa Road
P.O. Box 30577
Nairobi, Kenya

Telephone: 24391
Cable Address: INTBAFRAD

C O P Y

December 29, 1983

The Resident Representative
United Nations Development Programme
P.O. Box
Lilongwe 3
Malawi

Dear Mr. Gabre-Mahdin,

I enclose material relating to my mission to Malawi from November 9 to 16, 1983, and I should be grateful if you would forward it to Government. I suggest the following distribution:

1. Letter, Aide-Memoire and 3 copies of Monitoring Report to Mr. Nyasulu, Controller of Lands, Valuation and Water (DLVW).

2. Aide-Memoire and Monitoring Report to Mr. S. Mainala, Officer-in-Charge of Groundwater, DLVW.

3. Aide-Memoire and Monitoring Report to Mr. P. Chilton, Hydrogeological Adviser, DLVW.

4. Aide-Memoire and Monitoring Report to Mr. San Shwe Aung (UNV Country Monitoring Engineer INT/81/026).

5. A further 2 copies of the Aide-Memoire and Monitoring Report for your records.

By now, authority should have been received from Washington for Mr. San Shwe Aung to have access to a MK500 imprest under INT/81/026. This imprest is to be used for procurement of essential items necessary to avoid delays to his work and for minor purchases for handpump development work that cannot easily be procured through normal Government channels. A major reason for this imprest is the major interruptions to San Shwe Aung's work that have been caused by delays in procuring small items (for example piston rings for his motorcycle).

I was sorry, also, to have missed you during my visit. However, I received much advice and assistance from Mr. Lawson and Mr. Nhongo, for which I am most grateful. I look foward to seeing you during my next visit, which I tentatively plan for March 1984.

Yours sincerely,

David R. C. Grey
Regional Project Officer - INT/81/026
UNDP/WB Rural Water Supply Handpumps Project

Encl:

cc: Mr. S. Arlosoroff (WUD)

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

Regional Mission in Eastern Africa
Reinsurance Plaza, Taifa Road
P.O. Box 30577
Nairobi, Kenya

Telephone: 24391
Cable Address: INTBAFRAD

C O P Y

December 30, 1983

The Controller of Lands, Valuation and Water
Private Bag 311
Lilongwe 3
Malawi

Through The Resident Representative
United Nations Development Programme
P.O. Box
Lilongwe 3
Malawi

Dear Mr. Nyasulu:

I was sorry to have missed you in Malawi on my recent mission in mid-November, but I trust your trip to India was successful. I would like to take this opportunity to thank you and your staff for the hospitality and assistance afforded to me throughout my stay in Malawi, I will always enjoy my visits to Malawi!

I have prepared an Aide Memoire on discussion with Mr. Mwakikunga during my round up meeting. I attach the Aide Memoire and Annexes and also a report of the Handpump Performance Monitoring Results to date within the Livulezi Project, which includes a full data tabulation.

I hope to be able to visit Malawi again during the first quarter of 1984 and I look forward to seeing you then.

With best wishes,

Yours sincerely,

David Grey
Regional Project Officer - INT/81/026
UNDP/WB Rural Water Supply Handpumps Project

Encl.

cc: Gabre-Mahdin, UNDP, RR Lilongwe
Arlosoroff (WUD), PPU-Nairobi

INT/81/026 INTERREGIONAL RURAL WATER SUPPLY HANDPUMPS PROJECT

REPORT ON HANDPUMP PERFORMANCE MONITORING IN THE UPPER LIVULEZI INTEGRATED PROJECT FOR RURAL GROUNDWATER SUPPLIES, NTCHEU DISTRICT, MALAWI
NOVEMBER 1983

1. BACKGROUND

1.1. The handpump performance monitoring programme in the Upper Livulezi Integrated Project for Rural Groundwater Supplies is the focus in Malawi of field testing and technological development of rural water supply handpumps, in cooperation with the UNDP funded, World Bank executed Interregional Rural Water Supply Handpump Project. The major goals of the testing programme, in coordination with similar programmes in many other countries, are to increase the dependability and reduce the costs of rural water supply projects that utilise handpumps. This will be done through the identification of suitable handpumps for local manufacture and village-level maintenance, the development of a methodology for their installation and maintenance and whenever possible the actual establishment of in-country manufacture. Malawi is already a leader in the field of handpump development, with the production of both deep and shallow lift handpumps and the training of village caretakers in first line maintenance already well underway.

1.2 The handpump monitoring programme in Malawi was the first to start in the UNDP/WB global programme. Handpump installation in the Livulezi Project started in early 1982 and monitoring was undertaken irregularly until the arrival of the INT/81/026 Country Monitoring Engineer in September 1982, when full scale monitoring started. Nevertheless most handpump installation and maintenance details before September 1982 were recorded.

1.3 The following handpumps, which are the source of water supplies for 40,000 to 45,000 people, are currently being monitored in the Livulezi Project:

a)	Deep lift:	97 Maldev pumps (of 3 types, see below)
		23 India Mark II pumps
		14 Consallen pumps
b)	Shallow lift:	57 Mark V pumps
		10 Madzi/Blair pumps
	Total :	201 pumps

However of these the following deep-lift pumps are not used as the boreholes are virtually dry: 3 Maldev, 2 India MK II, 2 Consallen. Several shallow-lift pumps are also not being used as wells are dry (particularly at the end of the dry season).

1.4 Details of all the pumps being monitored are tabulated in Appendix I. The table also gives information about the borehole/dug well and about pump useage. Breakdowns are listed in the table for all pumps for which data are only available from April 1, 1983.

1.5 The remainder of this report describes the performance of the pumps and various down-hole assemblies. Particular attention is paid to the Maldev pump as this pump was designed and developed in Malawi and the Livulezi Project is its first real test. At the risk of this report being far too lengthy, much detail is provided of the various Maldev pumpheads and the numerous down-hole assemblies under test. The detail is given to provide a full record of experiences in the field. This record should be of value in the next stage of Maldev development.

1.6 It is planned that a consultant will assist in early 1984 in establishing volume production of the Maldev pump and prepare a full manufacturing manual. In preparing revised drawings he should take into account the laboratory test results, the field test results and experiences from several other countries where Maldevs are now operating. It is hoped that Mr. D. Unwin, the recently-retired Chief Engineer of the Consumer Association who has been associated with the Maldev pump since its inception and has been testing handpumps for many years, will undertake this consultancy.

1.7 It is perhaps important to note the limitations of the Upper Livulezi Project as a location for a handpump testing programme. Firstly the Project is unusual in that the high service level (designed on 250 people to a borehole and 125 people to a dug well) means that most villages have several pumps and none of the pumps are subject to the extremely heavy use common in some countries. Secondly, the high level of community involvement both in Project construction and maintenance ensures a high level of committment and care so that vandalism and misuse, common problems in many handpump programmes are almost unheard of. Thirdly water levels are not deep; only about 20% of the 134 deep well pumps are pumping from 20 metres or more and only 1 of them from over 30 metres (however these figures are probably fairly typical of most handpump projects in the East African region). Finally groundwater quality is, almost without exception, good throughout the Project area, so that corrosion does not pose a special problem. The Livulezi Project is clearly a 'good' project and one that should serve as a model for other projects in the region. It is, however, probably better to test handpumps in 'bad' projects where problems will be accentuated and become apparent much more quickly.

2. 'MALDEV' (AFRIDEV) PUMPS

2.1 Introduction.

Development of the Maldev pumphead commenced in Malawi during 1981 when a number of different prototypes were designed and built. In essence, the pumphead was designed from inception to be easy to maintain. Much was learnt from tried and proven pumps made elsewhere and some of their good features were incorporated, but none of these pumps can be described as 'easy to maintain'. Further essential design features were that: the pumphead should be manufactured in Malawi, and be relatively simple to make using off-the-shelf materials; the pumphead should be sturdy and reliable and readily able to cope with the 15m to 30m pumping heads commonly encountered in Malawi as well as the more exceptional 30-60m heads; and finally that the pumphead should be relatively inexpensive (US$100 was a target, with US$150 being acceptable). After several months of building prototypes a set of drawings were prepared in January 1982 for a pre-production run of 25 pumps. These pumps were built by Lilongwe Mechanical Development Limited without any jigs and fixtures, and many problems were encountered, with most pumps having to be returned due to assembly faults. Each handle and head were tailored as a set (whereas with the production units any handle would fit any head). 22 of these pumps were installed in the Livulezi Project between April and June 1982. In the meantime drawings were prepared for a full-scale production run, incorporating revised geometry to simplify manufacture and a number of other significant improvements. Cost estimates for a production run were sought from several potential manufacturers and two pumps each were hand-assembled without charge, according to the January 1981 drawings, by a company in Lilongwe and by Petroleum Services in Blantyre. Two units, one from each of these two companies, were sent in June 1982 to the Consumer Association (CA) for testing, under a project (cofunded by ODA and INT/81/026) to test and further develop the Maldev head. Due to the imminent start of the next batch for testing it was not possible to wait for a unit off the first production run. A production unit was sent to CA in November 1982 which replaced a pre-production unit after problems had been encountered in the test with bearing collapse in the handle, due probably to misalignment. The production unit completed the test without problems and the test report is awaited. The second pre-production unit manufactured by Petroleum Services, was installed in the Livulezi Project (ML(P)). Production drawings were completed in June 1982 and an order for 150 units was awarded to Petroleum Services Limited, Blantyre as they offered the lowest price. The first production units were ready in early August, but all of the first 20 units had to be sent back due to manufacturing errors. Much time was then spent in manufacturing a full range of jigs and fixtures for pumphead assembly and quality control. All components were to be identical and interchangeable (pumphead body, handle, hanger, cap, pedestal, etc.). A greatly improved quality was attained and production pumpheads started to be delivered and installed in September 1982. Since that time, to mid November 1983, 77 production units have been installed in the Livulezi Project, 10 in the Lower Shire and 95 in Dowa West, making a total of 183 production units currently in operation. Right from the start of the Maldev production the disadvantages of ball bearings for lever-operated handpump applications were recognised (the Maldev uses the same size ball bearing as the India Mark II, 2 in the handle and 1 in the rod hanger). As a possible alternative, one set of prototype bushes were made from polyacetal (an engineering plastic) by John Reynolds of CA in August 1982, these were sent to Malawi and a special pumphead (a Type 2 prototype Maldev MXa) was fabricated and installed in the Livulezi Project in September 1982. Extensive laboratory testing of these bushes in a Maldev head was undertaken by CA in the first half of 1983 with promising results and a further two prototype heads were installed in the Livulezi Project in September/October 1983 and moved in November 1983 to more arduous locations. In the ensuing sections the monitoring results of the three Maldev types (pre-production units, production units and Type 2 prototype with acetal bearings) will be discussed. As the down-hole components vary from standard brass cylinders with steel rising main and rods, all from various suppliers, to various prototype combinations incorporating plastic components these will be discussed seperately.

2.2 Pre-production Maldev ML and ML(P).

23 pre-production Maldev pumps (22 ML and 1 ML(P)) were installed between April and June 1982. Full details are given in the table in Appendix 1. Many of these pumpheads were seen to have faults at installation (poorly aligned handles, loose-fittings bearings and other faults). Since installation there have been nine breakdowns with seven pumpheads. Five pumpheads (M6, M8, M9, M10 and M17) have had problems with rod hanger bearings, one as a result of the hanger slipping off the bearing and four have had worn out bearings. M8 then had a replacement unsealed India MK II bearing fitted which only survived two months. Three pumpheads (M5, M9 and M23) have had problems with handle bearings, two as a result of handles slipping off the bearings and one with worn out bearings. As it has been general policy to phase out the pre-production pumpheads and replace them with production (MP) units (as there are many differences) M5, M8, M9 and M23 now have MP pumpheads. Furthermore, although working satisfactorily, M1 was changed from a ML to a Type 2 prototype (MXa) head. 18 pre-production Maldevs are still operating.

2.3 Production Maldev (MP)

77 production Maldevs have been installed in the Livulezi Project from September 1982 to the present, 41 of which were installed in 1982. Full details are given in the table in Appendix 1. Delays in installing the remainder were a result of a shortage of pump cylinders (although borehole construction was complete by about February 1982), which delayed the installation of many pumps until August and September 1983. To date there has not been one recorded breakdown. On 11 November 1983 the writer removed an MP pumphead (M52 on GP111) and replaced it with a Type 2 prototype MXb. This was selected as a rigorous test site as the pump is very busy with a pumping water level in excess of 25m and 16mm rods + 75mm cylinder. When the MP pumphead was removed, after just over 12 months operation, it was observed that the rod hanger bearing was damaged and would not have lasted much longer. Thus the first breakdown would possibly have occurred soon.

2.3 Prototype Type 2 Maldevs

The results so far of the minimal field trials of the prototype MX pumphead are limited but nevertheless are of sufficient interest to warrant special attention. One unit was installed in GP33, the extremely busy borehole in Kandeu camp, in September 1983. There are 4 identical polyacetal bushes (which could be readily and cheaply injection moulded in Malawi) in the pumphead, 2 in the handle fulcrum and 2 in the rod hanger. The bushes on the first prototype are a press fit in an outer housing and run on their inner surface on a pin (MXa). Rather crude measurements of the inside diameter of the bushes have been taken at various intervals with a somewhat unsatisfactory vernier. The measurements are given in Appendix 2. It can be seen that wear probably took place in the first few months after the pumphead was installed but from May 1983 to November 1983 there has been virtually no measurable wear. These results are remarkable, but various factors need to be taken into account. Firstly, the pump is undoubtedly one of the busiest units within the project; 2130 hrs of actual pumping was recorded by a prototype monitor attached to the pump outlet between the dates of 14

December 1982 and 20 October 1983, indicating an average daily period of actual pumping of almost 7 hours (there is however some doubt about the accuracy of the monitor). In December 1982 the standard 'A' type down hole assemblage of 16mm MS rod, 50mm GI rising main and 75mm brass cylinder was changed to prototype assemblage 'W' comprising 9.5mm stst rod, 75mm OD 67mm ID PVC rising main with a 63mm brass cylinder sleeved into the base. So with a pump setting of 21m and pumping water level of about 15m, the polyacetal bushes have not been operating under particularly rigorous conditions. The bushes were greased when installed initially, greased again after cleaning for measurements on 30/3/83, cleaned and not greased on 19/5/83, cleaned and greased on 22/6/83 and 16/8/83 and cleaned and not greased on 14/11/83. Two additional MX pumpheads were manufactured in September 1983 and one (MXb, with bushes rotating on both surfaces) installed on GP56 on 27/9/83 and the second (MXa, bushes rotating on inner surface only) installed on GP41 on 21/10/83. These were moved by the writer in mid-November 1983 to two of the most arduous settings within the project, both with heavy 'A' down-hole assemblages, one (MXb) very busy with a pump setting of 27m and a pumping water level of below 25m and the second (MXa) busy with a pump setting of 42m and a pumping water level of about 35m (see Appendix 1). Both of these heads have the disadvantage that the bushes are running on poorly machined pins that have actually been painted and the paint is being burnt off during operation. None of these acetal bushes have been greased. If the bushes survive this treatment, we have a remarkable bearing assemblage.

2.4 Down-hole assemblies

The various down-hole arrangements in use in the Livulezi Project are listed in the notes to Appendix 1. A total of eight are in use, of which one (CS) is used exclusively with the Consallen, a second (IS) is used exclusively with the India MK II (which is also installed with arrangement B) and the remaining six are currently being tried with the various Maldev pumpheads (with a further one (V) no longer in use). It may be noted that many other combinations have been tried within the project over almost 2 years, but those currently being tested are mostly relatively successful survivors. Each set of down-hole components used with the Maldev pumphead will be dealt with below:

a) The 'A' standard assembly, comprising 16mm MS rods, 50mm GI rising main and 75mm brass cylinders, is the traditional assembly in Malawi. As these have been the materials commonly available, the majority of the Maldev pumpheads on test use the A assembly, in contrast to the 12mm rods and 63.5mm cylinders (IS assembly) of the India MK II (some of the India MK II pumps on test use the B assembly) and the 9.5mm rods and 50mm cylinders of the Consallen. To put this into perspective, a 16mm rod is almost double the weight of a 12mm rod and almost three times the weight of a 9.5mm rod. An equal stroke with a 75mm cylinder delivers almost 50% more water than a 63mm cylinder and over twice that of a 50mm cylinder. Giving an example of this, the 'MXa' Type 2 prototype Maldev M97 in borehole GP22 has a standard A down hole assembly with a pump setting of 42m and a pumping water level of about 35m. When operating, the pumphead is under the equivalent stresses of a standard

India Mark II operating at a cylinder setting of about 75m and a pumping head of 50m or a standard Consallen with a cylinder setting of about 120m and a pumping water level of about 80m. Not surprisingly, this Maldev pump, with a 7:1 advantage handle, is heavy to operate. In general the 'A' assemblies have been very reliable. One very important point to make is regarding cup leather life. It has been estimated that the average life of a cup leather in a typical Malawi borehole is about 5 months. In May and June 1981 18 'A' assemblies were installed in Livulezi feasibility project boreholes. Two of these had new cup leathers in December 1982 (i.e. after one and a half years operation) and the remaining 16 assemblages still have the original leather seals two and a half years after installation, with none of these seals showing a marked fall in efficiency. The point is clear and that is with improved borehole design (well screen design and setting; gravel pack size and emplacement; development techniques) cup leather life has in most cases exceeded 5 times the average, and they continue to function well. This serves to re-emphasize the point that the Malawi programme has already made several times, and that is that good borehole design is as important, if not more so, than good handpump design - a good handpump on a bad borehole is no better than a bad handpump on a good borehole. Further emphasis for this point comes from boreholes GP96 (pump M33) and GP93 (pump M37) - see Appendix 1. The pump M33 was installed in GP96 on 5/10/82 and the borehole was 31m deep, the cup leathers were worn out and replaced on 20/6/83 and the borehole was 28.7m deep, they were again replaced on 27/10/83 and the borehole was 27.5m deep. The story is similar but less severe for GP93. Sand pumping, probably as a result of poor gravel emplacement and development, causes leather wear, rapid pump breakdown and borehole deterioration through infill. All over Malawi, borehole infill is recorded, as is rapid cup leather replacement. Cup leathers in a well-designed borehole may last as many years as those in a poorly designed borehole will last months. The 66 'A' assemblies with Maldev pumpheads have otherwise proved sturdy and reliable with no rod or rising main breakages and only 4 other problems, 3 caused by plunger separation on the seal retainer to valve body thread and 1 by mango pips jamming (but not damaging) a plunger. However the groundwater of the project area is non-corrosive (unlike in parts of the Dowa West Project area) so corrosion problems would not be expected. A final comment is that the 'A' assembly is heavy in operation and heavy to remove when maintenance is necessary.

b) The 'B' standard assembly is similar to the 'A' type but with 63mm brass cylinders. These cylinders were ordered in 1982 and arrived in mid 1983. The reduction in size from 75mm was a result of a conscious decision to standardise on a 63mm cylinder (as is used by 250,000 India MK IIs and is the standard for the PVC down-hole assemblages currently under development). There have been no problems at all with the 'B' assemblies (which have only been installed since August 1983).

c) The 'V' prototype assembly comprised 12mm MD rod, 75mm OD 67mm ID PVC rising main, 75mm OD 63mm ID PVC cylinder with a HDP plunger and extractable HDP footvalve (known as the 'Mcleod' footvalve and plunger). Two of these assemblies were installed in April 1982, one was removed shortly after due to very rapid cylinder wall wear caused by sand pumping and the second (M2 in borehole GP55) was left operating until 20/5/83. The footvalve worked well throughout the 13 months, although extraction was difficult due to the effort required. The plunger, however, wore the PVC cylinder wall rapidly and the typical sequence was efficient operation for a month or so with efficiency falling during the second month to almost zero. The top pump rod was then cut to reduce its length by 200mm, resulting in the plunger operating in a new cylinder section. The sequence then commenced again. When removed, the cylinder wall showed marked wear although the plunger body was only slightly scored and not greatly worn. A 'Mcleod plunger' from the 'V' assembly is now working (in the 'Z' assembly) in a brass cylinder and working fairly well. A 'Mcleod footvalve' is working very efficiently in assembly 'X'.

d) The 'W' prototype assembly comprises 9.5mm stainless steel rods, 75mm OD 67mm ID PVC rising main with an old 63mm brass cylinder (complete with brass footvalve) sleeved into the bottom of the PVC pipe (by heating the latter), and a 63mm brass plunger with cup leathers. 6 of these assemblies have been working in the Livulezi Project with 4 remaining and 16 are working in the Dowa project. In all cases the PVC rising main is suspended from a rubber cone compressed by two plates clamped between the pump head and pump pedestal. In the Livulezi a safety line connects the bottom of the pipe string to a hook welded into the pump pedestal; in Dowa no safety lines are used but an outer PVC ring is solvent cemented onto the top of the PVC pipe above the rubber cone, to prevent slippage. To date no problems whatsoever have been encountered with the PVC rising main or its suspension method and many assemblies have now been operating for one year (the deepest setting is in Dowa, at 27m). Problems have however been encountered in the Livulezi Project with footvalve leakage, which has resulted in 2 'W' assemblies (M57 and M60) being replaced by standard 'B' assemblies (and M58 is showing similar symptoms). Furthermore, two pumps (M1 and M59) have required replacement cup leathers. It is almost certain that the footvalve problems and possible that the leather wear are a consequence of worn cylinders (they are probably over 10 years old). The leathers of pump M1 in boreholes GP33 were actually torn on extraction through the rising main, but they were very worn and there were traces of sand on the plunger. The plungers of 'W' assemblies are extractable (i.e. they pull out through the rising main and pumphead, in an operation that takes 2 people less than 10 minutes for a setting of 20 metres). When the plunger leathers are worn this is an easy operation but with new plunger leathers it is difficult both because of a fairly efficient seal even in 67mm ID rising main and because of the danger of damage to the leathers caused by jamming at a PVC pipe join. For that reason PVC rising main should always be joined socket down to give smooth lips when the plunger is being extracted. However, although the 'W' prototype assembly appears to be working well it is recommended that those in the Dowa Project be removed and installed in the Livulezi Project where they can be more closely watched. Spreading prototype down-hole assemblies to different projects could result in problems.

e) The 'X' prototype assembly (of which only 1 is installed) comprises 16mm MS rods, 75mm OD 67mm ID PVC rising main, 75mm OD 63mm ID PVC cylinder, the 'Mcleod' extractable HDP footvalve (which is an interference fit in a PVC receiver in the bottom of the PVC cylinder) and a conventional 63mm brass plunger with cup leathers. This assembly was installed on 7/6/83 and is working well but the volumetric efficiency has reduced significantly over 4 months (7/6/83 77%, 11/7/83 70% 5/8/83 70%, 20/10/83 66%). The arrangement is undoubtedly a good one - cheap to put together and easy to maintain - and the next few months should show whether the volumetric efficiency stabilises at an acceptable level or continues to fall as a result of wear of the PVC cylinder wall. There is no evidence of sand pumping, however.

f) The 'Y' prototype assembly comprises 9.5mm stainless steel pump rods, 75mm OD 67mm ID PVC rising main, 75mm OD 63mm ID PVC cylinder and linked plastic plunger and plastic footvalve (with the latter an interference fit in a special PVC receiver at the bottom of the cylinder). This assembly represents the first field trial anywhere in the world of the prototype down-hole components developed by the Consumer Association in a special project linked to the Maldev pumphead (cofunded by INT/81/026 and ODA). The first assembly, utilising a leather plunger seal was installed on 27/9/83 (pump M16, borehole GP56). Over the next few days a number of problems were encountered with the footvalve jumping out of its receiver and on 11/10/83 the footvalve and plunger were removed and the footvalve was replaced as one of the interference-fit legs had snapped. With the new footvalve the unit has worked well to date, with volumetric efficiency measured on 27/9/83 of 79%. Even with a 5:1 handle the unit is very light to operate (setting 18m and estimated pumping water level 12m) and the handle mechanical advantage could be reduced to 4:1 or even less. On 13/11/83 the writer watched the footvalve and plunger being extracted and replaced, an operation that took two men (and could probably be done by one if a clamp was used) a few minutes only. A second assembly with a urethane seal was installed with the damaged footvalve in GP41 (M5) on 21/10/83 but within two days problems were faced which resulted in the removal of the footvalve and plunger and discovery that a second interference-fit leg on the footvalve had snapped. The original 'A' assembly was replaced. It has been suggested that the foot valve 'legs' were broken as a result of catching in the joints on the inner wall of the PVC rising main during insertion. Whether this is so or not, the next batch of prototype assemblies will need to be strengthened. The assembly is, however, an excellent demonstration of 'easy maintenance' and has taken a big step towards making village-level maintenance a feasibility.

g) The 'Z' assembly (one only, Pump M69 in borehole GP118) comprises standard 16mm MS rods, 50mm GI rising main, 63mm brass cylinder with a 'Mcleod' HDP plunger. The plunger has been operating since 18/2/83 at a setting of 21m and a pumping water level of about 12-14m with very little apparent friction, so it is easy to operate. However, the efficiency has started to fall (18/2/83 75%, 13/4/83 75%, 13/5/83 75%, 14/6/83 75%, 12/7/83 70%, 5/8/83 70%, 28/10/83 63%). Again the next few months will show whether the efficiency stablises or continues to fall. In the field trials so far, leather, the traditional seal material, has given a better life and a better seal in both plastic and brass cylinders than the various plastic and rubber seals that have been tried in both plastic and brass cylinders.

2.5 Maldev pumps elsewhere in Malawi

The writer understands that 95 Maldev pumps have been installed, commencing in October 1982, in the Dowa West Project (65 in project drilled boreholes and 30 in project rehabilitated boreholes). During a visit by the writer to Dowa in May 1983 it was clear that a batch of Maldev pumps had been supplied by Petroleum Services without undergoing their normal quality control checks. With more than 20 pumps in the store the fulcrum bolt would not pass through the 3 bushes in the pumphead handle support brackets. This is normally checked in the factory and a reamer run through the bushes if necessary. During installation of 2 or 3 pumps from the batch a hammer had been used to force the fulcrum bolt into place and the bearings had been shifted. The writer proposed that all of these pumps be returned to Petroleum Services for proper quality control checking, and understands that this was done. This strongly emphasises the need for quality control checking. Most of these checks should already be being carried out by Petroleum Services, but it would be wise to have an independent inspection of sample units. Early in 1983 Petroleum Services ran out of mild steel 50mm sockets for the pumphead outlet and instead used malleable iron sockets. Three of these sockets have broken soon after pump installation. The 3m outlet extension pipe, resting on a temporary wooden pillar, has been pushed to one side by cattle, snapping the socket. Two points emerge, firstly that only mild steel sockets should be used and secondly that proper concrete pillars with an inset steel ring to capture the extension pipe should always be used. The three broken sockets represents the only breakdowns so far with 95 Maldev pumps in the Dowa West Project. Ten Maldev pumps were installed in heavily used boreholes in the Lower Shire in September 1982 by the Ngabu Maintenance Unit, who were shown how to install one unit. One pump was reported to have broken down soon after and it was learnt that the hardened steel inner race of the handle bearings had run on the fulcrum bolt, wearing through it in days and the pump was then operated with the handle resting in the pumphead slots. This occurred because the fulcrum bolt was not tightened, and it is essential with all lever-operated pumps using ball races that this bolt is tight enough to grip the inner race of the bearing. The pump had a new handle fitted and is operational again. The writer has seen a similar problem with India MK II pumps in the Sudan and this emphasises the need for correct installation. In the Livulezi Project and eventually in the Dowa Project this will not occur because of the monthly preventive maintenance carried out by the village caretakers, who tighten all nuts and bolts. This raises a question - if a lock nut or tab is used to lock the fulcrum bolt at installation to prevent it loosening, the village caretaker cannot undertake the responsibility of keeping it tight and this responsibility is an important part of that important 'sense of ownership'. The question of using a lock nut should however be considered. One further breakdown, also in the Lower Shire, has been a snapped pump handle, apparently in the middle of the 25mm mild steel, square section solid bar although the writer could find no one who had seen the broken handle. As the force required to snap this bar would be considerable, is likely that there was a fault in the steel. It is not at this stage possible to draw any other conclusions. The handle was replaced and the pump is in operation.

2.5 Summary

About one hundred and seventy production Maldev pumps are currently in operation, many of which have been working for one year or more. A further 18 pre-production Maldev pumps (originally 23) and 3 Type 2 prototype Maldev pumps are also in operation, with the 18 pre-production units operating for one and a half years and one of the Type 2 units for over one year. The pumps are working down to heads of 35m and settings of 42m, and many are very busy, with over 300 users. There have been 5 breakdowns in total with the production units (none in the Livulezi Project, although a seized rod hanger bearing was predicted): 3 broken outlet pipe sockets due to the use of non-specified malleable iron sockets and inadequate support pillars, one sheared fulcrum bolt due to it being loose, one snapped handle (for which the reason is uncertain). With the 23 pre-production units there have been 9 breakdowns with 7 units, of which 2 were caused by the handles slipping off the bearings, 1 by worn handle bearings, 1 by the rod hanger slipping off bearings and 5 by worn rod hanger bearings (one of which was a result of replacing a worn bearing with a spare unsealed India MK II bearing, which seized due to lack of lubrication within 2 months). The cases of the handles and the hanger slipping off bearings are a result of oversize holes drilled for the bearings (seen at installation), the worn bearings could be just a result of wear but this is likely to have been accelerated by poor alignment when the units were hand assembled. The Type-2 pumpheads have had no problems. Overall, therefore, the Maldev pumphead has performed very well and it has also proved to be very easy to install and maintain. There is, however, room for improvement, in simplifying manufacture and maintenance further and possibly increasing reliability. The following points are made regarding the pumphead:-

a) The Type-2 Maldev pumphead pumphead with acetal bearings looks very promising so far and would be a significant improvement on the production Maldev, due to reduced costs and quality control requirements of manufacture, simplified maintenance (a village caretaker could change the acetal bushes in a few minutes; ball bearings require much more careful replacement) and possibly enhanced reliability.

b) If the ball-bearing production unit is continued, loctite or a similar bearing cement should be used to prevent slip if a bearing seat is overdrilled. The few failures of the rod hanger bearing indicates that an improved hanger may be worthwhile. At present 2 bearings are used in the handle and only 1 bearing is used in the hanger. An improved rod hanger would incorporate 2 bearings pressed in a tube which would carry the rod stud, the bearings would be spaced about 25mm apart and the axle unit would be similar to the present one. An alternative would be to immediately switch to using acetal bushes for the rod hanger, which could eventually be retrofitted to all operating Maldev pumps. The acetal rod hanger bushes in 'MXa' pump M1 (GP33) have shown very little wear over 14 months operation. Only one set of handle ball bearings in almost 200 pumps have worn out so far. Nevertheless the writer considers that the change to acetal bushes (if they continue to perform well over the next few months) will have a number of significant advantages.

c) Quality control of pumphead manufacture is absolutely essential and DLVW should consider how best to do this. Perhaps the Malawi Bureau of Standards could be of assistance. A schedule of quality control checks should be drawn up by the proposed consultant.

d) Spare parts for the pumphead should be stocked, and it is suggested that a stock level of 5% handles and 5% rod hangers should be ordered with each batch of pumps and maintained at that level. Additional ball bearings should be stocked at 5%.

e) Malleable iron sockets should never be used for the pumpstead outlet; mild steel sockets should always be used.

f) If pumpheads are to be installed at dispersed sites where no caretaker training will be undertaken, fulcrum nuts and bolts should be firmly tightened and locked (with a lock nut or tab) on installation.

Conclusions can be drawn from the performance of the various types of down-hole components that are being used:-

a) The conventional assembly of steel rods and rising main, brass cylinder and cup leather can give several years of maintenance free life if the borehole is properly designed and developed and the groundwater is not corrosive.

Otherwise life betwen maintenance episodes will only be months. However, removal of the conventional assembly when maintenance is necessary is heavy and difficult requiring skilled men, shear-legs and several special tools. If any maintenance is to be undertaken at village level an alternative is needed.

b) PVC rising main affords the opportunity to use reasonably cheap, corrosion free, lightweight, large diameter pipe which will allow extraction of footvalve and plunger without removing the rising main. The current arrangement of adaptor plates and rubber cone to suspend PVC pipe has so far proved to be very successful, and is an example of the modular nature of the Maldev pumphead design, which allows the suspension of various rising main types and sizes. There is not yet sufficient data to say whether cup leathers operating in a PVC cylinder will prove a reliable solution or whether a brass (or stainless steel) cylinder lining will be necessary, although the testing to date of various seal materials does endorse the use of the traditional leather cup. However, the leather will swell when extracted so it is not easy to remove unless worn out - it may, for example, be necessary to extract a new cup to replace/repair a leaking footvalve. The PVC cylinder does allow a long cylinder to be used and the plunger to be moved along its length as cylinder wall wear occurs; it is likely that cup leather life in a PVC cylinder will be considerable. The principle of very easy maintenance has been demonstrated with several of the prototype assemblies in the Livulezi Project. Maintenance could be made easier still by a device whose design is currently on the drawing board - a small self-locking clamp that will fit into the handle rod-hanger slots and allow one person to "jack" the rods out using the pump handle.

2.6 A possible solution

With the test results so far, the following is put forward as a possible solution for a 'VLOM' (village-level operation and maintenance) handpump which will only require occasional input from government extension staff to train and assist villagers. The pump can be made entirely in Malawi and will be of relatively low cost. The testing programme during 1984 should hopefully result in firm and unambiguous proposals for such a unit.

a) <u>Pumphead</u>. Type 2 Maldev head designed to take both the rotating and non-rotating polyacetal bush (to allow longer evaluation of the two types without affecting the pumphead design). The steel pump pedestal could be replaced by a concrete pedestal (this is being tried in Kenya because of the high cost of the steel pedestal). Various other small modifications can be made to simplify the pumphead.

b) Rising main. 75mm class 10 PVC pipe (67mm ID) held by the existing rubber cone and adaptor plates, with a PVC sleeve on the pipe above the cone to prevent slip and a nylon rope (or polypropylene strap) as a safety line connecting the bottom of the rising main to the pump pedestal .

c) Pump rods. 10mm or 12mm galvanised, cold-drawn, mild steel rods (or stainless steel in localities where groundwater is known to be corrosive). Simple snap-on rod connectors are currently being developed by CA, until then a rod socket should be welded to one end of each rod. If a PVC cylinder is used, this could be 3m long and the final rod lengths at the top could be 2x1m and 1x0.5m lengths, to give 5 positions of plunger operation within the cylinder (at 2.5m, 2m, 1.5m, 1m and 0.5m). If any scoring of the inside of the PVC rising main by the rods is observed, low density polyethylene (LDP) pipe of about 25mm diameter could be sleeved over the rod. The use of fibreglass rods is a possibility that needs to be investigated.

d) Cylinder. 75mm class 16 PVC pipe (63mm ID) could be used as a cylinder, so long as at least one year of efficient operation is obtained with the plunger in one position. A 3m cylinder (costing about US$20) will then give at least 5 years life if the plunger is moved as suggested above. If PVC cylinder wear is unacceptable, consideration will need to be given to sleeving the PVC rising main with brass or stainless steel tube (or coating it with a hard material such as a resin).

e) Footvalve and Plunger. With the results obtained so far, leather cups appear to be the most suitable plunger seals and the leather industry in Malawi ought to be able to make them, with some technical assistance initially. An extractable footvalve of a modified 'Mcleod' type or strengthened CA type which snaps into a PVC receiver below the cylinder would appear to be an acceptable solution. Whether the footvalve and plunger should be linked as in the CA prototype is questionable. The obvious and very important advantage is that footvalve removal is easy and the column of water in the rising main will always be drained when the plunger is removed. Disadvantages are firstly that the footvalve will always be removed with the plunger even if the footvalve is working well and secondly that, unless a long link rod is used, movement of the plunger to an unworn part of a PVC cylinder will not be possible. It is hoped that about 10 more sets of improved CA prototypes will be installed in Malawi in early 1984 and, together with more volumetric efficiency results of the cup leather/PVC cylinder combinations already working, decisions can be made.

3. CONSALLEN PUMPS

3.1 Consallen pumps, manufactured in the UK, were incorporated in the field trials as they appeared to be a promising design using corrosion-free materials. They had also performed well in laboratory tests. The pumps were supplied in 2 batches under UK Commodity Aid.

3.2 The Consallen pump comprises a simple lever-operated pumphead fabricated from mild steel and a down-hole assembly which includes 9.5mm stainless steel rods, 32mm ABS pipe which is threaded and socketed, 50mm stainless steel cylinders and a neoprene plunger seal.

3.3 A total of 16 Consallen pumps have been installed, with the first thirteen in June to August 1982, one in December 1982, one in January 1983 and one in October 1983. Two pumps (C10 and C8, see Appendix 1) were completely removed in November 1983 as the pumpheads needed replacement (due to broken flange brackets), one was replaced with a Maldev, and one with an India Mk II. Two pumps are installed on boreholes (drilled on a ridgetop) which are virtually dry, so they are not used. So 12 Consallens are currently being monitored and 14 altogether have been monitored.

3.4 Of the 14, 4 pumps have not broken down at all during an accumulated period of pumping of 52 months (one of these has only been installed for 1 month). With the remaining 10 there have been 66 breakdowns in total during an accumulated period of pumping of 127 months. These breakdowns have involved the following:

6 broken pumphead support brackets (new pumpheads fitted)
1 collapsed fulcrum brass bush (new handle fitted)
1 collapsed rod hanger bearing (new handle fitted)
8 seized cylinder plungers (new cylinders fitted)
1 perished cylinder footvalve (new footvalve fitted)
48 broken rising main (all replaced)
- of which 13 were top lengths and 8 were bottom lengths (average no. for these 10 pumps is 7 lengths of rising main) 27% of breaks were top lengths, 17% were bottom lengths and 56% were one of the 5 intervening lengths. All breaks have occured on the threads.

The following points should be noted:

(a) Where new cylinders or handles are fitted, this is for convenience in the field and the old units are then reconditioned, if possible, in the camp.

(b) Since October 1982 the INT/81/026 Country Monitoring Engineer is certain that every Consallen pump has been correctly installed (i.e. correct stroke length). There have been over 30 rising main breakages since then.

3.5. The tabulation in Appendix 1 summarises the most significant results. In general it would appear that those pumps with a maximum pumping water level around 20 m or more break down often (every 2 weeks to 4 months), with the variation roughly depending on how busy they are. Those with water levels of 10 - 15 m show a full range of breakdowns (from every 2 months to not at all in 17 months) again broadly corresponding to how busy the pumps are. Although the results are not wholly conclusive yet, it would appear that the 1982 Consallen is inappropriate for use where pumping water levels (PWLs) will exceed 15 m, and should probably not be used in a normal busy village location where PWLs are likely to exceed 10m, if an interval of about 12 months between breakdown is required. It is quite likely (but unsubstantiated) that at a PWL of c.5m the pump will be very reliable. However at this head a very cheap direct action unit will be equally reliable - only 6 of the 10 Madzi ('Malawi-Blair') units installed in November 1982 have broken down, with a total of 8 breakdowns in 12 months, at PWLs of up to 8 m. A further point to note is that Consallens C10 and C8 were replaced with a Maldev and an India MK II pump respectively in November 1982 (one year ago). C10 was breaking down on average every 0.6 months and C8 every 1.3 months. Since the units were replaced, the Maldev pump has had 1 set of cup leathers and the India Mk II has not been touched.

3.6 The Consallen has not performed well in the tests so far and the results have been communicated to the manufacturers who are energetically attempting to modify and improve the weak points identified so far. Five '1983' Consallens incorporating many improvements will be sent to Malawi in early 1984 to replace the five worst performers (C9, C14, C4, C5 and C13). These and the remaining pumps should ideally be monitored for at least a further 12 months.

4. INDIA MK II PUMPS

4.1 The India Mark II handpump was chosen for the test programme because of its outstanding reputation for reliability and its good performance in laboratory trials. To date, about 250,000 India Mark II handpumps have been made in India and are operating in many countries. 25 pumpheads and 10 sets of down-hole assemblies were procured from INALSA, New Delhi through UNICEF. British leather buckets were specified as was Crown Agents quality control inspection.

4.2 23 India MK II handpumps are currently operating within the project (a 24th was replaced on 14/11/82 by a Type 2 prototype Maldev after operating for 2 months only). Of the 23, 5 were installed in May/June 1982, 3 in November/December 1982, 6 in July 1983 and the remaining 9 in September/October 1983. Of these, only the 8 installed in 1982 have standard India MK II down-hole components 'IS' - 12mm MS rods, 32mm GI rising main and 63mm brass cylinder, all from India). Of the remaining 15, 7 have standard 'A' assemblies and 8 have standard 'B' assemblies (both with 16mm pump rods, 50mm rising main, 'A' with 75mm brass cylinders and 'B' with 63mm brass cylinders). Appropriate pipe and rod adaptors were made, in order that these assemblies could be used.

4.3 Not one breakdown or repair has been recorded with an India MK II pump since installation of the first unit on May 1 1982. This record is excellent; but perhaps it is not surprising when it is considered that the India Mark II is proving itself in villages in many countries where water levels are deeper and the number of users considerably higher than in the Livulezi Project. In the Sudan, with static water levels commonly in excess of 30m and users queuing at the pumps all day and sometimes well into the night, an India Mark II pumphead appears to survive well over a year without maintenance. (During 1984 INT/81/026 will commence a handpump monitoring programme in the Sudan)

4.4 There is little more that can be said about the performance of the India Mark II in the Malawi monitoring programme: the pump has been without fault and it is popular. However the abundance of precision machining and tight quality control required in the manufacture of the unit mean that it would be a very difficult pump to manufacture in Malawi. Furthermore the pump could be described as a '1970s' unit. It was designed in the 1970s to overcome the problems of poor reliability of the cast iron hand pumps being used in the Indian rural water supply programme. The India Mark II has achieved its purpose admirably, raising the period between pumphead breakdowns from months to possibly years. The pump cannot, however, be described as easy to maintain, which is the key feature for the handpumps of the 1980s if the massive rural water supply programmes utilising handpumps are to have a chance of long term success. Some (but perhaps not all) of the good features of the India Mark II have been designed into the Maldev pumphead with the added design feature of easy maintenance. Much of the work that is being done in Malawi on plastic down-hole assemblies will be replicated in India in 1984 as the big problem of making the India MK II easier to maintain is about to be tackled.

5. THE MARK V SHALLOW WELL HANDPUMPS

5.1 The introduction of a simple, cheap and easily assembled handpump was a focal part of the "Community Protected-Wells Programme" which started in Malawi in 1975. Since that time six "Marks" have been developed with Marks II, III, IV and V each being an improvement on the earlier version and the Mark VI being specifically developed for greater pumping heads (6 - 10m with a 45mm ID cylinder) to complement the Mark V (up to 6m with a 56mm ID cylinder). The down-hole assembly of the Mark V pump comprises PVC rising main and PVC pump rod, both solvent cement joined. An underlying principle of the pumps is that no lever or other force-reducing mechanism is used due to the pump's shallow application. The absence of a lever eliminates any wear related to bearings in a fulcrum and the direct-lift action greatly simplifies manufacture. A further advantage is that high plunger speeds (up to 1 m/sec) are achieved which allow the use of plungers without seals. Even badly worn plungers will work satisfactorily if operated at high pumping rates. Pump efficiency (i.e. the ratio of actual discharge to swept volume) is not too important at shallow depth, so slip past the plunger can be tolerated and can even be positively beneficial as water will provide lubrication and reduce plunger and cylinder wear.

5.2 Over 1500 Mark V pumps have been manufactured in a DLVW workshop since July 1980 with the only major modifications being to the "Tee' handle and guide bush. 57 Mark V pumps have been installed in the Livulezi Project (including the feasibility phase) between 4/6/81 and 25/4/81. However monitoring data and maintenance records have only been systematically collected since April 1, 1983.

5.3 From April 1, 1983 to mid November 1983, a period of 7 months, there have been a total of 82 breakdowns with Mark V pumps. 21 of the 57 pumps have not broken down at all (but 8 of these are in wells which are dry or almost dry so the pumps will be rarely, if ever, used). With the remaining 36 pumps, 21 units have broken down once (again 3 of these are in wells described as dry or almost dry), 5 have broken down twice, 2 three times, 1 four times, 3 five times, 3 six times and 1 eight times. This record at first glance appears to be very poor indeed. However 68 out of the 82 breakdowns are due to a single cause: breakages of the PVC pump rod at the joint with the Gl pipe of the 'Tee' bar handle. This is a classic notch point in the PVC pipe, which has long been recognised as the weakest point of the pump. These breakdown figures clearly illustrate how weak a point it is. The remaining 24 breakdowns were caused by the following: 5 broken plungers, 3 broken footvalves, 4 broken PVC rising main collars, 1 broken adaptor union (used to hang the rising main) and 1 broken 50mm Gl Tee (used on the pumphead outlet spout).

5.4 It is clear that the breakage of PVC pump rods in the Mark V pump is a very serious problem, and it is reported from all over Malawi. Overcoming the problem will result in a dramatic reduction in breakdowns and the improvements to other components (plunger, footvalve, rising main support) can be tackled with less urgency. Three immediate possibilities are being explored to overcome the problem of broken pump rods.

a) use of larger diameter, thicker walled PVC for the pump rod. This may be advisable anyway, but it will not get rid of the notch resulting from the steel pipe to PVC pipe connection.

b) use of a flexible connector to join the PVC pipe to the steel handle. The Mechanical Supervisor in the Wells Programme has produced a design and had about 30 connectors made. Six of these have been sent to the Livulezi Project for installation in the pumps which are breaking down often The connector should absorb any flexing which has previously been absorbed at the top of the PVC rod, resulting in fatigue and breakage. It is too early to say, but it is quite possible that this simple modification could overcome the problem.

c) use of steel pump rods. The advantage of the PVC pump rod is that it is cheap, lightweight and flexible, so the pump is easy to operate and maintain. However if pump rod life cannot be increased to years rather than months, the use of small diameter (8 or 9 mm diameter) mild steel or stainless steel rod should be seriously considered. One prototype shallow well handpump (see 5.5 below) has been installed in Dowa. The pump has a reduced cylinder diameter and 9.5 mm stainless steel pump rods, giving approximately the same operating effort as a standard MK V but slightly smaller yield.

5.5 A design for an improved shallow well pump was prepared in September 1982. A prototype was made by Petroleum Services Ltd. and installed in Dedza District in October 1982. The pumphead incorporates many of the design features of the Mark V with modifications to reduce cost and overcome weak points. Except for modifications to the design of the rod guide bush arrangement (adding wooden bushes) the unit has worked well in a busy location for over a year without attention. Two more prototypes of similiar design have been made up in the Wells Programme Workshop and installed in Dowa. A further feature of the unit is that it does away with the imported adaptor union to hang the PVC rising main, replacing it with the locally made compressed rubber cone arrangement that has been so successful with the Maldev pump (hanging PVC rising main to depths of up to 27m). One of the prototypes uses 9.5mm stainless steel pump rods and two use PVC pump rod linked to the steel handle with a flexible rubber connector.

5.6 In summary, there are a few very significant weak points with the Mark V handpump that require urgent attention. The 3 improved shallow well pump prototypes made so far appear promising and it is strongly recommended that additional units (say 10) be made and installed in the Livulezi Project for close monitoring. The development work that the Wells Programme Mechanical Supervisor is doing should be supported, so that the problems can be overcome. The direct action unit has a very important role to play, as it could possibly be used in 50% of the groundwater points to be constructed in Malawi in the next few years, and its use is strongly endorsed because of its simplicity. The Malawi shallow well handpump has been a pioneer and has been followed by others of basically similiar design such as the BP 50 in Ethiopia, the TARA in Bangladesh and now the PEK made in Canada. The next generation of Malawi shallow well handpumps can learn a lot from a study of its successors.

6. THE MADZI-BLAIR SHALLOW WELL HANDPUMP

6.1 The Madzi pump is a shallow-lift handpump of innovative design which is being manufactured largely of PVC pipe by Pipe Extruders Ltd. in Lilongwe. The pump was designed by the Blair Research Laboratory of the Ministry of Health in Zimbabwe and is being manufactured in Zimbabwe and now in a modified form in Malawi. The major design feature is that the pump rising main also serves as the pump rod, with water discharging from the 'walking stick' direct-action handle. In principle, there are two PVC pipes (one inside the other) both with non-return valves at their bases. The outer pipe is fixed and its valve acts as a conventional footvalve. The moving inner pipe is both rising main and pump rod. The non-return valve in the inner pipe lets water pass on the down-stroke (when the foot-valve is closed) and thus water is forced up the hollow pump rod to the surface. On the up-stroke water enters the cylinder through the open footvalve in the normal way. The pump has a smaller diameter plunger than the Mark V and can be used at somewhat greater heads, 10 m probably being the effective maximum working head. The pump is easy to install and easy to maintain. One reservation is the nature of the discharge outlet. The addition of the 3 m extension pipe fitted to the the outlet of Maldev and Mark V handpumps has won considerable favour as it ensures that both dirty water and washing activities are kept away from the waterpoint itself. The Madzi pump will only discharge directly over the dug well or borehole, and the concrete apron will wear and eventually crack.

6.2 There are 10 Madzi pumps under test, 7 of which were installed in December 1982 (5 of these in boreholes and 2 in dug wells), 2 in June 1983 and 1 in September 1983. The 5 boreholes were drilled during the Livulezi Feasibility Project in the first half of 1981 at 150 mm diameter and completed with 90 mm PVC borehole casing, giving an internal diameter of only 80 mm. As conventional 'A' type down-hole assemblies would not fit into this casing, Mark V direct action pumps were installed in the boreholes. These spent most of the time broken and were replaced by Madzi pumps.

6.3 In contrast to the performance of the Mark V pumps the Madzi pumps have performed relatively well since installation (the breakdown information recorded in Appendix 1 is since pump installation). There have been 7 breakdowns in total, affecting 5 pumps. 5 of the breakdowns were due to breaks in the 25 mm PVC rod/riser, one occurring as a crack in the pipe and the other four as breaks in the pipe below (not on) the threads joining the PVC pipe to the steel 'walking stick' handle. One breakdown was a result of a breakage on the top threads of the outer 50 mm PVC pipe and one breakdown was caused by a broken footvalve.

6.4 Once again we can see that the major problem is caused by the notch point at the steel pipe to PVC pipe connection. The problem is however of much smaller magnitude than with the Mk V pump (perhaps because with the Madzi pump the pipe is full of water thus heavier and straighter, in the Mark V the PVC pump rod is full of air, lighter, buoyant and more likely to flex).

6.5 The Madzi pump has performed relatively well, although it would be a significant improvement to see breakdowns reduced to less than one a year in normal useage (125 users, 20-25 families). There is, however, a question regarding the acceptability of the pump in a project where well-designed aprons are kept clean by proud users who find the Madzi pump 'messy'. In a more typical useage where there are not many other pumps for comparison, it is probable that acceptability would be less of a problem. The monitoring information will be conveyed to the manufacturers so that improvements can be made.

7. CONCLUSIONS

7.1 The handpump testing programme so far in the Livulezi Project has clearly demonstrated the benefits of careful monitoring in identifying problems in handpump design, operation and maintenance. The need for carefully conducted field trials as an essential follow-on to laboratory tests has been clearly established.

7.2 The next stage of the testing programme in Malawi should be to consolidate the knowledge gained so far. As far as possible, the aim should be to reduce diversity within the programme so that decisions can be made in 1984 on handpump designs for local manufacture that can become standards for the large integrated groundwater development programme that is planned over the next few years.

Measurements of Polyacetal Bush and Pin Assembly (MXa), pump M1, GP33

	Handle Fulcrum					Rod Hanger				
	Pin O.D(mm)	Bush ID(mm)				Pin O.D. (mm)	Bush I.D.(mm)			
Sept. 1982 (design figures - not measured)	30.0	30.4				30.0	30.4			
30/03/83	30.0/30.1	30.3/31/1				30.0-30.1	30.4/30.2			
	Pin	Left Bush Vert.	Left Bush Horiz	Right Bush Vert.	Right Bush Horiz	Pin	Left Bush Vert.	Left Bush Horiz	Right Bush Vert.	Right Bush Horiz
19/05/83	30.0	30.8	30.7	30.4	31.1	30.0	30.5	30.4	30.5	30.3
22/06/83	30.0	30.8	30.7	30.6	31.1	30.1	30.5	30.1	30.5	30.3
16/08/83	30.0	31.0	30.7	30.6	31.2	30.1	30.5	30.2	30.5	30.3
14/11/83	-	30.9	30.7	30.6	31.2	not measured				

HANDPUMP MONITORING RESULTS TO NOVEMBER 14, 1983
UPPER LIVULEZI PROJECT MALAWI

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
M1	GP53	27.9	ML MKa	19/4/82 9/82	A to 2/12/82 W	21	3-4	1	4	R1.26/9/83	disconnected plunger	reconnected + new leathers	pumps trace sand.
M2	GP55	22.4	ML	21/4/82	V to 20/5/83 A	21	4	1	3	NONE	(Mcleod plunger raised every 2 months approx.)		
M3	GP54	22.7	ML	27/4/82	A	18	2	1	4	NONE			
M4	GP48	18.3	M	6/5/82	A	12 to 10/82 15 to 10/83 16.5	3-4	2	3	NONE			
M5	GP41	14.6	ML MP	7/5/82 22/3/83	A	12	2	1	3	R1.22/3/82	handle off bearings	MP head complete	
M6	GP43	20.3	ML	7/5/82	A	18	2-3	1	3	R1.15/7/83	Worn hanger bearing	MP hanger only	
M7	GP45	14.8	ML	7/5/82	A	12	1-2	1	3	NONE			
M8	GP62	26.4	ML MP	17/5/82 5/4/83	A	18 to 23/9/82 24	4	1	4	R1. 8/7/83 R2. 23/9/83 R3.11/10/83	Worn hanger bearing " " " mango pips on plunger	unsealed I bearing MP head complete -	
M9	GP52	12.5	ML MP	19/5/83 5/4/83	A	12	3	3	3	R1.5/4/83 R2.28/7/83	handle off bearings worn hanger bearing	MP head + handle MP hanger only	still ML
M10	GP72	14.2	ML	19/5/83	A	12 to 5/5/83 13	3	4	1	R1.29/9/82	hanger off bearings	MP hanger only	Almost DR

APPENDIX I
Sheet 2

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
M11	GP39	17	ML	24/5/82	A	15	2	1	3	NONE			
M12	GP57	15	ML	25/5/82	A	12 to 19/2/83 13.5	3	4	1	NONE			Almost DRY
M13	GP50	18	ML	26/5/82	A	15 to 5/10/83 16.5	3-4	2	3	NONE			
M14	GP44	20.7	ML	1/6/82	A	18	2	1	4	NONE			
M15	GP49	20	ML(P)	1/6/82	A to 27/6/82 X	12 to 21/2/83 15	2-3	1	3	NONE			
M16	GP56	20.4	ML	2/6/82	A to 27/9/82 Y	15 to 27/9/83 18	3	1	3	NONE			CATR prototype footvalve + plunger.
M17	GP65	26.5	ML	4/6/82	A	18 to 9/83 19.5	3-4	1	4	R1.12/1/83	worn hanger bearing	MP hanger only	
M18	GP53	15.0	ML	7/6/82	A	12 to 19/2/83 13.5	3	2	3	NONE			
M19	GP47	14.2	ML	9/6/82	A	12	1-2	1	4	NONE			
M20	GP36	9.9	ML	14/6/82	A	9	2	2	3	NONE			
M21	GP60B	24	ML	14/6/82	A	18 to 21/2/83 21 to 11/10/83 22.5	5	2	3	NONE			

APPENDIX I
Sheet 3.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
M22	GP65	20.5	MP	16/6/82	A	15	2-3	1	4	NONE			
M23	GP61	23	ML MP	17/6/82 6/6/83	A	18 to 5/2/83 21	5	3	3	R1.6/6/83	worn handle bearings	MP head + handle	still ML hanger
M24	GP73	30	ML	22/6/82	A	24 to 15/2/83 27	6	2	4	NONE			
M25	GP69	26	MP	14/9/82	A	24	5	2	3	NONE			
M26	GP84	25	MP	4/9/82	A	24	4-5	1	4	NONE			
M27	GP85	15.4	MP	15/9/82	A	15	3	2	3	NONE			
M28	GP86	23	MP	15/9/82	A	18 to 17/2/83 21	3	1		NONE			
M29	GP88	22	MP	15/9/82	A	18	3	1	3	NONE			
M30	GP89	27.3	MP	15/9/82	A	18	3-4	1	3	NONE			
M31	GP80	20	MP	16/9/82	A	18	3	1	3	NONE			
M32	GP82	23	MP	16/9/82	A	18 to 17/2/82 19.5	3-4	1	3	NONE			
M33	GP95	31 28.7=R1 27.5=R2	MP	5/10/82	A	27 to 7/10/83 24	4-5	1	3	R1.20/6/83 R2.7/10/83	leathers worn out disconnected plunger	new leathers new leathers	severe sand-pumping + infill
M34	GP93	31	MP	5/10/82	A	18	3-4	1	3	NONE			

APPENDIX I
Sheet 4.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Usage	11 A. Repair Date	Breakdowns B. Details	C. New Parts	12 Notes
M35	GP87	17.5	MP	6/10/82	A	15	2	1	3	NONE			
M36	GP92	25	MP	6/10/82	A	21	3-4	1	4	NONE			
M37	GP93	31 27.2=RI	MP	6/10/82	A	27 to 7/10/83 24	4	1	3	RI.7/10/83	leathers worn out	new leathers	sand-pumping + infill
M38	GP95	25	MP	6/10/82	A	21	4	1	3	NONE			
M39	GP90	22.1	MP	7/10/82	A	21	4	4	1	NONE			Almost DRY
M40	GP97	20.3	MP	7/10/83	A	18	4	1	3	NONE			
M41	GP94	23.2	MP	8/10/83	A	21	3	1	3	NONE			
M42	GP105	22	MP	8/10/83	A	18	2	1	4	NONE			
M43	GP102	20.6	MP	21/10/82	A	18	1-2	1	3	NONE			
M44	GP104	32.4	MP	21/10/82	A	24 to 20/7/83 27	6	2	4	NONE			
M45	GP101	30.0	MP	21/10/82	A	24	3-4	1	4	NONE			
M46	GP107	27	MP	22/10/82	A	24	2-3	1	4	NONE			
M47	GP110	27	MP	22/10/82	A	24	4-5	1	3	NONE			
M48	GP99	29	MP	25/10/82	A	24	4-5	1	3	NONE			
M49	GP49	27	MP	25/10/82	A	24	4-5	1	3	NONE			

APPENDIX I
Sheet 5.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
M50	GP106	31	MP	25/10/82	A	24	4	1	4	NONE			
M51	GP108	28	MP	26/10/82	A	21	4	1	3	NONE			
M52	GP111	30.5	MP MXb	26/10/82 11/11/83	A	27	6	2	4	NONE	(when changing to MX b observed hanger bearing damaged, 11/11/83)		
M53	GP114	27.5	MP	26/10/82	A	24	3-4	1	4	NONE			
M54	GP90	21	MP	30/11/82	A from 5/81	15	3-4	2	4	NONE			replaced National, original DHA
M55	GP17	24	MP	30/11/82	A from 5/81	15	2	1	3	NONE			replaced National, original DHA
M56	GP21	21.3	MP	2/12/82	W	18	3	1	3	NONE			replaced National
M57	GP20	23	MP	2/12/82	W to 22/7/83 B	18	3-4	1	3	RI.22/7/83	leaking brass foot-valve (NB. very old cylinder)	type B installed	replaced (National DHA to M67)
M58	GP11	15.8	MP	1/12/82	W	12	2-3	2	4	NONE			replaced National (DHA to M65)
M59	GP8	24.4	MP	2/12/82	W	21	5	3	4	RI.30/5/83	leathers worn out	new leathers	replaced Consallen.

APPENDIX 1
Sheet 6.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
M60	GF23	16.8	MP	3/12/82	W to 6/10/83 B	12 to 6/10/83 15	2-3	1	4	RI 6/10/83	leaking brass foot-valve (NB very old cylinder)	type B installed	replaced National
M61	GF27	24	MP	3/12/82	A from 6/81	18	2-3	1	3	NONE			replaced National original DHA
M62	GP28	19.5	MP	3/12/82	A from 6/81	15	3	1	4	NONE			replaced National original DHA
M63	GP 35	27	MP	14/12/82	A	26	6	3	4	NONE			
M64	GP 17	30	MP	13/1/83	A from ? 1981	24	4	1	3	NONE			old cylinder from borehole A219
M65	GP'12	31.8	MP	13/1/83	A from 5/81	21	3	1	4	RI.5/10/83	plunger disconnected	reconnected (leathers good)	old cylinder + seats from GPII
M66	GP15	30	MP	13/1/83	A from 5/81	21	3	1	4	NONE			
M67	GP15	30.4	MP	18/2/83	A from 6/81	24	4	1	4	NONE			old cylinder + seats from GP2
M68	GP113	28	MP	18/2/83	A from 6/81	21	2	1	4	NONE			
M69	GP 18	25	MP	18/2/83	Z	21	3	1	3	NONE			'Mcleod' Plunger in brass cylinder

APPENDIX I
Sheet 7.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
M70	GP139	31	ML MP	16/6/83 19/8/83	A	24	3	1	4	NONE			
M71	GP122	30.5	MP	25/7/83	A	21	3	1	4	NONE			
M72	GP123	30.7	MP	3/8/83	A	24	4	1	4	NONE			
M73	GP128	30	MP	4/8/83	B	27	3	1	4	NONE			
M74	GP137	21.3	MP	4/8/83	B	18	2-3	1	4	NONE			
M75	X1	36.6	MP	9/8/83	B	21	3	1	4	NONE			
M76	GP120	30	MP	9/6/83	A	21	3-4	1	4	NONE			
M77	GP124	30.5	MP	17/8/83	B	24	3-4	1	4	NONE			
M78	GP125	35	MP	17/8/83	B	27	3	1	4	NONE			
M79	GP142	28.8	MP	18/8/83	B	27	5-6	1	4	NONE			
M80	GP140	27.4	MP	13/8/83	B	24	3-4	1	3	NONE			
M81	GP138	25	MP	13/8/83	B	21	4	1	3	NONE			
M82	GP148	17.2	MP	19/8/83	B	15	3	2	3	NONE			pumps sand
M83	GP141	29.1	MP	19/8/83	B	27	4	1	4	NONE			
M84	GP149	22.5	MP	23/8/83	B	21	3-4	1	3	NONE			

APPENDIX I
Sheet 8.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
M85	GP129	25	MP	24/8/83	B	21 to 16/9/83 22.5	3	1	4	NONE			
M86	GP132	18	MP	29/8/83	B	15	3	1	4	NONE			
M87	GP144	28.7	MP	7/9/83	B	27	6	3	4	NONE			
M88	GP127	35.3	MP	7/9/83	B	30	2-3	1	4	NONE			
M89	GP133	25	MP	8/9/83	B	21	4	1	3	NONE			
M90	GP130	27	MP	14/9/83	B	21	2-3	1	4	NONE			
M91	GP109	30.8	MP	22/9/83	B	24	3	1	4	NONE			
M92	A22	46.4	MP	23/9/83	B from?	15	2	1	3	NONE			old cylinder and leathers
M93	GP135 B	25.7	MP	30/9/83	B	24	5	1	4	NONE			
M94	GP143	23.4	MP	29/9/83	B	22.5	5	3	4	NONE			
M95	GP150	37	MP	7/10/83	B	27	3-4?	1	3	NONE			
M96	FC78	29.2	MP	8/10/83	A from?	18	2-3?	1	3	NONE			old cylinder and leathers
M97	GP22	45.8	MXa	14/11/83	A from 6/81	42	7	1	3	NONE			prototype head with plastic bearings

APPENDIX I
Sheet 9.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
IN1	GP38	25	I	1/5/82	IS	18	1-2?	1	4	NONE			
IN2	GP40	21.5	I	4/5/82	IS	18	1-2?	1	3	NONE			
IN3	GP42	22.7	I	24/5/82	IS	18	3	1	3	NONE			
IN4	GP46	13.7	I	2/6/82	IS	12	1-2	1	3	NONE			
IN5	GP71	30	I	19/6/82	IS	18	3-4	1	4	NONE			
IN6	GP10	17.2	I	30/11/82	IS	15	2-3	1	4	NONE			Replaced National
IN7	A219	33.6	I	4/12/82	IS	21	4	1	4	NONE			
IN8	GP74	24.7	I	4/12/82	IS	22.5	5	4	1	NONE			has become Almost DRY
IN9	GP119	40.7	I	11/7/83	B	30	4	1	4	NONE			
IN10	GP121	30	I	12/7/83	B	24	4	1	3	NONE			
IN11	GP131	13.6	I	13/7/83	B	12	2	1	3	NONE			
IN12	GP147	27.9	I	14/7/83	B	24 to 7/10/83 25.5	6	3	4	NONE			
IN13	GP145	18.4	I	22/7/83	B	15 to 6/10/83 16.5	4	3	4	NONE			

APPENDIX I
Sheet 10.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Usage	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
IN14	GP22	45.8	I MXa	14/9/83 14/11/83	A from 6/81	42	7	1	3	NONE			replaced National, original DHA now prototype MXa
IN15	GP25	23	1	30/9/83	A from 6/81	18	3	1	4	NONE			replace National, original DHA
IN16	GP29	23	1	30/9/83	A from 6/81	21	3-4	1	4	NONE			replaced National, original DHA
IN17	GP32	17.1	1	30/9/83	A from 6/81	12	3	3	2	NONE			replaced National, original DHA
IN18	GP14	18.2	1	3/10/83	A from 5/81	15	3-4	3	3	NONE			replaced National, original DHA
IN19	GP15	18.1	1	3/10/83	A from 5/81	15	2-3	1	4	NONE			replaced National, original DHA
IN20	GP18B	27.5	1	3/10/83	A from 5/81	21	5	3	4	NONE			replaced National, original DHA
IN21	GP30	24	1	29/9/83	A from 6/81	18	2-3	1	2	NONE			replaced National, original DHA

APPENDIX I
Sheet 11.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
IN22	GP26	23	I	29/9/83	B	21	3	1	4				replaced National new DI
IN23	GP146 B	26.7	I	4/10/83	B	24	5	4	1				Almost DRY
IN24	GP134	41	I	22/7/83	B	30	5	1	4				
C1	GP34	19.4	C	8/6/82	CS	18	3	1	4	R1.10/82 R2.14/1/83 R3.8/11/83	no 4 rm broken cracked pumphead fulcrum ditto	new rm new pumphead ditto	
C2	GP59	18.5	C	8/6/82	CS	15	2	1	2	NONE			
C3	GP53	15.2	C	9/6/82	CS	12	3	3	2	NONE			
C4	GP37	22.3	C	15/6/82	CS	18	3	1	4	R1.11/82 R2.1/83 R3.3/83 R4.6/6/83 R5.12/6/83 R6.9/83 R7.10/83	worn brass bush broken rod lock nut + disconnected rods pumphead fulcrum seized plunger no 1 rm broken no 1 rm broken no 4 rm broken + pumphead fulcrum	new handle new lock nut new pumphead new cylinder new rm new rm new rm + new pumphead	

APPENDIX I
Sheet 12.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
C5	GP67	21.8	C	15/6/82	CS	21	4-5	1	3	R1. 5/2/83	no 7 rm broken	new rm	
										R2.15/2/83	seized plunger+ no 7 rm broken	new cylinder + rm	
										R3. 3/83	no 4 rm broken	new rm	
										R4. 6/6/83	no 6 rm broken	new rm	
										R5.20/6/83	no 3 rm broken	new rm	
										R6. 7/83	no 7 rm broken	new rm	
										R7. 8/83	no 6 rm broken	new rm	
C6	GP68C	21.5	C	16/6/82	CS	18	3	1	2	NONE			
C7	GP70B	14.1	C	19/6/82	CS	12	3	4	1	R1.11/82	broken rod lock nut + disconnected rods	new lock nut	Almost DRY
C8	GP74	24.7	C (1	13/7/82 30/11/82)	CS	21	5	3	3	R1. 8/82	no 7 rm broken	new rm	
										R2. 9/82	no 1 rm broken	new rm	
										R3.11/82	pumphead fulcrum cracked	REMOVED	now India MK II
C9	GP77	29.5	C	13/7/82	CS	27	5	1	4	R1.12/8/82	no 4 rm broken	new rm	
										R2.11/9/82	no 1 rm broken	new rm	
										R3.23/9/82	disconnected rm		
										R4.11/10/82	seized plunger, no 3 rm	new cylinder + rm	
										R5. 1/11/82	no 7 rm broken	new rm	
										R6.12/5/83	worn hanger bearing	new handle	
										R7.31/5/83	seized plunger	new cylinder	
										R8. 6/6/83	no 3 rm broken	new rm	
										R9.24/7/83	no 1 rm broken	new rm	

APPENDIX I
Sheet 13.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Useage	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
C9										R10 2/8/83	no 1 rm broken	new rm	
										R11.13/8/83	no 7 rm broken	new rm	
										R12.25/8/83	no 5 rm broken	new rm	
										R13.13/9/83	no 6 rm broken	new rm	
										R14.22/9/83	no 2 rm broken	new rm	
										R15.28/9/83	no 1 rm broken	new rm	
										R16.13/10/83	no 6 rm broken	new rm	
										R17.25/10/83	no 7 rm broken	new rm	
										R18.12/11/83	breakdown reported		
C10	GP81	24.4	C (MP	13/7/82 30/11/82)	CS	18	4	3	4	R1. 7/8/82	no 7 rm broken	new rm	
										R2.10/8/82	no 6 rm broken	new rm	
										R3.18/8/82	no 3 rm broken	new rm	
										R4.23/8/82	no 1 rm broken	new rm	
										R5. 2/9/82	no 1 rm broken	new rm	
										R6.11/10/82	no 2 rm broken	new rm	
										R7.30/11/82	pumphead fulcrum cracked	REMOVED	now MALDEV
C11	GP76	16.0	C	28/7/82	CS	15	4	4	1	-			DRY
C12	GP75	17.5	C	29/7/82	CS	15	3-4	3	3	R1.11/10/82	no 2 rm broken	new rm	
										R2.23/5/83	no 2 rm broken	new rm	
C13	GP79	23	C	17/8/82	CS	21	4	1	1-2	R1.23/9/82	no 1 rm broken	new rm	
										R2.13/5/83	seized plunger + no 3 rm broken	new cylinder + rm	
										R3.13/9/83	no 2 rm broken	new rm	
										R4.27/10/83	seized footvalve	new cylinder	

APPENDIX I
Sheet 14.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
C14	F.82	33.6	C	4/12/82	CS	24m to 10/83 27m	5	1	3	R1.14/1/83	no 5 rm broken	new rm	Out of order most of the time
										R2. 4/2/83	seized plunger + no 7 rm	new cylinder + rm	
										R3.12/2/83	seized plunger + no 1 rm	new cylinder + rm	
										R4. 9/3/83	no 4 rm broken	new rm	
										R5.24/3/83	no 3 rm broken	new rm	
										R6. 1/6/83	seized plunger + no 5 rm	new cylinder + rm	
										R7. 9/8/83	no 8 rm broken	new rm	
										R8. 5/10/83	no 8 rm broken	new rm	
										R9.28/10/83	breakdown reported		
C15	GP126	24.5	C	20/1/83	CS	21	2-3	1	3	R1.18/5/83	no 3 rm broken	new rm	
										R2.16/9/83	no 1 rm broken	new rm	
C16	GP15	18.9	C	12/10/83		15	2	1	3	NONE			
										(NB. Mark V breakdowns from April 1983 only.			
	SW1	5.6	V	4/6/81		c.5	1	1	3	NONE			
	SW2	5.3	V	4/6/81		c.5	1	1	3	R1.24/10/83	PVC pumprod broken	repaired	
	SW3	4.9	V	23/6/81		c.4.5	1	1	3	NONE			

APPENDIX I
Sheet 15.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Usage	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
	SW4	4.2	V	17/6/81		c.4	1	2	4	R1.27/4/83	PVC rod broken	repaired	
										R2.6/5/83	ditto	ditto	
										R3.20/6/83	ditto	ditto	
										R4.8/7/83	ditto	ditto	
										R5.28/7/83	ditto	ditto	
										R6.9/8/83	ditto	ditto	
										R7.26/8/83	ditto	ditto	
										R8.20/10/83	plunger broken	new plunger	
	SW5	5.8	V	25/5/81		c.5.2	1-2	2	4	R1.27/4/83	PVC rod broken	repaired	
										R2. 6/5/83	ditto	ditto	
										R3.14/6/83	ditto	ditto	
										R4.24/6/83	ditto	ditto	
										R5. 8/7/83	ditto	ditto	
										R6. 9/8/83	plunger broken	new plunger	
	SW6	7.5	V	5/6/81		c.6.5	1-2	1	3	R1.27/4/83	nail damaged footvalve	new footvalve	
	SW7	4.8	V	1/8/81		c.4.3	1	1	2	R1.20/10/83	PVC rod broken	repaired	
										R2.26/10/83	ditto	ditto	
	SW8	5.5	V	5/8/81		c.5	1-2	2	3	R1.10/9/83	PVC rod broken	repaired	
	SW9	5	V	4/6/81		c.4.5	1	1	3	R1.26/8/83	PVC rod broken	repaired	
										R2.28/9/83	plunger + foot valve broken	new plunger + foot valve	
										R3.24/10/83	PVC rod broken	repaired	
	SW11	4.8	V	20/1/82		c.4.2	1	2	4	R1.11/7/83	rm collar broken	new collar	
										R2. 23/9/83	PVC rod broken	repaired	

APPENDIX I
Sheet 16.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
	SW12	4.1	V	8/2/82		c.3.8	1	1	3	R1.5/11/83	PVC rod broken	repaired	
	SW13	4.0	V	20/1/82		c.3.8	1	1	3	R1.14/11/83	PVC rod broken	repaired	
	SW14	4.1	V	16/2/82		c.3.8	1	1	3	R1.27/5/83	plunger broken	new plunger	
	SW15	4.0	V	23/2/82		c.3.7	1	2	2	NONE			
	SW16	5.0	V	15/2/82		c.4.7	1	4	1	R1.26/5/83	PVC rod broken	repaired	Almost DRY
										R2.3/6/83	footvalve broken	new footvalve	
	SW17	3.1	V	30/3/82		c.2.7	1	4	1	-			DRY
	SW18	4.8	V	14/4/82		c.4	1	4	1	R1.11/5/83	PVC rod broken	repaired	Almost DRY
	SW19	4	V	15/4/82		c.3.5	1	2	3	R1.9/6/83	PVC rod broken	repaired	
	SW20	5.1	V	21/4/82		c.4.5	1	3	3	R1.3/6/83	adaptor union broken	new union	
										R2.9/6/83	PVC rod broken	repaired	
										R3.17/6/83	ditto	ditto	
										R4.20/7/83	ditto	ditto	
										R5.29/7/83	ditto	ditto	
	SW21	5.7	V	21/4/82		c.5	1-2	4	1	-			DRY
	SW22	4.3	V	15/5/82		c.3.8	1	4	1	-			Almost DRY
	SW23	5.3	V	12/7/82		c.5	1	1	3	R1.10/8/83	PVC rod broken	repaired	

APPENDIX I
Sheet 17.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
	SW24	5.6	V	30/6/82		c.5	1-2	4	1	R1.15/7/83	PVC rod broken	repaired	Almost DRY
										R2.5/8/83	ditto	ditto	
	SW25	4.2	V	14/12/82		c.4	1	1	3	R1.12/4/83	PVC rod broken	repaired	
	SW26	5.3	V	30/6/82		c.4.8	1	3	2	NONE			
	SW27	5.4	V	14/7/82		c.5	1-2	4	1	—			Almost DRY
	SW28	5.7	V	22/7/82		c.5	1-2	2	4	R1.13/6./83	PVC rod broken	repaired	
										R2.24/6/83	ditto	ditto	
										R3.20/7/83	ditto	ditto	new handle
										R4.10/8/83	ditto	ditto	to PVC rod
										R5.22/8/83	ditto	ditto	rubber link
										R6.12/9/83	ditto	new link fitted	fitted
	SW29	4.5	V	10/8/82		c.4	1	1	3	R1.27/10/83	GI Tee broken	new Tee fitted	
	SW30	5.5	V	1/9/82		c.5	1-2	1	3	NONE			
	SW31	5.4	V	9/8/82		c.5	1-2	1	3	R1.27/6/83	PVC rod broken	repaired	
	SW32	6.5	V	16/9/82		c.6	2	2	1	R1.5/4/83	PVC rod broken	repaired	
	SW33	5.1	V	2/9/82		c.4.5	1	4	1	R1.25/7/83	PVC rod broken	repaired	Almost DRY
	SW34	4.4	V	19/7/82		c.4	1	2	3	NONE			
	SW35	5.0	V	21/7/82		c.4.5	1	4	1	-			Almost DRY

APPENDIX I
Sheet 18.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting, m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
	SW36	3.8	V	3/11/82		c.3.5	1	1	2	R1.27/9/83	rm broken at collar	repaired	
	SW37	4.4	V	15/11/82		c.4	1	1	2	NONE			
	SW38	5.6	V	5/11/82		c.5	1-2	1	3	R1.9/6/83	PVC rod broken	repaired	
	SW39	5.0	V	15/11/82		c.4.5	1	1	2	NONE			
	SW40	5.6	V	4/10/82		c.5	1-2	1	2	NONE			
	SW41	5.0	V	15/11/82		c.4.5	1	1	2	NONE			
	SW42	4.5	V	8/11/82		c.4	1	4	1	-			Almost DRY
	SW43	4.9	V	22/11/82		c.4.7	1	1	2	R1.20/7/83	PVC rod broken	repaired	
	SW44	5.4	V	5/11/82		c.5	1-2	1	2	R1.5/10/83	PVC rod broken	repaired	
	SW45	6.0	V	30/11/82		c.5.5	1-2	1	3	NONE			
	SW46	6.0	V	19/11/82		c.5.5	1-2	1	4-3	R1.24/5/83 R2. 6/6/83 R3.20/6/893 R4.29/6/83 R5.8/7/83 R6.20/7/83	rm collar broken PVC rod broken ditto plunger broken PVC rod broken PVC rod broken	new collar repaired ditto new plunger new adaptoer union repaired	Users reduced when nearby bh equipped

APPENDIX I
Sheet 19.

For key see notes on last sheet

1	2	3	4	5	6	7	8	9	10	11			12
Pump No.	Well No.	Depth m	Pump head	Inst. date	Down-hole Assembly DHA	Pump Setting m.	Est max PWL	Water Avail	Use-age	Breakdowns A. Repair Date	B. Details	C. New Parts	Notes
	SW47	5.4	V	22/11/82		c.5	1-2	1	3	R1.25/4/83	PVC rod broken	repaired	
										R2.6/8/83	ditto	ditto	
										R3. 28/9/83	ditto	ditto	
										R4.8/11/83	ditto	ditto	
	SW48	?	V	?		?	?	1	2	R1.6/8/83	PVC rod broken	repaired	
	SW49	3.8	V	23/3/83		c.3.6	1	4	1	-			DRY
	SW50	5.1	V	25/4/83		c.4.8	1	1	3	NONE			
	SW51	5.9	V	11/4/83		c.5.7	1-2	1	4	R1.12/5/83	PVC rod broken	repaired	
										R2.20/7/83	rm collar broken	new collar	
										R3.5/10/83	PVC rod broken	repaired	
										R4.20/10/83	ditto	ditto	
										R5.27/10/83	ditto	ditto	
	SW52	5.6	V	13/12/82		c.5.2	1-2	2	2	R1.28/9/83	PVC rod broken	repaired	
										R2.6/10/83	ditto	ditto	
										R3.25/10/83	ditto	ditto	
	SW53	3.8	V	10/8/82		c.3.7	1	2	3	NONE			
	SW54	4.4	V	10/12/82		c.4	1	4	1	-			Almost DRY
	SW55	4	V	6/4/83		c.3.8	1	2	3	R1.3/5/83	PVC rod broken	repaired	
										R2.26/8/83	ditto	ditto	
	SW57	4.9	V	19/7/82		c.4.7	1	1	2	R1.3/11/83	PVC rod broken	repaired	

APPENDIX I
Sheet. 20.

For key see notes on last sheet

1 Pump No.	2 Well No.	3 Depth m	4 Pump head	5 Inst. date	6 Down-hole Assembly DHA	7 Pump Setting m.	8 Est max PWL	9 Water Avail	10 Use-age	11 Breakdowns A. Repair Date	B. Details	C. New Parts	12 Notes
	SW53	4.2	V	5/10/82		c.4	1	2	4	R1.4/5/83	PVC rod broken	repaired	
										R2.21/7/83	ditto	ditto	
										R3.26/9/83	ditto	new handle	
										R4.24/10/83	ditto	repaired	Prototype
										R5.11/11/83	ditto	new rubber link	rubber link
	SW59	5.1	V	3/5/82		c.4.5	1	4	1	R1.11/5/83	PVC rod broken	repaired	DRY
BIADZI/BLAIR													
	GP12	17.3	B	12/82		c.10	2	1	3	R1.4/8/83	top rm broken on threads	replace top rm	
	GP13	16.8	B	12/82		c.10	1	1	3	R1.15/8/83	top PVC rod broken	repair	
	GP19	20	B	12/82		c.10	2	1	3	NONE			
	GP24	17.1	B	12/82		c.10	?	1	2	R1.29/7/83	top PVC rod broken	repair	
	GP31	18	B	12/82		c.10	1-2	1	3	NONE			
	SW10	5.5	B	12/82		c.5	2	2	3	R1.6/10/83	top PVC rod broken	repair	
	SW55	?	B	12/82		?	?	3	4	R1.3/6/83	cracked PVC rod	new PVC rod	
										R2.20/7/83	footvalve broken	new footvalve	
										R3.15/8/83	top PVC rod broken	repair	
	SW60	4.6	B	13/6/83		c.4.4	1	1	3	NONE			
	SW61	5.6	B	16/6/83		c.5.3	1-2	1	3	NONE			
	SW62	5.5	B	9/83		c.5	1	1	2	NONE			Pumps sand

NOTES

Column 1. Pump Code
M = Maldev
I = India
C = Consallen
no code - direct action units

Column 2 Well No
GP = borehole
SW = dugwell
XI, A219 etc. = old boreholes

Column 3 Depth
of hole given in metres

Column 4 Pumphead
ML = pre production Maldev (hand assembled by Lilongwe Mechanical Development Ltd., Malawi)
ML(P) = pre production Maldev (hand assembled by Petroleum Services Ltd.)
MP = production Maldev (jig assembled by Petroleum Services Ltd., Malawi)
MX = prototype Maldev 2 with acetal bearings (hand assembled by Petroleum Services Ltd., Malawi)
- a non rotating
- b rotating

I = India Mark 2 (made in India)
C = Consallen (made in UK)
V = Mark V direct action pump (made by DLVW, Malawi)
B = Madzi/Blair direct action pump (made by Pipe Extruders Ltd. Malawi)

Column 5 Installation date of pumphead

Column 6 Downhole Component

			rising main	rods	cylinder	seal	notes
CS	=	Consallen standard	32 mm ABS	9.5 mm stst	50 mm ID stst	neoprene	
IS	=	India MKII standard	32 mm GI	12 mm MS	63 mm ID brass	leather	
A	=	'normal' assembly	50 mm GI	16 mm MS	75 mm ID brass	leather	
B	=	' "	50 mm GI	16 mm MS	63 mm ID brass	leather	
V	=	prototype assembly	75 OD/67ID PVC	12 mm MS	750D 63 ID PVC	HDP	'Mcleod' footvalve and plunger
W	=	" "	750D/67ID PVC	9.5 mm stst	750D/67ID PVC brass sleeve	leather	brass sleeves are old cylinders
X	=	" "	750D/67 ID PVC	16 mm MS	750D/63ID PVC	leather	Extractable 'Mcleod' HDP footvalve
Y	=	" "	750D/67 ID PVC	9.5 mm stst	750D/63 ID PVC	leather	CATR linked footvalve and plunger
Z	=	" "	50 mm GI	16mm	63 mm brass	HDP	'Mcleod' Plunger

Note where down hole component installation date proceedes that of pumphead, this indicates original components including seals of feasibility project National pumps.

Column 7 Pump setting in metres

Column 8 Estimated Maximum Pumping water Level at peak periods and in dry season:

1 = 0- 5 m
2 = 5-10 m
3 = 10-15 m
4 = 15-20 m
5 = 20-25 m
6 = 25-30 m

(2 numbers indicates overlapping range e.g. 3-4 is PWL of + 15 m)

Column 9 Water Availability a subjective assessment by Country Monitoring engineer.

1. Good well, enough water
2. Occassionally pumps air
3. Commonly pumps air
4. Almost DRY or DRY

Column 10 Useage a subjective assessment by Country Monitoring Engineer

	Borehole	Dugwell	
1 - Almost Unused	-	-	
2 - Not Busy	$\lessapprox$ 150	< 100	people
3 - Busy	$\approx$ 250	100 - 150	people
4 - Very Busy	$\gtrapprox$ 300	> 150	people
DESIGN	250	125	people

Appendix 2

Measurements of Polyacetal Bush and Pin Assembly (MXa), pump M1, GP33

	Handle Fulcrum Pin O.D(mm)	Handle Fulcrum Bush ID(mm)				Rod Hanger Pin O.D. (mm)	Rod Hanger Bush I.D.(			
Sept. 1982 (design figures - not measured)	30.0	30.4				30.0	30.4			
30/03/83	30.0/30.1	30.3/31/1				30.0-30.1	30.4/30.2			
	Pin	Left Bush Vert.	Left Bush Horiz	Right Bush Vert.	Right Bush Horiz	Pin	Left Bush Vert.	Left Bush Horiz	Right Bush Vert.	Right Bush Horiz
19/05/83	30.0	30.8	30.7	30.4	31.1	30.0	30.5	30.4	30.5	30.3
22/06/83	30.0	30.8	30.7	30.6	31.1	30.1	30.5	30.1	30.5	30.3
16/08/83	30.0	31.0	30.7	30.6	31.2	30.1	30.5	30.2	30.5	30.3
14/11/83	-	30.9	30.7	30.6	31.2			not measured		

INT/81/026

December 28, 1983

Mr. Arne Jensen
Director, Supply Division
UNICEF
866 United Nations Plaza
New York, New York 10017

Dear Mr. Jensen:

Re: Procurement of Handpumps for UNDP Project INT/81/026

During 1981, as you may recall, we had etablished an agreement with UNICEF's Supply Division through which the Supply Division would procure and arrange for shipping of handpumps to be included in field trials being conducted by UNDP Project INT/81/026, Field Testing and Technological Development of Rural Water Supply Handpumps. We have used the procedures of the agreement once, in late 1982, to procure handpumps for testing as part of UNICEF's rural water supply program in the Sudan.

We are now ready to procure larger numbers of several types of handpumps for inclusion in testing program, and have enclosed the details of the orders. Although we have tried to make each individual order self-explanatory, there are several considerations which apply to all:

(a) As you ask manufacturers for quotations, we should appreciate your stressing the fact that the pumps are being ordered as part of a global handpump testing program, and requesting them to charge promotional prices. You might want to include a paragraph such as the following: "Your pumps and equipment have been selected for demonstration and field trials in [country] under a handpumps project funded by the United Nations Development Programme. For this reason we request from you a promotonal price for the items. You will be promptly informed of any serious problems of your pumps should they occur in the field and be supplied with the interim and final results."

(b) On the shipments for the Philippines (Maldev and India Mark II pumps), we will have to clear the quotations with the government before the order can be placed.

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(c) In all countries to which the pumps are to be shipped, we have agreements with UNDP that they will assist in the customs clearance of the pumps into the country. Thus, we would suggest that the pumps normally be addressed to UNDP, marked for UNDP Project INT/81/026, unless you consider your UNICEF office to be in a better position to assist in clearance through customs. In every instance, however, UNDP will need to be informed of the arrival of the shipment so that they may notify our Regional Project Officer responsible for the country and to arrange for in-country transportation.

(d) Shipments overland to the field trial locations will be arranged by the country's water supply agency with assistance from UNDP and the Regional Project Officer.

Payment to you can be handled either (i) in advance based upon an estimate of costs for the pumps (quotations), shipping, and your service charges, which will later be reconciled upon receipt of the final bills; or (ii) full payments to be made upon receipt of the final bills. Details of the billing procedure are to be specified later.

Please let me know at (202) 676-1790 if you have any questions. We should appreciate your handling the orders as soon as possible, especially the orders of pumps to be shipped by airfreight to Beijing, China, since they are required for an on-site training course for installers and caretakers in mid-February.

We greatly appreciate your assistance in procuring these pumps for the handpumps testing program.

Sincerely,

S. Arlosoroff
Chief, Applied Research & Technology Division, WUD
(UNDP Projects Manager, INT/81/026, GLO/80/004, INT/82/002)

cc with enclosures: Messrs. Potashnik (UNDP/New York), Beyer (UNICEF/New York), Kresse (GTZ)
Messrs. Tschannerl, Grey, Journey, Langenegger, Rosenhall (WUD)
Ms. McDonald (CIDA); del Castillo (WUD)

BGross/mc

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INT/81/026

December 28, 1983

Mr. H.R. Vermuelen
Delft University of Technology
Department of Civil Engineering
1 Steinweg
Delft
The Netherlands

Dear Mr. Vermuelen:

As you may be aware the UNDP and the World Bank are presently embarked on a cooperative Hanpumps Project to further the development and testing of handpumps which can be operated and maintained at the village level in the developing countries for the extraction of water from wells. This project forms a part of the International Drinking Water and Sanitation Decade.

In this regard we understand from Mr. J.H. Kop that your office may have information on a "new" handpump for the Philippines, that is, design, drawings, etc that were developed as a result of a cooperative research effort between Delft University of San Carlos, Cebu City. If possible we would very much appreciate receiving copies of this information for use on the Handpumps Project.

You will be interested to know that the handpumps which are part of the standard designs of the Philippine Ministry of Public Works and Highways and the Rural Waterworks Development Corporation are included in our field trials in the Philippines.

For your interest I am pleased to enclose a copy of Report No. 2, which summarizes the laboratory test results of the first twelve handpumps tested in our project, as well as a brochure.

Sincerely yours

Gerhard Tschannerl
Senior Project Officer
Applied Research & Technology Div., WUD

Enc.

cc: Messrs. Arlosoroff (WUD), Rosenhall (WB/Bangkok)

GT/GCT:slj

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INT/81/026

December 28, 1983

Mr. J.H. Kop
4 Traaiweg
3956 NP Leersrum
The Netherlands

Dear Mr. Kop:

Your letter of October 16, 1983 to Mr. John Mr. Kalbermatten together with enclosures has been referred to this office for attention. We much appreciate your efforts in obtaining this information in the form of photographs on successful handpumps in the Philippines. It will be of great value in our on-going UNDP/World Bank Global Handpumps Project. Also we very much appreciate your sending us the names and addresses of other contacts in the Philippines for information on handpumps. We have written to them for further information.

You will be interested to know that all the pumps that are included in the standard designs of the Philippine Ministry of Public Works and Highways and also the Rural Waterworks Development Corporation, are being tested as part of our project.

Sincerely yours,

Gerhard Tschannerl
Senior Project Officer
Applied Research & Technology Div., WUD

cc: Messrs. Arlosoroff (WUD), Rosenhall (WB/Bangkok)

GT/GCT:slj

INT/81/026

December 28, 1983

Mr. N.H. Smith
Marketing Services Manager
GSW Water Products Division
559 Hill Street W.,
Fergus, Ontario, N1M 2X1

Dear Mr. Smith:

Re: UNDP INT/81/026 Handpumps Project

It was a pleasure meeting with you and your colleages at your plant in Fergus and discussing our common interests in handpumps. The visit to your production facility gave me a very interesting overview of the products made in the Fergus plant.

In this connection I would like to confirm our offer to undertake an accelerated laboratory test of your handpump at the Consumer Association Testing and Research (CATR), Gosfield, England at our expense with the support of CIDA. Should you accept, you will be asked to ship two identical pumps complete with pump head, pump stand, cylinder assembly, instruction manual for installation and maintenance (if any), and price list. You will recall that the normal SWL for the test is 45m. We would be grateful if you can s ip the two pumps free of charge.

You will be informed by CATR of the test results according to their standard procedure. The information will simultaneously be sent to our office for dissemination after a reasonably long interval, during which you will have ample opportunity to send your comments to CATR. The test results will have a wide circulation in assistance agencies, developing country governments, and among interested individuals.

Sincerely yours

Gerhard Tschannerl
Senior Project Officer
Applied Research & Techonology Div., WUD

cc: Ms. Mc Donald (CATR)
Messrs. Mills, (CATR), Potashnik (UNDP/NY), Miller (EDS), Langenegger (WB/Abidjan), Rosenhall (WB/Bangkok), Grey (WB/Nairobi), Journey (WB/Dhaka), Arlosoroff, Ramuglia, Burnett, Gross, Ms. del Castillo (WUD).

GT:slj

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INT/81/026

THE WORLD BANK / INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE December 28, 1983

TO Files

FROM Gerhard Tschannerl, Senior Project Officer (WUD)

EXTENSION 61785

SUBJECT Comments on GSW and PEK Pumps - Mission to Canada

Additional remarks on my mission to Canada, 12/6 - 8:

GSW.

The design has not been substantially changed from when it was still called the Beatty pump. Even if judged for durability only, several design faults are apparent:

- two exposed upper rod guides
- sealed small-size ball bearings exposed on both sides, inner racers not fitted on the same shaft (3 shaft sections are screwed together)
- three pivots
- cast iron forks
- detachable handle
- excessive travel of both valves
- thin-walled brass cylinder, subject to denting
- design requiring both casting and welding.
- etc.

Recognizing that theirs is not a VLOM pump, the company representatives nevertheless accepted my offer to have the pump tested at Gosfield with the reaction, "We have nothing to loose." They are willing to ship 2 pumps to U.K. free of charge. (See my enclosed letter). No field trials are warranted.

PEK.

Michel Kaine is in the handpumps and drilling rig business with an enlightened and informed R & D approach reminiscent of the "wiz kids" of the microcomputer business. We should recognize that he is in a different league from those who want to push their conventional designs as far as possible. The pump looks very good and will, even if turns out to have some faults, provide us with stimulating ideas. Some testing/study of the PEK has already been arranged with Tim Journey under CIDA funding, and I propose to expand this:

Bangladesh - 2 pumps for study and testing
CATR - 2 pumps for accelerated lab testing (as yet to be defined)
Sri Lanka - 15 pumps (in 1 or 2 sites)
Ivory Coast - 15 pumps under CIDA trials (see my BOR for prior PEK contacts with the Ivory Coast)

The agreed division of costs with Michel Kaine is as follows:

Item	PEK	INT/81/026
CATR test		All
Pumps (crating included)	Half	Half
Air freight of pumps		All
Spare parts for 2 years	All	
Local transport at destination, clearance, installation and maintenance		All
Follow-up in Ivory Coast and Bangladesh (at least 1 trip)	All	

Shipment of actual spares will be minimal. This is in effect PEK's guarantee for materials.

Trials of PEK in the Ivory Coast requires clearance with Otto Langenegger. Firm quotations are being sought through UNICEF.

cc: Messrs. Arlosoroff, Ramuglia, Burnett (WUD),
Langenegger (WB/Abidjan), Journey (WB/Dhaka),
Rosenhall (WB/Bangkok), Grey (WB/Nairobi),
Mills (CATR), Mc Leod (Australia).

GT:slj

INT/81/026

December 28, 1983

Industrial Enterprises Ltd.,
P.O. Box 454
Toowoomba Qld.,
Australia 4350

Attention: Mr. R.A. Fraser

Dear Mr. Fraser:

We are in receipt of your letter of August 15, 1983 to Mr. S. Arlosoroff concerning rural water supply handpumps and potential markets in the Pacific Basin and Southeast Asia. I apologize for the late reply which is due to a busy mission schedule.

At this time it is our impression that shallow well pumps, that is, 0-15 meters, would account for 75-85% of the the market in Southeast Asia (excluding China). We have no data on the total potential market. However, a rough estimate for Thailand, Malaysia, Indonesia and the Philippine Islands would suggest a market of the order of 1 to 1 1/2 million pumps through the end of the century.

We would like to point out, however, that your pump would be up against stiff competition from those of local manufacture, such as the India Mark II and the Japanese Kawamoto. Also the need for frequent priming of suction pumps is an undesirable characteristic, as this may lead to the introduction of pollutants into the well. Another problem with conventional shallow well for community use pump is its durability. Whereas such pumps may serve adequately the needs of an extended family, say 20-25 persons, they are not likely to stand up well under conditions of heavy use, where 100 or more persons in a village are using the pump daily.

Field trials of a selected and representative group of handpumps which have already been tested in the laboratory (see our Report No. 2, enclosed) are now underway in several developing countries. Regrettably, the present budget does not allow us to fund additional laboratory tests. Should you be interested to subject your pump to laboratory tests, this would have to be done at your own expense or through a sponsor, such as the Australian government. Further information may be obtained from Mr. Ken Mills, Testing Manager, Harpenden Rise Laboratory, Harpenden Hertfordshire, AL5 3BJ, England.

nr

Sincerely yours,

Gerhard Tschannerl
Senior Project Officer
Applied Research & Technology Div., WUD

Enc.

Copy: Mr. Mills (CATR)

cc: Messrs. Arlosoroff (WUD), Mc Leod (Australia)

GT:slj

INT/81/026

December 28, 1983

Mr. H. van Engelen
Chief, Water Resource Center
University of San Carlos
Cebu City, Philippines

Dear Mr. van Engelen:

Re: UNDP INT/81/026 Handpumps Project

As you may be aware, the UNDP and the World Bank are presently engaged in an interregional Handpumps Project to further the development and testing of handpumps which can be operated and maintained at the village level in the developing countries for extraction of ground water from wells. This project forms part of the International Water Supply and Sanitation Decade. The Philippines is one of the countries where handpumps field trials are carried out by our project.

In this regard we understand from Mr. J.H. Kop that your office may have information (particularly the results of field trials) on the "new" handpump and the "old" handpump in the Philippines that were developed as a result of cooperative research between Delft University and the Water Resources Research Center, University of San Carlos. If possible we would very much appreciate receiving copies of this information for use in the Handpumps Project.

You will be interested to know that the handpumps which are part of the standard designs of the Philippine Ministry of Public Works and Highways and the Rural Waterworks Development Corporation are included in the field trials in the Philippines.

na

For your interest I am pleased to enclose a copy of Report No. 2 which summarizes the laboratory test results of the first twelve handpumps tested in our project as well as a brochure.

Sincerely yours,

Gerhard Tschannerl
Senior Project Officer
Applied Research & Technology Div., WUD

Enc.

Copy: Mr. Smith, Res. Rep. (UNDP/Manila)

cc: Messrs. Arlosoroff (WUD), Rosenhall (WB/Bangkok)

GT/GCT:slj

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File Title	Barcode No.
UNDP/INT/81/026 - Rural Water Supply Handpumps Project - Fields, Trials and Technology Development Project - 1981 / 1983 Correspondence - Volume 17	30192462

Document Date	Document Type
December 23, 1983	Memorandum

Correspondents / Participants
From: Gerhard Tschannerl, Sr. Project Officer (WUD)

Subject / Title
Handpumps Project - Contracts with UNVs

Exception(s)
Personal Information

Additional Comments

The item(s) identified above has/have been removed in accordance with The World Bank Policy on Access to Information. This Policy can be found on the World Bank Access to Information website.

Withdrawn by	Date
Ann May	19-May-16

INT/81/026

December 23, 1983

Mr. Stuart Eaves
Virtus Ltd.,
London Street, Fleetwood
Lancashire FY7 6JQ
United Kingdom

Dear Mr. Eaves:

Thank you for your letter of August 15, 1983 addressed to Mr. Arlosoroff and myself, with the enclosed information on the Merrill handpump.

We would like to share with you some thoughts on the remarks you made.

1. We feel that the complete 50-meter price of £600 - £800 per unit is very high. Many developing countries would be unable to finance such high costs. Is there any way to substantially lower the cost?

2. To assume that the pump will be maintenance free for a minimum period of five years seems unrealistic. Several other pump manufacturers have made this claim before, and their pumps failed in field applications, sometimes at a high cost to themselves and the host country. Would you provide a service warranty for pumps in developing countries?

3. Experience has shown that field testing of 1 - 2 units is of little value. It serves more the purpose of demonstration. Field tests would require a minimum of 15 - 25 pumps for even rudimentary statistical analysis to be made.

4. If ODA is prepared to sponsor such field trials, we shall ask them for the results and disseminate them through our large distribution list -- with proper acknowledgement, of course.

Please let us know how the CATR tests are progressing. We look forward to hearing more about the performance of the Merrill handpumps in the future. Best wishes in the New Year.

Sincerely yours,

Gerhard Tschannerl
Senior Project Officer
Applied Researh & Technology Div., WUD

Enc.

Copy: Mr. K. Mills (CATR)

cc: Messrs. Grey (WB/Nairobi), Langenegger (WB/Abidjan),
Rosenhall (WB/Bangkok), Journey (WB/Dhaka),
Mc Leod (Australia), Taylor (Md), Sternberg (Md)

GT:rkb/slj

INT/81/026

UNITED NATIONS DEVELOPMENT PROGRAMME

BUDGET REVISION

 INT(INT/81/026)

Country: Interregional

Project Title: Field Testing and Technological Development of Rural Water Supply Handpumps

Project Number: INT/81/026/D/01/42

The purpose of this budget revision is to incorporate a cost-sharing contribution of US$1,305,630 from the Canadian International Development Agency for activities in Bangladesh, Ghana, Ivory Coast, and Sri Lanka in accordance with the basic agreement and workplan agreed upon between CIDA, UNDP, and the Bank.

Previous Input (Budget Revision "C")	US$4,890,000
Revised Input (Budget Revision "D")	US$6,195,630
Total Increase in Input	US$1,305,630

Agreed on behalf of the Executing Agency

December 22, 1983
Date

Agreed on behalf of UNDP

1/1/84
Date

COST-SHARING
(In U.S. Dollars)

December 19, 1983

Project No. INT/81/026/D/01/42
Project Title: Field Testing and Technological Development of Rural Water Supply Handpumps

		Total	1983	1984	1985	1986
100.	Cost-sharing 1/					
	103.1 GTZ	500,000	40,000	350,000	110,100	
	103.2 CIDA	1,305,630	200,000	539,330	319,000	247,300
157.	Overhead					
	156. Overhead charges on line 103	---	---	---	---	---
	159. Component total	---	---	---	---	---
199.	Total Cost-sharing	1,805,630	240,000	889,330	429,100	247,300

1/ The payment schedule for depositing of funds as follows:

October 1, 1983	C$504,000	(US$409,740)
October 1, 1984	C$563,000	(US$457,700)
October 1, 1985	C$539,000	(US$438,190)

Payments are to be made in Canadian Dollars into UNDP Contributions Account No. 260959405 at the Toronto Dominion Bank, 106 Sparks Street, Ottawa, Ontario, Canada.

CdelCastillo:aq

PART IV: UNDP CONTRIBUTION
JULY 1981-JUNE 1986

Date: December 19, 1983
Project No. INT/81/026/D/01/42
Project Title: Field Testing and Technological Development of Rural Water Supply Handpumps

	Total		1981 1/		1982 1/		1983		1984		1985		1986	
	m/m	US$	m/m	US$	m/m	US$	m/m	US$	m/m	US$	m/m	US$	m/m	US$
10. Personnel														
11. Experts														
11.01 Manager	46	390,380	4.5	3,777	6	46,003	9.15	76,900	10.2	96,000	10.2	99,400	6	68,300
11.02 Engineer	49	315,938	5	16,700	17	108,638	12	80,400	12	86,800	3	23,400		
11.03 RPO (S. Asia)	44	276,093	6	26,183	12	68,310	12	76,600	12	82,700	2	22,300		
11.04 Consultants	15	484,424	7	53,071	8	137,853		133,500		160,000	--	---		
11.05 RPO (E. Africa)	41	255,730	5	27,964	12	70,566	10	74,700	12	69,900	2	12,600		
11.06 Economist	30.4	241,196	1	5,883	6	32,513	10.2	80,200	10.2	96,500	3	26,100		
11.07 Adm. Officer	15	82,690	1.5	9,000	3	11,680	4.2	23,300	4.2	25,130	2	13,580		
11.08 RPO (E. Asia)	24.5	179,900	--	---	--	---	6	39,200	12	88,800	6.5	51,900		
11.09 RPO (W. Africa)	27	310,100	--	---	--	---	12	142,500	12	132,600	3	35,000		
11.10 Investment Support		44,893	--	---		39,809		5,084	--	---	--	---		
11.11 Expert	18	110,000	--	---	—	---	--	---	12	72,000	6	38,000		
11.12 Economist (NB)	21	128,000	--	---		---	5.1	30,000	10	63,000	6	35,000		
11.99 Component total		2,819,344		142,578		515,372		762,384		973,430		357,280		68,300
13. Support Staff		504,376		21,000		55,026		157,300		174,030		74,020		23,000
14. UN Volunteers	326	381,752	12	404	72	127,348	120	100,000	120	125,000	2	17,000		12,000
15. Expert travel		353,845		18,018		65,827		120,000		99,000		51,000		
16. UNDP Mission costs		37,314				12,814		15,000		5,000		5,000		
18. Adjustment previous years		7,394				7,394								
19. Component total:	657	4,104,525	42	182,000	136	783,781	201	1,154,684	227	1,376,460	46	504,300	6	103,300
20. Subcontracts														
21.01 Subcontract #1 CATR		399,532		80,000		196,532		10,000		113,000		---		
21.02 Subcontract #2		14,600				9,600		---		5,000		---		
21.03 Subcontract #3		53,000				---		40,000		12,000		1,000		
21.04 Subcontract #4		3,216				3,216								
21.05 Subcontract (PNG)		11,000						11,000						
21.06 Subcontract (ICDDR,B)		369,000						133,000		86,000		90,000		60,000
29.00 Component total		850,348		80,000		209,348		194,000		216,000		91,000		60,000
30. Training														
32. Group training		204,400		---		32,000		55,000		68,600		28,800		20,000
39. Component total		204,400		---		32,000		55,000		68,600		28,800		20,000
40. Equipment														
41. Expendable (pumps and spares)		381,654		26,222		102,846		50,316		175,070		15,200		12,000
42. Non-expend.		235,689		0		73,689		50,000		102,000		10,000		0
43. Premises and support for RPOs		151,500		---		44,500		21,000		70,000		12,000		4,000
48. Adjustment Previous years		---		---		---		---		---		---		
49. Component total		768,843		26,222		221,035		121,316		347,070		37,200		16,000
50. Miscellaneous														
51. Operation & Maint. of Equipment		65,578		---		378		9,700		27,600		15,900		12,000
52. Reporting costs		15,500		---		---		---		8,000		3,500		4,000
53. Sundry		183,011		10,000		6,784		35,300		95,627		3,300		32,000
56. Other		400		---		400		---		---		---		
58. Over/under accural		3,025		---		3,025		---		---		---		
59. Component total		267,514		10,000		10,587		45,000		131,227		22,700		48,000
99. GRAND TOTAL	657	6,195,630	42	298,222	136	1,256,751	201	1,570,000	227	2,139,357	46	684,000	6	247,300
101. Cost-sharing (GTZ)		500,000		0		0		40,000		350,000		110,000		
102. Cost-sharing (CIDA)		1,305,630						200,000		539,330		319,000		247,300
103. Total UNDP Contribution		4,390,000		298,222		1,256,751		1,330,000		1,250,027		255,000		

INT/81/026

December 21, 1983

Mr. Anthony Churchill, WUD

Michael Cohen, WUDOR

74591

Budget Revision "D" of INT/81/026 Covering CIDA Cost-sharing

-na

I am attaching hereto four copies of budget revision D, INT/81/026 which has been cleared by Ms. Ramona Retiro, Loan Department, Disbursements II and by Mr. Gerhard Tschannerl, WUDOR.

I would be grateful if you would sign on behalf of the Bank.

Attachments

cc and cleared with: Mr. Tschannerl, WUDOR: Ms. Retiro, LOA
cc: Mr. Arlosoroff, WUDOR

CdelCastillo:aq

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(3/82)

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ENT/81/026

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MESSAGE NUMBER

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START HERE

BOOK OF THREE

(1) MR. MCLEOD, 10 PARK STREET, PORT DOUGLAS FR/IT

QUEENSLAND 4871, AUSTRALIA.

F (2) MR. ROSENHALL, INTBAFRAD, BANGKOK (THAILAND)

(TELEX 788-82817) #1787

F (3) MR. SUBBARAMAN, RESIDENT REPRESENTATIVE (UNDP)

PORT MORESBY, (PAPUA NEW GUINEA)

794

(TELEX 22197)

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PAGE 1 OF 1

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MESSAGE NUMBER:

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MR. KEN MCLEOD, 10 PARK STREET, PORT DOUGLAS, QUEENSLAND 4871, AUSTRALIA. INFO MR. ROSENHALL, INTBAFRAD, BANGKOK AND MR. SUBBA-RAMAN, RES. REP. PORT MORESBY. OUR REF. NO. 1608. RE UNDP INT/81/026 HANDPUMPS PROJECT.- TERMS OF REFERENCE.

AAA. WE WOULD LIKE YOU TO SPEND TWO DAYS IN LAE AT A TIME CONVENIENT TO ALL PARTIES CONCERNED WITHIN THE NEXT THREE WEEKS, TO FOLLOW UP ON YOUR RECENT MISSION THERE. YOU ARE TO MONITOR THE PROGRESS OF THE HANDPUMPS FIELD TRIALS AS OUTLINED IN YOUR RECENT TRIP REPORT.

BBB. PLEASE MAKE YOUR OWN TRAVEL ARRANGEMENTS FROM RABAUL AND INFORM THE RESIDENT REPRESENTATIVE OF YOUR MISSION DATES.

CCC. YOU ARE TO MAIL US A BRIEF TRIP REPORT, COPY TO ROSENHALL, WITHIN 15 DAYS OF COMPLETING YOUR MISSION.

REGARDS, TSCHANNERL/ARLOSOROFF, INTBAFRAD.

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TELEX NO.:

DATE: DEC. 21, 1983

SUBJECT: INT/81/026

DRAFTED BY: GTschannerl:slj

EXTENSION: 61785

CLEARANCES AND COPY DISTRIBUTION:
cc: Messrs. Potashnik (UNDP, NY)
Cohen, Freedman, Middleton,
Beier (WUD), Sud (AEP),
Dutt(AEA).

AUTHORIZED BY (Name and Signature): G. Tschannerl G. Tschannerl

DEPARTMENT: WUD

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1 OF 2	61785		

START HERE

MR. BLANCH-SOLER, UNDP, LAPAZ, BOLIVIA. OUR REF. NO. 1611. RE UNDP INT/81/026 HANDPUMPS PROJECT.

AAA. YRTEL MISC1924 WE APPRECIATE YOUR EFFORTS TO IDENTIFY HAND-PUMPS INSTALLATION AND MAINTENANCE WHICH COULD BE MONITORED UNDER OUR PROJECT. THE TENTATIVELY PROPOSED MISSION DATES FOR TSCHANNERL ARE FEB. 3-10, DURING WHICH TIME BOTH TECHNICAL AND ADMINISTRATIVE ARRANGEMENTS CAN BE DISCUSSED.

BBB. OUR WRITTEN AGREEMENTS FOR FIELD TRIALS IN COOPERATING COUN-TRIES TYPICALLY INVOLVE A SINGLE DOCUMENT SIGNED BY ALL OR AN EXCHANGE OF LETTERS BETWEEN:

111. AN ASSISTANCE AGENCY (WHICH TAKES RESPONSIBILITY FOR SUPPORTING HANDPUMP INSTALLATION AND MAINTENANCE AND USUALLY PART OF THE MONITORING COSTS, SUCH AS THE VEHICLE FOR THE MONITOR),

222. THE HOST GOVERNMENT, AND

333. OUR PROJECT MANAGEMENT FOR THE WORLD BANK AS EXECUTING AGENCY. UNDP IS INVOLVED AT ALL STAGES FOR COORDINATION AND ADVICE.

CCC. IN PREPARATION FOR AN AGREEMENT IT IS THEREFORE NECESSARY TO IDENTIFY ORGANIZATIONS FOR 111 AND 222 ABOVE. WORKING WITH A

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SPECIFIC DONOR DOES NOT PRECLUDE BEING ASSOCIATED WITH OTHER ASSISTANCE AGENCIES, MOST LIKELY IN OTHER PARTS OF THE COUNTRY. WE COULD CONCEIVE OF SEVERAL SUCH AGENCIES PARTICIPATING IN THE FORMAL AGREEMENT, BUT IT ADDS COMPLICATIONS. A FORMAL AGREEMENT WITH ONE DONOR DOES HOWEVER NOT PRECLUDE COOPERATIVE ARRANGEMENTS WITH OTHERS WITHOUT MUTUAL FINANCIAL OBLIGATION. WE HOPE TO DRAFT SUCH AN AGREEMENT TOGETHER WITH YOU DURING THE UPCOMING MISSION IF THE CONDITIONS SEEM SUITABLE.

HAPPY HOLIDAYS, TSCHANNERL/ARLOSOROFF, INTBAFRAD.

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SUBJECT: INT/81/026 | DRAFTED BY: GTschannerl:slj | EXTENSION: 61785

CLEARANCES AND COPY DISTRIBUTION:
cc: Messrs. Mashler (UNDP,NY), Cohen, Freedman, Middleton, Beier, Ramuglia, Burnett (WUD), Yepes, Scott (LCP), Scherer(LC2)

AUTHORIZED BY (Name and Signature): G. Tschannerl

DEPARTMENT: WUD

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INT/81/026

December 21, 1983

Mr. Michael A. Roumi
Manager, International Sales
Monarch Industries Limited
International Division
889 Erin Street
Winnipeg
Canada

Dear Mr. Roumi:

Re: UNDP INT/81/026 Handpumps Project

With reference to your letter of November 29 and your telephone call to us of December 6, we are pleased that you will be able to furnish 50 new pump heads for the field trials in Ghana. We expect the wells to be ready in mid-February, by which time the new pump heads should ideally have arrived in Bolgatanga. Since this timetable appears quite unrealistic for the supply of the pumps, could you let us know your earliest shipping and estimated arrival dates.

The pumps should be shipped to Accra for customs clearance by UNDP. Please mark the address clearly on the crates:

Mr. Alfred Mubanda
UNDP Resident Representative
P.O. Box 1423
Accra
Ghana
Project: UNDP INT/81/026

The project number should be part of the address. It is also advisable to give the sturdy crates unique markings, such as spraying the edges with fluorescent paint, for easier identification in the port of Accra. Send the original shipping documents to the above UNDP address and a copy to our office and to Mr. Ron Schatz. We shall then arrange for the transport by road from Accra to Bolgatanga.

We shall shortly order the two pumps for laboratory testing through our usual procurement procedure.

We are thankful for your cooperation.

Sincerely yours

Gerhard Tschannerl
Senior Project Officer
Applied Research & Technology Div., WUD

Enc.

Copies: Messrs. R. Schatz (CIDA),
A. Mubanda, Res. Rep. (UNDP, Accra)
J. Nunoo (GSWC)
Ms. McDonald (CIDA)

cc: Messrs. Langenegger (WB/Abidjan),
Arlosoroff, Gross (WUD)

GT:slg

INT/81/026

December 20, 1983

Mr. Alfred Mubanda
UNDP Resident Representive
P.O. Box 1423
Accra
Ghana

Dear Mr. Mubanda:

Re: UNDP INT/81/026 Handpumps Project

As the enclosed correspondence indicates, Monarch Industries have agreed to furnish at their expense new pump heads for the Monarch pumps to be included in the handpumps field trials in the Upper Region. We request your assistance with clearing the shipment through customs once the time comes.

The transport of the crates from Accra to Bolgatanga will be done by GSWC. We shall be grateful if you could inform GSWC as well as the Canadian High Commission in Accra once the shipment has been cleared.

Sincerely yours,

Gerhard Tschannerl
Senior Project Officer
Applied Research & Technology Div., WUD

Enc.

Copy: Mr. R. Schatz (CIDA)

cc: Messrs. Arlosoroff (WUD),
Langenegger (WB/Abidjan)

GT:slj

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BOOK OF SIX (SEE MESSAGES ATTACHED)

(1) MCLEOD

10 PARK STREET (CABLE) FR/ITT

PORT DOUGLAS, QUEENSLAND 4871

AUSTRALIA

(2) MCLEOD

C/O KEN TREZISE

P.O. BOX 423 (CABLE) FR/ITT

RABAUL, PAPUA NEW GUINEA

(3) JOURNEY 950

INTBAFRAD (TELEX NO. 642302 IDA BJ) #3204

DHAKA, BANGLADESH

(4) PRIESTLEY 953 -

UNDEVPRO (TELEX NO. 31 2611 UNDP IN)

NEW DELHI, INDIA

(5) GRAY 953 -

UNICEF (TELEX NO. 31-5170)

NEW DELHI, INDIA

(6) MUDGAL FOR PONNAMBALAM 953 - 41

RICHARDSON & CRUDDAS LTD. (TELEX NO. MS 7128)

END OF TEXT

MADRAS 600001, INDIA

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ATTENTION KEN MCLEOD, 10 PARK STREET, PORT DOUGLAS, QUEENSLAND 4871, AUSTRALIA; AND C/O KEN TREZISE, P.O. BOX 423, RABAUL, PAPUA NEW GUINEA. FOR INFO JOURNEY, INTBAFRAD, DHAKA; PRIESTLEY, UNDEVPRO, NEW DELHI; GRAY, UNICEF, NEW DELHI; AND MUDGAL, RICHARDSON & CRUDDAS, MADRAS FOR MR. PONNAMBALAM, TWAD BOARD.

OUR REF. NO. 1605. RE UNDP INT/81/026 HANDPUMPS PROJECT. TERMS OF REFERENCE: MISSION TO INDIA AND BANGLADESH.

AAA ON OR ABOUT JAN. 14, YOU WILL ARRIVE IN MADRAS, INDIA, FOR THE FOLLOWING PURPOSES: (A) COMPLETION OF TEST PUMP INSTALLATIONS; (B) INSTALLATION OF WATER MONITORS; (C) VERIFICATION OF QUALITY OF PVC RISING MAIN AND EXPERIMENTAL BELOWGROUND COMPONENTS; (D) COMPLETION AND INSTALLATION OF CLICK-IN CHECK VALVE; (E) REVIEW OF SUITABILITY OF TEST SITES; (F) INITIATION OF WATER QUALITY TESTS FOR ALL TEST SITES; (G) SUPERVISION AND ON-JOB TRAINING OF MONITOR-ING ENGINEER; (H) LIAISON WITH TWAD BOARD, RICHARDSON AND CRUDDAS, WAVIN, UNICEF AND CROWN AGENTS IN ORDER TO ESTABLISH CLOSE COOPERA-TION IN THE EXECUTION OF THE PROJECT. BBB YOU WILL BE ACCOMPANIED BY KEN GRAY FOR THE WEEK OF JAN. 16, AS UNICEF WILL PROVIDE TRAINING COURSES FOR ALL CARETAKERS OF TEST PUMPS. CCC YOU WILL PROCEED TO DHAKA, BANGLADESH ON OR ABOUT JAN. 29 FOR TWO DAYS OF DISCUSSIONS AND SITE VISITS WITH MR. W.K. JOURNEY. DDD ON YOUR

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RETURN TO AUSTRALIA ON OR ABOUT JAN. 31 YOU WILL MAIL TO MR. ARLOSOROFF A FULL TRIP REPORT WITHIN 15 DAYS. YOUR TRAVEL ARRANGEMENTS ARE WITH AMEX CAIRNES AS USUAL. HAPPY HOLIDAYS, TSCHANNERL/ARLOSOROFF, INTBAFRAD.

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SUBJECT: INT/81/026

DRAFTED BY: G. TSCHANNERL:kb

EXTENSION: 61785

CLEARANCES AND COPY DISTRIBUTION:
cc: Messrs. Potashnik, Cohen, Beier, Middleton, Pettigrew, Freedman, Arlosoroff, Sandstrom, Robless, MacWilliam

AUTHORIZED BY (Name and Signature): G. TSCHANNERL G. Tschannerl

DEPARTMENT: WUD

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INT/81/026

Dec. 19, 1983

Back to office report

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

Cha - Rural WS
cc F-338

DATE December 19, 1983

TO Mr. S. Arlosoroff, Chief, Applied Research & Technology Div., WUD

FROM G. Tschannerl, Senior Project Officer and
L. Rosenhall, Regional Project Officer

EXTENSION 61785

SUBJECT UNDP Project INT/81/026: Rural Water Supply Handpumps
PEOPLES' REPUBLIC OF CHINA
Complete Back-to-Office Report (Mission: August 13-30, 1983)

- Beijing - Discussion with officials of Chinese Academy of Agricultural Mechanization Sciences (CAAMS) to finalize project details;
- Shanxi Province - Discussion with the local authorities on project execution;
- Hunan Province - Discussion with the local authorities on project execution.

ANNEXES

I. List of Persons Met
II. Maps of Field Trials Sites
III. Manufacture of Handpumps and Small Drilling Rigs
IV. Water Supply Situation in the Field Trials Areas

SUMMARY

1. The joint mission was carried out by G. Tschannerl and L. Rosenhall in accordance with the terms of reference dated 7/26/83 and 7/25/83 respectively. Engineers from CAAMS, the conterpart agency in China, accompanied the mission the entire time.

2. Final arrangements were made for a Chinese study team to visit the U.K. and the F.R.G. The mission was informed that an entirely new facility for laboratory testing of handpumps will be built in Beijing, while in Changsha the existing pump laboratory will be upgraded. A draft of the CAAMS report on the survey of Chinese handpumps was reviewed.

3. The logistic and administrative arrangements for the field trials which had been made in the Provinces at the initiative of CAAMS were reviewed with CAAMS and with the Provincial authorities. A tentative list of dug wells and boreholes to be located in the different brigades and towns was selected as well as the distribution and types of imported pumps.

4. The workplan for the laboratory and field trials was discussed in Beijing and in the Provinces, to be finalized during Mr. Rosenhall's next mission in mid-November. All agencies involved in the work have made tremedous efforts towards the implementation of the tasks. One of the remarkable results to date from this project in China has been the manufacture of the first prototypes of Chinese deepset handpumps, from among which one pump was selected by the mission for shipment from Beijing to England to be used by CATR for testing and demonstration in the presence of the Chinese study team. Officials from the Ministry of Machine Building assured us that once they receive our recommendations for pump designs to be manufactured in China, they will incorporate handpump manufacture in the production plan, thereby assuring the selected plants both raw materials supply and a market (See Annex III).

5. The field testing area in Hunan Province includes three small towns with populations ranging from 1,600 to 16,800 inhabitants (see Annex IV). Their present water conditions are similar to those of rural areas because the homes are densely located in a confined space, surrounded by fields and have no improved supplies apart from a few suction-type handpumps. Problems encountered with the present are: relatively large numbers of users per water source, poor groundwater quality (esp. iron), water tables falling below 7-8 (i.e. out of the reach of suction pumps), pollution of surface waters by fertilizers, pesticides, and at times sanitary wastes. Study deepset handpumps are recommended for these urban applications. Sanitary effluent should not be a problem there since the dwellings are located on higher ground, permitting the small amount of effluent that accrues to drain into the surrounding fields.

BEIJING: CAAMS

6. The survey of Chinese handpumps was completed by CAAMS and reviewed by the mission. It was carried out by 9 research institutes and engaged 14 engineers in May, June and July; 25 provinces and cities were covered. It includes 57 different makes of hand and footpumps distributed as follows:

20	Suction pumps for drinking water
5	Deepset pumps for drinking water (same design, but five different manufacturers)
32	Irrigation pumps
57	Total

7. CAAMS estimates that the survey covers 70-80 percent of all the existing pump types in China. Most of the surveyed pumps are manufactured at county level with a few at commune level.

8. The pump varieties are: diaphram, 3 cylinder piston animal driven, piston human driven (suction as well as deepset), centrifugal bicycle driven, centrifugal foot driven, 2-cylinder foot driven and horizontal pressure/suction for irrigation. The diaphram (membrane) type of pump is very popular in China and is frequently used for pumping waste, irrigation and drinking water.

9. Since deepset (force) handpumps are not generally known in China, the selection of pump types to be imported had to be given high priority so that a few units of each type can be air freighted to China as soon as possible for training and demonstration purposes, hopefully to arrive in Beijing by the beginning of January 1984. Enclosed is a tentatively agreed list for pumps to be included in the field trials, subject to final approval by the signatories of the agreement.

10. In addition to these pumps, two more of each type will be procured for laboratory testing - either at Beijing or Changsha - except for the Treadle pump, and a basic set of spares will be supplied. The total number of imported pumps is 171 + 16 = 187 pumps. The number of Chines pumps will similarly increase.

11. With the exceptions of a few samples, the pumpstand colomn of the Mark II and the Maldev will be made in China, as well as all the rods and rising mains. Spare parts will also be manufactured in China for the later part of the field trials.

12. A team of 6 engineers will visit England and the Federal Republic of Germany as earlier agreed. They are expected to leave Beijing on September 18 and return to China around October 18.

13. A deep-set handpump made in China was selected for shipment to CATR in U.K. for testing and demonstration in the presence of the study team at CATR. CAAMS was briefed on the procurement procedure for the laboratory equipment. CAAMS has already prepared the design drawings for the laboratory, which provides for constructing the walls of the test tower with bricks. It was recommended that CAAMS should revise the design after the study team had seen the handpumps testing tower at CATR in England before the final design is implemented, especially to incorporate more flexibility in the floor structure.

14. CAAMS will initiate and conduct training courses in Jincheng, Changsha and Wangsheng Counties for all levels of project personnel involved in the activities. The subjects will include well construction, installation, maintenance, and monitoring. In order to start the training in January next year, CAAMS requested a few units of each imported pump type to arrive in China by air as soon as possible. CAAMS also asked for our participation in the training program. Other training in water supply which will take place in China consists of two workshops/seminars sponsored by UNDP and WHO in late November 1983 and in March/April 1984.

15. Following a suggestion from the local authorities in Jincheng Country and considering that most deep wells will be located there, it was agreed that the UN Volunteer should be based in Jincheng and travel frequently to Changsha and Wangsheng Counties, the duty station being subject to government clearance. The UN Volunteer should start his assignment in China if possible at the beginning of January to be able to participate in the training program.

16. The mission coordinated in Beijing with Mr. A. Bruestle (AEP), the team leader of the China rural water supply project identification mission. The handpumps project will play an important role particularly in the early stages of the rural water supply project because it will have demonstrated the utilization of deepset handpumps and will have available the preliminary results of handpumps performance by the time the loan disbursement is to begin.

17. Meetings were held with UNDP Beijing to brief the officers concerned and to coordinate the future work. UNDP will continue to stay in close touch with CAAMS and assist as before with any problems that may arise. The office provided invaluable help in the preparations of the study tour to U.K. and F.R.G.

JINCHENG COUNTY, SHANXI PROVINCE

18. A sufficient number of open wells (mostly intermediate and deep) is available in the area selected for the field trials, with at least 3 hours of use per day. In addition, 40 deep boreholes can be made available in a rural area within the boundaries of Jincheng City. The criteria for site selection were discussed in detail and CAAMS was asked to prepare a list of specific well sites in time for the next mission in mid-November.

19. The 55 Chinese pumps will be selected for approval during the next mission in mid-November 1983. It is expected that the majority of these will consist of deepset pumps recently produced in China as a result of previous missions under the handpumps project to China.

20. It was agreed to keep the number of communes in the field trials to a maximum of 10 in Jincheng County in order to concentrate the pumps in an area small enough to carry out consistent monitoring. The installation of the pumps for the field trials will be done as a joint effort between the local Bureau of Public Health, the Bureau of Water Resources and the Bureau of Agricultural Machinery with the following responsibilities:

Activity	Responsible Bureau/Agency
Improvement of wells and construction of aprons	Water Resources
Installation of the pump (and possible local manufacture)	Agricultural Machinery
Monitoring assistance and environmental aspects for the well system	Public Health
Coordination and technical guidance	CAAMS, Beijing
Maintenance	Brigades under the guidance Agricultural Machinery

21. One site will be prepared as model for demonstration purposes. The people involved as well as the users at the potential sites will be invited to this site for training. They will then be asked to install the pumps themselves with guidance from the above Bureaus. Three local monitors will be designated for our project. They will all be mechanical technicians and employed by the Bureau of Water Resources. One monitor will operate in the northern part of Jincheng County, the second in the western part and the third in the southern suburbs of Jincheng City. They, in turn, will be under the technical supervision of the Country Monitoring Engineer (UN Volunteer).

HUNAN PROVINCE
Hunan Provincial Research Institute of Agricultural Machinery, Changsha

22. Engineers from the Institute briefed the mission on the Institue's activities and on its plans for handpumps laboratory testing. It is planned to upgrade the existing motorized pump testing facility under the guidance of the Ministry of Machine Building and CAAMS. The list of equipment required will be forwarded to CAAMS after the study team has returned from Europe. The Institute will also play an advisory role in the field trials in Hunan Province.

Field Trials in Changsha and Wangsheng Counties, Hunan Province

23. With the exception of three existing wells in Chuenhua Shan Commune, Changsha County, no other existing wells are available for testing handpumps. The field trial area will be comprised of two communes and one town in Changsha County and two communes and two towns in Wangsheng County. All the places were visited and the site selection criteria was discussed in detail with the local authorities.

24. The local authorities were asked to select sites as follows:

Changsha County	
Hunghua Commune	10 sites S.W.L. < 6 m
Hunghua Commune	10 sites S.W.L. > 6 m
Chuenshua Saun Commune	3 sites, existing shallow wells
Langli Town	10 sites S.W.L. < 4 m
Langli Town	5 sites S.W.L. > 10 m
Subtotal	38 sites
Wangsheng County	
Gaotag Ling Commune	10 sites S.W.L. < 5 m
Gaotag Ling Commune	20 sites S.W.L. > 5 m
Xinkang Town	5 sites S.W.L. < 4 m
Xinkang Town	5 sites S.W.L. > 4 m
Jinggang Town	10 sites S.W.L. < 6 m
Jinggang Town	10 sites S.W.L. > 6 m
Hungtin Commune	20 sites S.W.L. < 6 m
Hungtin Commune	20 sites S.W.L. > 6 m
Subtotal	100 sites
Suburbs of Changsha City	12 sites S.W.L. < 6 m
Total	150 sites

25. It was agreed that about half of the wells will be ready (either dug or drilled) by the middle of November 1983 and the remaining ones by the middle of January 1984.

26. It was further agreed that the Hunan Provincial Research Institute of Agricultural Machinery will give technical advice for installation of the handpumps under the overall coordination of the Bureau of Public Health. Prior to final site selection in Langli Town, drilling tests will be carried out to ensure suitable groundwater levels, and water quality tests of the groundwater in Jinggang Town will be carried out prior to site selection to determine the likely cause of the occurrence of a surface film on the water obtained from some of the existing handpumps. The maintenance will be the responsibility of the brigades in each commune and town. The Bureau of Public Health will employ two mechanical technicians as monitors, one each for Changsha and Wangsheng counties.

27. Some present and potential handpumps manufacturers were visited as well as a plant making small drilling rigs. See Appendix III for findings and recommendations.

TENTATIVELY AGREED DISTRIBUTION OF PUMP TYPES
FOR FIELD TRIALS

Type	SWL	Foreign	Chinese	Total
HUNAN PROVINCE				
India Mark II	15-40	10		
Maldev (with MkII cylinder assembly)	12-35	10		
Tara	up to 12	30		
Blair	up to 7	20		
Rower	up to 7	3		
Treadle	up to 7	3		
Manual irrigation	up to 7		3	
Animal irrigtion	up to 7		3	
Other suction and force pumps	5-35	___	68	
Total Hunan		76	74	150
SHANXI PROVINCE				
India Mark II	45-60	10		
- " -	12-40	10		
Maldev (with MkII cylinder assembly)	12-40	20		
Consallen	12-40	10		
Preussag (2 types, 10 each)	12-40	20		
Tara	up to 12	10		
Blair	up to 7	10		
Others	5-40	___	55	
Total Shanxi		95	55	150
OVERALL		171	129	300

PERSONS MET

BEIJING

Governmet Officials

Dr. Li Juru, Director, Patriotic Public Health Campaign Committee
Ministry of Health, Beijing

Mr. Gong Ting Rong, Regional Programme Officer,
Department of International Relations,
Ministry of foreign Economic Relations and Trade

Mr. Tao Zhen, Project Officer,
Foreign Affairs Bureau,
Ministry of Machine Building Industry

Mr. Li Mingxiang, Engineer,
Agricultural Machinery Bureau,
Ministry of Machine Building Industry

Chinese Academy of Agricultural Machinery Sciences (CAAMS)

Mr. Feng Bingyuan, Deputy Chief Engineer
Mr. Chen Weirong, Engineer
Mr. Wu Tonglin, Engineer
Mr. Yao Jun, Assistant Engineer

UNDP

Mr. Ablertus Sissingh, Senior Development Field Adviser
Mr. W. Scholtes, Assistant Resident Representative
Mr. N. Kakar, Assistant Resident Representative
Mr. Jia Lusheng, Programme Officer

WHO

Dr. Eric Goon, Representative & Programme Coordinator

SHANXI PROVINCE
Taiyuan

Mr. Zhang Jin, President Chief, China Medical Association
Mr. Meng Ding-Wen, Vice-Director,
Patriotic Public Health Campaign Committee (PPHCC)
Mr. Du Jia-Wen, Officer, PPHCC
Mr. Wang Ping, Officer, PPHCC
Mr. ChenJin Mei, Officer, PPHCC
Mr. Wang Deng Yun, Hygine Department
Mr. Chao Xie Jin, Director of Section, Provincial Foreign Economic Relations
Relations Officer
Mr. Ma Xin, Interpreter, Provincial Foreign Economic Office

Office of the Northern District of the Well Drilling Team, Taiyuan

Mr. Xian, Director
Mr. Zhao, Head of Brigade, Northern District

Jincheng County Headquarters, Jincheng City

Mr. Yan Zhixian, Chief of the County and Mayor of Jincheng City
Mr. Gao Wenbin, Director of Immunization Section
Mr. Chang Zin, Deputy Mayor of Jincheng City
Mr. Wang Yifu, Deputy Director of Immunization Section
Mr. Wang Emhua, Deputy Head, Bureau of Public Health
Mr. Yuan Fengiu, Officer, District Office of Foreign Affairs

Jincheng Valve Factory, Jincheng City

Mr. Chang Baoguo, Director
Mr. Li Linson, Engineer

Jincheng Plastics Factory, Jincheng City

Mr. Wang Wansuen, Secretary
Mr. Zhang Zhijun, Director

Jencheng Automobile Parts Factory, Jincheng City

Mr. Liu Baoguei, Director and Secretary
Mr. Li Anyang, Engineer

Bei Yicheng Commune, Jincheng Country

Mr. Shen Honglieng, Secretary

Chuandi Commune, Jincheng County

Mr. Ye Xiaobang, Deputy Director

Zhouchuen Commune, Jincheng County

Mr. Li Zhiuan, Director

Bagong Commune, Jincheng County

Mr. Dong Dehuan, Secretary of the Commune
Mr. Wu Zuru, Head of the Commune
Mr. Zhang Huhai, Secretary of Brigade
Mr. Wu. Huduei, Head of Brigade
Mr. Gou Baoru, Secretary of Dong Siyi Brigade

HENAN PROVINCE (in transit)
Zhengzhou

Mr. Wang Shu-yuan, China National Machinery and Equipment. Contact person for booking train ticket Zhengzhou-Changsha, Tel.: 32795

HUNAN PROVINCE
Changsha

Mr. Xing Shutian, Director, Hunan Provincial Bureau of Public Health
Mr. Xiao Yi-Bai, Chief Engineer
Bureau of Mechanical Industry
Mr. Tang Shuye, Head of Environment Section of Immunization, Changsha City
Mr. Yao Zhichuen, Officer of Environmental Health, Office of Public Health
Mr. Dan Dechi, Officer, Hunan Foreign Affairs Office

Hunan Provincial Research Institute of Agricultural Machinery, Changsha

Mr. Yao Hanwen, Director
Mr. Jia Dachu, Deputy Director
Mr. Chen Ruenmin, Chief Engineer
Mr. Wu Taijie, Engineer
Mr. Chen Shuguang, Engineer
Mr. Liu Quangjun, Engineer
Mr. Tan Jianhua, Asst. Engineer

Changsha Prospecting Machine Plant, Changsha

Mr. Xia Hantian, Director
Mr. Lou Jianhuang, Engineer
Mr. Yi Tianming, Engineer

Changsha County

Mr. Zhou Gueilong, Director
Mr. Wang Fuzhou, Chief of Bureau of Public Health
Mr. Peng Dingram, Public Health Bureau
Mr. Cheng Qisong, Changsha County Government

Huanghua Commune, Changsha County

Mr. Chao Songrong, Head of the Commune
Mr. Chen Guoming, Head of the Commune Hospital

Changsha County Factory of Light Industry and Machinery, Chuenhua Shen

Mr. Su Changshong, Director

Chuenhua Shan Commune, Changsha County

Mr. Liu Liangcheng, Director

Langli Town, Changsha County

Mr. Yi Haoram, Mayor

Wangcheng County

Mr. Zhou Debao, Head of Environmental Section
Mr. Dong Zhengou, Vice-Director of Wangcheng County
Mr. Yi Kebin, County Government
Mr. Zhou Fanghua, Director of Wangchen County Immunization Section
Mr. Jheng Ruenxiang, Deputy Chief of Bureau of Public Health

Gaotang Lin Commune

Mr. Deng Diyuen, Head of the Commune
Mr. Wu Baixun, Head of Nongke Brigade

Xikang Town, Wangcheng County

Mr. Lou Cheng, Director of the Commune
Mr. Xiao Jiangou, Head of Xikang Brigade

Jinggang Town, Wangcheng County

Mr. Gou Wenbin, Head of the Town
Mr. Li Gueisheng, Deputy Head
Mr. Liu Taibing, Officer in Charge of Drilling

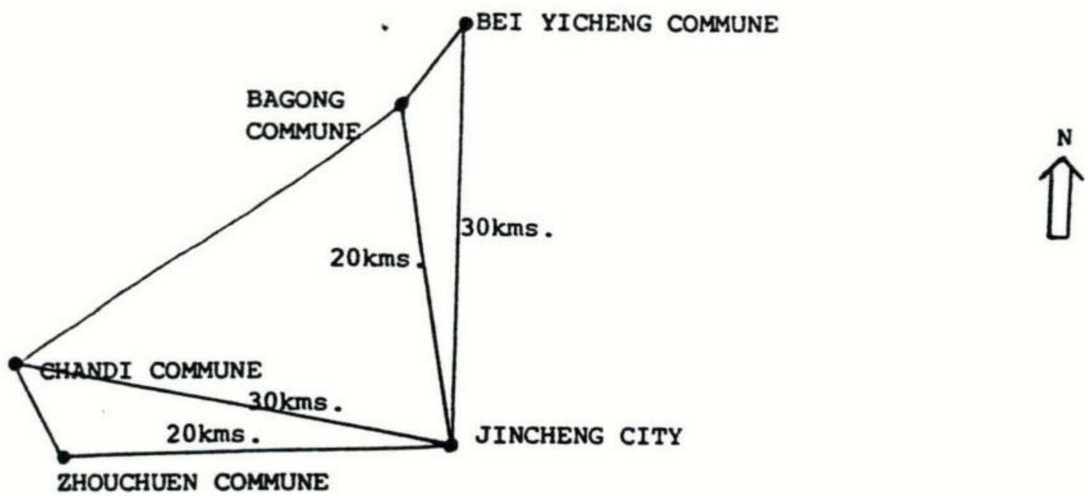
Huangjin Commune, Wangcheng County

Mr. Yu Zhanfu, Head of the Commune
Mr. Zhu Zhizhong, Head of the Brigade
Mr. Zhu Fulan, Head of the Commune Hospital

ANNEX II
Page 1

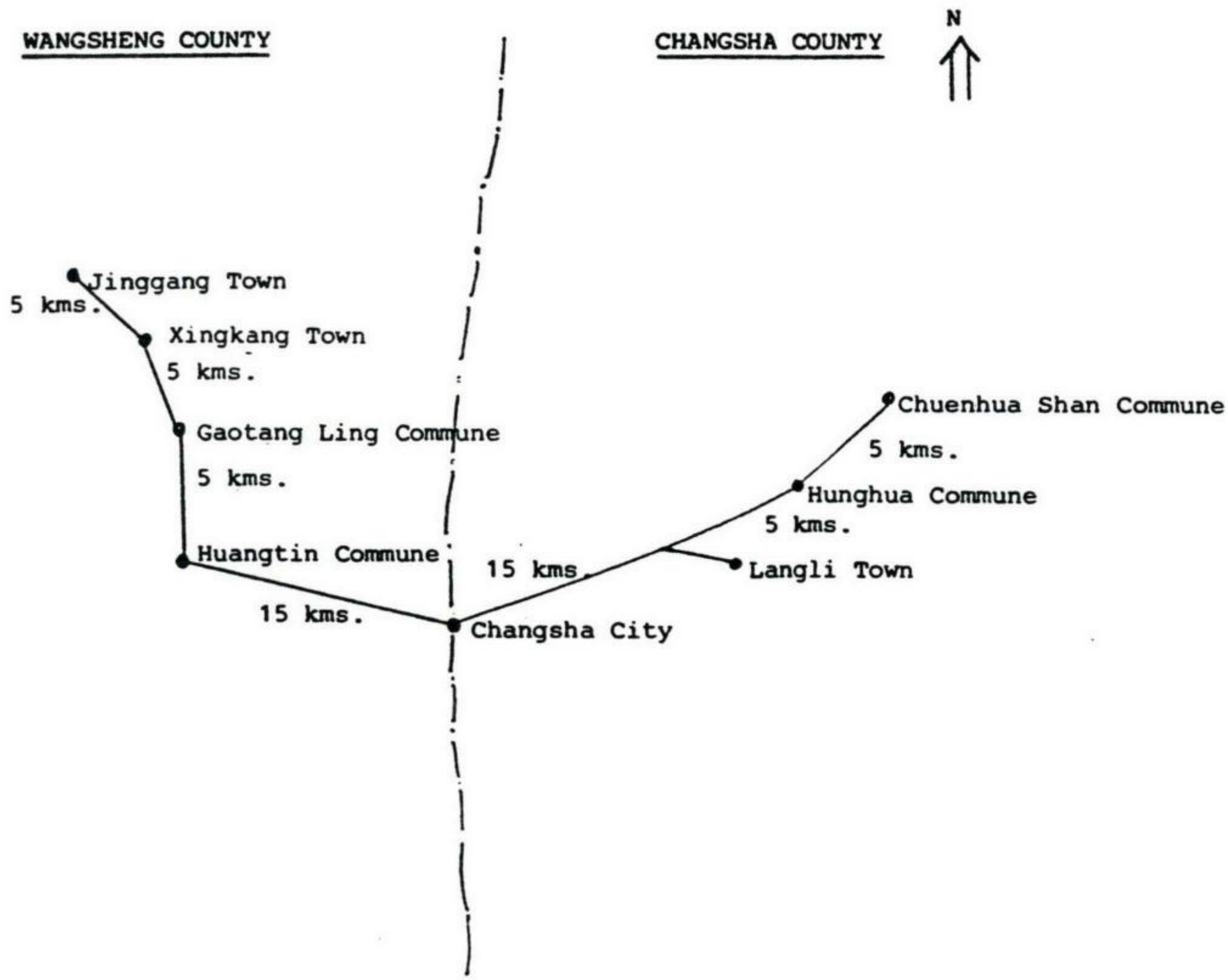
MAPS OF FIELD TRIALS SITES

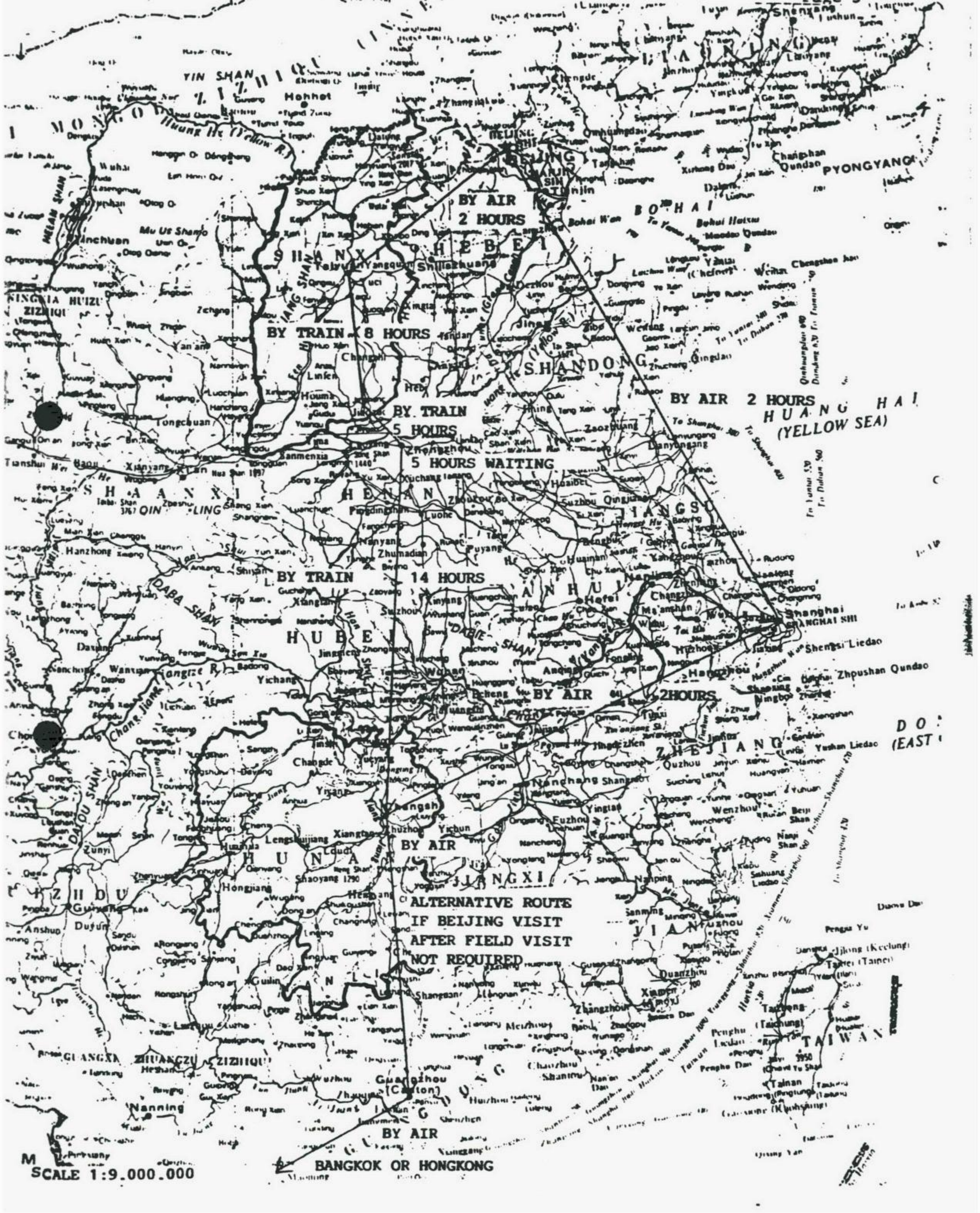
Location of Communes in the Field Trials - JINCHENG COUNTY, SHANXI PROVINCE



Location of Communes in the Field Trials

HUNAN PROVINCE




BY AIR
2 HOURS
BY TRAIN 8 HOURS
BY TRAIN
5 HOURS
5 HOURS WAITING
BY AIR 2 HOURS
BY TRAIN 14 HOURS
BY AIR
2HOURS
BY AIR
ALTERNATIVE ROUTE
IF BEIJING VISIT
AFTER FIELD VISIT
NOT REQUIRED
BY AIR
BANGKOK OR HONGKONG
SHANDONG
HUANG HAI
(YELLOW SEA)
PYONGYANG
BO HAI
HEBEI
SHAANXI
HENAN
HUBEI
ANHUI
ZHEJIANG
JIANGXI
Shanghai
Tianjin
Zhengzhou
Wuhan
Nanchang
Guangzhou
(Canton)
Nanning
Hohhot
Yinchuan
TAIWAN
SCALE 1:9.000.000

MANUFACTURE OF HANDPUMPS AND SMALL DRILLING RIGS

General

1. Several present or potential handpump and low-cost drilling rig manufactures were visited in the two provinces where field trials will take place. At present there appears to be a severe shortage of handpumps in China, which is related to the overall production and raw materials allocation system. For most of the items produced by China's industry, the raw materials are alloted to the factories by production planning organizations, making it very difficult for any factory to produce goods outside the plan due to problems experienced with obtaining the raw materials for this production.

2. Handpumps have so far not been part of the production plans, at least in the two provinces we visited, so that the factories that manufacture handpumps had to obtain their raw materials through their own initiative rather than through the state plan. We have been assured by officials of the Ministry of Machine Building that once test result have been obtained and recommendations for types of handpumps to be produced have been made, the Ministry will allocate the production (and consequently the necessary raw materials) to certain factories.

3. The introduction of plastic components into handpumps will have to be carefully considered in China. The plastics industry as a whole appears to be very unevenly developed, ranging from the common use of plastics for certain light consumers goods and for light agricultural machinery, (pesticide sprayers, etc.) to the non-availability of the appropriate plastic compounds for certain applications which are otherwise accepted worldwide. Plastic pipes are made of polyetylene, because the extrusion process for PVC employs lead as a lubricant, making the pipe unsuitable for water supply applications. The pipe extrusion as well as the injectionmolding machinery in the plants that the team visited are quite old, suggesting that the introduction of plastics components into handpumps may require improvement further upstream in the plastics industry. Future collaboration with UNDP and UNIDO on this issue seems indicated.

Jincheng Valve Factory, Jincheng Town, Shanxi Province

4. This is a general metal working plant, specializing in producing valves for engines. Most of the machine tools are lathes and grinders, with a small number of other machines and a small electric and acetylene welding capacity. It appeared that the plant has a lot of excess capacity and is looking for other products to make. Our general impression was that the quality of production was not very good.

Jincheng Plastics Factory, Jincheng Town, Shanxi Province

5. Two pipe extruders are used to make PVC piping for sewerage and electric lines, with lead employed as a lubricant. The pipes stored in the yard had a relatively large wall thickness, many of them showing radial uneveness. The machinery for extrusion and for injection molding is 20-25 years old, and is also used to extrude polyetylene piping for water supply pipelines. In spite of the slow speed of the extrusion machinery, the demand for pipes is less than the capacity of the machines.

Jincheng Autobile Parts Farctory, Jincheng Town, Shanxi Province

6. Following the reservations the team expressed for the prospect of handpumps manufacturing in the Jincheng Valve Factory, we were shown the Jinching Automobile Parts Factory as a possible alternative future handpumps manufacturer. The difference between these two factories was readily apparent, demonstrating the great disperity in the manufacturing potential of different plants. The factory specializes in producing air compressors and crank shafts for trucks. The single or double cylinder air compressors for the trucks breaking system uses iron or aluminum castings of high quality. Total cost of a one-cylinder air compressor FOB is Yen 150. The machine tools at the factory are generally of more recent origin and in very good conditions. The production seemed very well organized, rationalized for mass production in a single shift. The production appeared to be near capacity. It also has a generating station with three diesel generators as standby in case of power failure.

7. The factory would be capable of producing a high quality handpump once given the necessary technical and materials assistance, but at a price which might be higher than that of other factories a with a less sophisticated production setup.

Chagsha County Factory of Light Industry & Machinery, Hunan Province

8. The factory, owned by the county and located in Chun Hua Commune, is the only factory making handpumps in the province. Its main products under the plan are agricultural thrashers; handpumps are producted only as a sideline activity.

9. The handpump design is of the suction variety, with a cast iron cylinder, cast iron fork, and cast iron handle (See the enclosed prospecters both in Chinese and in English translation). The cylinder diameter is 100 mm with a maximum stroke of 160 mm. It uses rubber cup seals and check valves. Present production is 2,000 units per year, of which about half are sold within the county and half outside, with a price of Yen 35 locally and Yen 32 for outside the country. The price difference is because generally larger quantity orders are placed from outside the country. The Director estimates that the production capacity is 10,000 pumps per year.

10. Even though the machinery in the factory is quite old, the range of available equipment and the work organization seemed well suited for the production of the type of handpumps the factory is presently making. It may however be difficult to raise the production level appreciably above what it is now without some improvements of the existing machinery. The pump design is very promising and has a good potential to be brought up to the durability of similiar types of suction pumps, such as the Bangladesh No. 6, after some minor design changes.

11. At present there is no system of spare parts production, aside from the rubber bucket which is sold by the factory upon written request for the price of Yen 1. The design was originally introduced in 1973, with mass production starting in 1978.

12. The following performance problems were observed on the pump in the field: excessive wear of pins, loss of bolts, wear of pin holes; rusting and disappearance of fastening screws on the lid; severe rusting and wear of the swivel-type spout; malfunction of poppet valve due to roughness in the cage, and handle breakage. Other major installation problems not related to pump design were looseness of the pump and drop pipe in the cement foundation, and installations at sites where the water table is at or below the barometric level.

Changsha Prospecting Machine Plant, Changsha

13. The factory, which is under the Pronvincial Bureau of Geology, makes drilling rigs that are primarily intended for exploratory drilling. As a sideline activity a portable drilling rig for water supply and irrigation has been manufactured since 1980. There are two versions, one at 4.5 HP and a 6.5 HP model, using one diesel motor for drilling and another one for pumping. (See the attached prospecter, both in Chinese and English translation.) The rigs are produced whenever an order of sufficient size is received, generally every three months. The production has been increasing from 120 units in 1981 to 180 units to 1983, and the capacity for producing portable rigs is said to be 500 units per year. The price has remained constant over time at around Yen 10,000 for sales inside China. The export price was not available at the factory, but may be substantially higher. The rigs are primarily used by the mining department of the Ministry of Geology for exploration, with few additional ones sold for water supply drilling.

14. The 4.5 HP unit is portable, equipped with a self propelled wheel on the bottom of the drilling unit (see enclosed prospectus), while the 6.5 HP model is stationary. With a weight for the 4.5 HP model of 220 kg for the rig and 100 kg for the pump, totaling 320 kg, the unit is well suited for transport on the back of a small truck, from which it can be "walked" over a ramp onto the ground and unto the drilling site. The pump at present is designed for water circulation, but might also be adopted for sludge circulation. Both models are rated for a maximum bit diameter of 110 mm and a maximum depth of 30 m. Workers at the factory however, who themselves undertake drilling for water supplies with the 4.5 HP model during their spare time, feel that the rigs can easily be used down to 50 or perhaps even 80 m. Normally for a rock hardness of up tp 3 a 91 mm diameter triangular-shaped carbon tip bit is used, while for a hardness of up to 5 or 6 a 75 mm hollow drilled bit is employed. The diesel consumption, which is considered an important factor in China for the utilization of drilling rigs for ground water utilization, is said to be 190 grams per hour per horsepower with a diesel price of 44 fen per litre for industrial use and 30 fen per litre for agriculture.

(See translation)

SYB—100型
手摇式吸水泵

说 明 书

湖南省长沙县医用汽车修配厂

厂址：长沙县春华山　电话：长沙县总机转

SYB—100型手摇式吸水泵

使 用 说 明

为满足广大农村社员集镇居民饮水卫生的需要，我厂试制了活塞式手摇吸水泵，经实践使用深受用户欢迎。并经市、县卫生防疫部门检查认定，性能良好，使用可靠。

一、特 征 与 性 能

本产品是专供无自来水源的地区，在不需电动力的情况下可抽取地下水。适用于地下井、封盖井、明井、或低洼塘池。它采用活塞结构使用人力摇杆、最大吸水高度9米，在4至7米高度抽吸水时，每分钟手摇摇杆50至70次，可抽水量120—150市斤。它体积小、操纵灵活、全泵重量47市斤左右，在4—7米抽水高度时，摇杆力约20—40市斤，10岁以上的小孩均可自如地操纵。

二、安装、使用、维修、保养方法

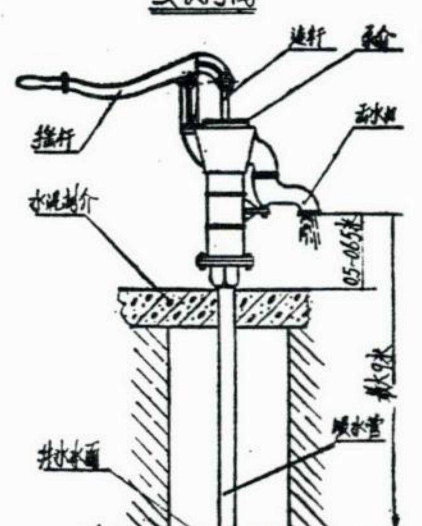
（1）用户按安装简图可自行安装，井面最好制做水泥封盖，或水泥固板，将水管牢固地固定于水源上方，应使水管插入井水面0.8米以上，水管的长度应视水源离水泵出水口的高度而定，一般应保持出水口离地面0.5—0.6米为宜，要注意水管不被堵塞。

（2）安装后第一次试用抽水，一般可不加注引水，但吸水高度超过5米时，一般应将泵盖揭开，从顶部注水，使泵体充满，盖好泵盖，再摇水。如泵体内保持有一定水量后，就不需再加注引水。

（3）维护保养。橡胶活塞川使用一定时期后，将会磨损应予更换。换胶川时，将泵盖螺丝旋松揭开泵盖，提起活塞连杆，卸下已磨损胶川，换上新的即可使用。

（4）在使用过程中，发现有吸水不上的现象，一般是属泵体内存水漏干，是由于胶皮活门不密封原因，应检查是否有残渣堵塞或橡胶活门变形等，应对症排除。

安装简图



FORM NO. 788
(1-74)

IBRD LANGUAGE SERVICES DIVISION	
CONTROL NO. CE-78/84	DATE: December 2, 1983
ORIGINAL LANGUAGE: Chinese into English	
DEPT. WUD	TRANSLATOR: Kung

The SYB - 100 Hand Pump

(Prospectus)

Product of the Repair and Assembly Plant for Hospital Vehicles

Changsha County, Hunan Province

Address: Chunhuashan, Changsha County

Tel: Changsha County Exchange

The SYB - 100 Hand Pump

To meet the needs of the broad masses of rural commune members and township people for clean potable water, this plant has successfully trial-produced a piston hand pump, which has been well received by the users. After being tested and evaluated by the health and epidemic-prevention departments in Changsha City and County, this pump has been proven to be a product that works well and is reliable.

I. Features and Functions

This hand pump is specially designed for areas that have no tap water. It can be used to draw underground water without electric power supply. It is suitable for drilled wells, open and covered wells, or shallow ponds. Its hand-powered piston structure permits drawing from a depth of up to 9 meters. When used at 4 to 7 meters and being pumped 50 to 70 times a minute, the volume of water drawn can reach 120 to 150 jin (1/2 kg). This pump is compact and easy to operate, having a gross weight of only 47 jin. When used at 4 to 7 meters, only 20 to 40 jin of power is needed to work the handle. A young person of over 10 years of age can easily use it.

II. Installation, Use and Maintenance

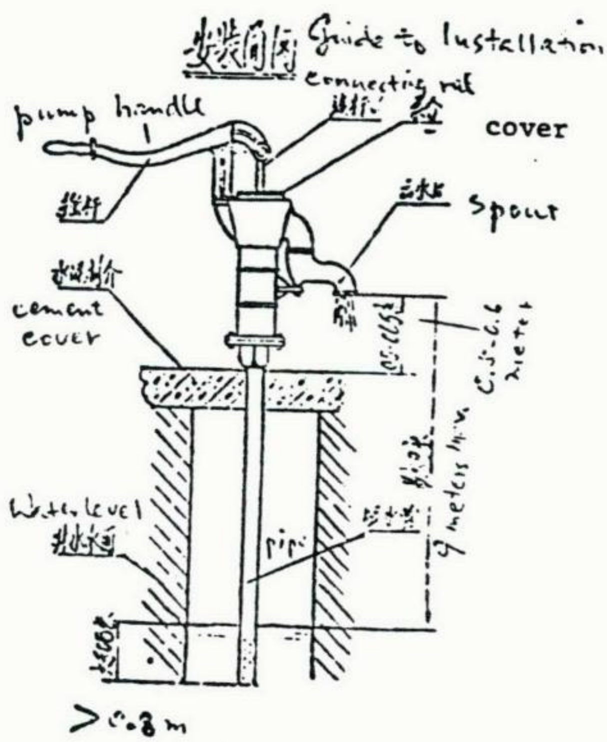
1. This pump can be installed by following the guide (See Figure) in this Prospectus. The well surface should be sealed with cement, or cement covers may be used, so that the water pipe is fixed right onto the water source. The pipe should be over 0.8 of a meter submerged, the total length of the pipe being determined by the distance between water source and the spout above ground. Generally speaking, the spout should be 0.5 to 0.6 of a meter above ground. See that the pipe is not blocked.

2. When drawing water for the first time after installation of pump, it is normally unnecessary to prime the pump. However, if the lift is over 5 meters long, it would generally be necessary to open the cover and pour water in until the pump body is full. Then put the cover back in place, and

shake the water. So long as a certain amount of water is maintained in the pump body, there is no need to inject more water.

3. Maintenance. After a period of use, the rubber cup seal of the piston will become worn and should be replaced. In replacing the rubber cup seal the first step is to remove the screws on the pump cover and open it; then lift the piston connecting rod and remove the worn-out rubber cup seal. When a new one is installed, the pump is ready for use again.

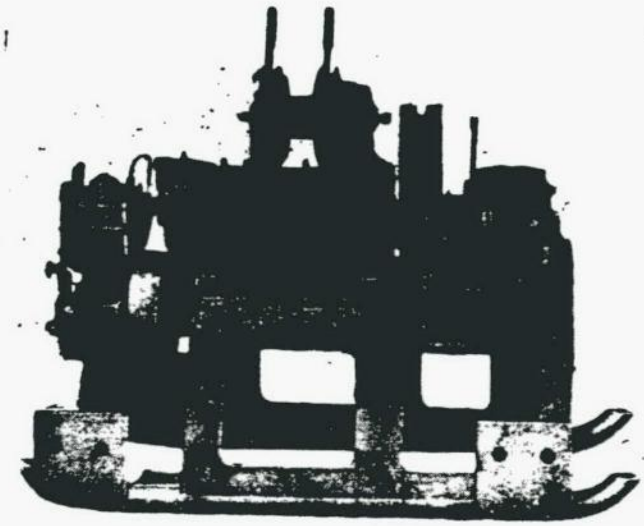
4. Sometimes it may be difficult to draw water. At such times, the problem generally is a leak in the pump body and that water has been drained. This is because the rubber valve has started to leak. It is necessary to find out if there is a blockage in the pipe or deformation of the rubber valve. Then do what is necessary to remove the cause of malfunction.



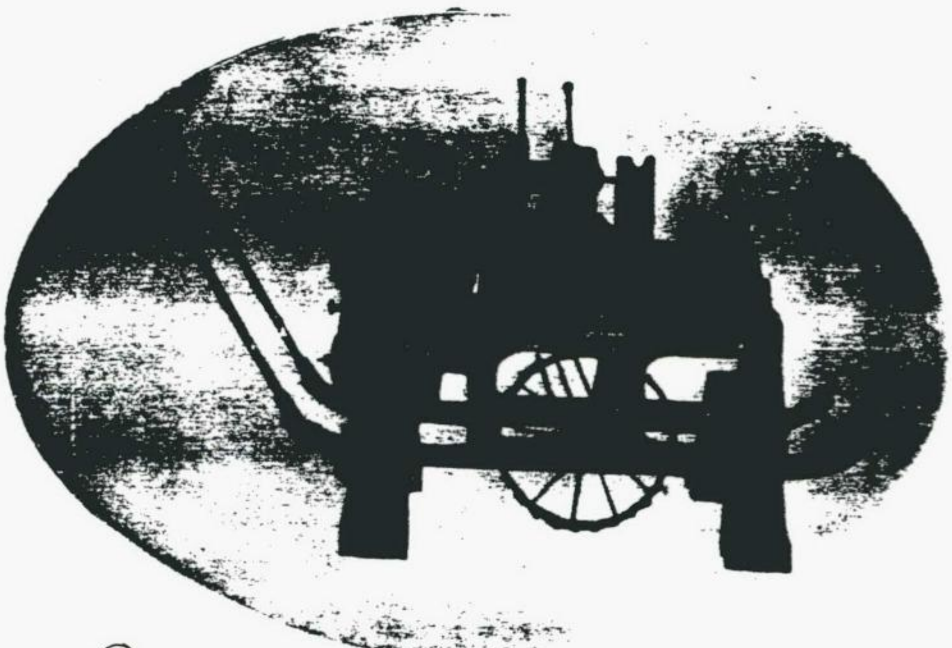

Machine
CHANGTAN
械厂
CHANGSHA PROSPECT MACHINE PLANT

一、简要说明

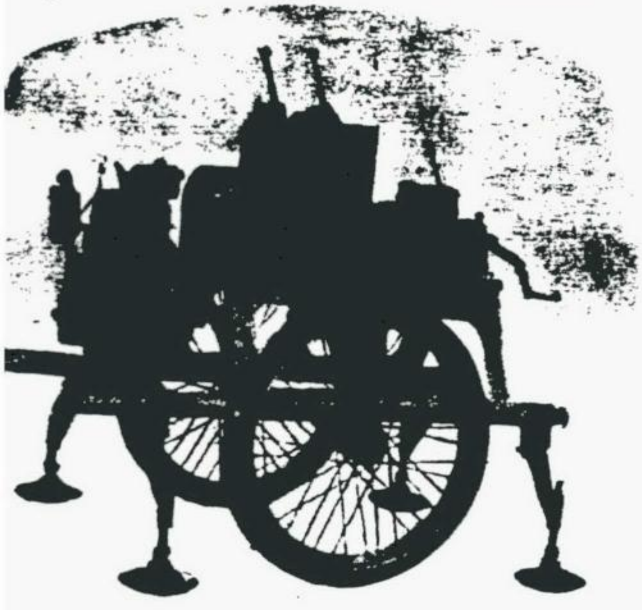
QPC—30型，QP—30型轻便钻机是
在总结多年修理及生产钻机的基础
吸收国内外多种小型钻机的特长而设
造的。先后在湖南、湖北、四川、广
河南、福建、贵州等省的不同地层
土、红色砂岩，灰岩等七级以下岩层
进彳 广泛的生产性试验，效果良
适合石油物探、地质、煤炭、建材、
、建筑等部门的工程钻探。该钻机已
九八一年十一月在地质部装备工业局
的技术鉴定会上通过，並以地质部工
一09号文颁发了技术鉴定书。鉴定
旨出：“QPC—30型和QP—30型两
便钻机设计思想正确，在满足物探爆
进二 要求的前提下，创造性地解决
机轻便，可靠，搬迁方便和适应范围
问题，为我国石油物探及其它用途的
工作提供了一种经济效益显著，技术
先进的新机型，深受广大用户欢迎。
国当前较先进的浅孔轻便钻机，可以
批量投产。”



① ↑ QP—30型取消自行机构，改为散装形式，可拆性好，适合高山崎岖地区使用。

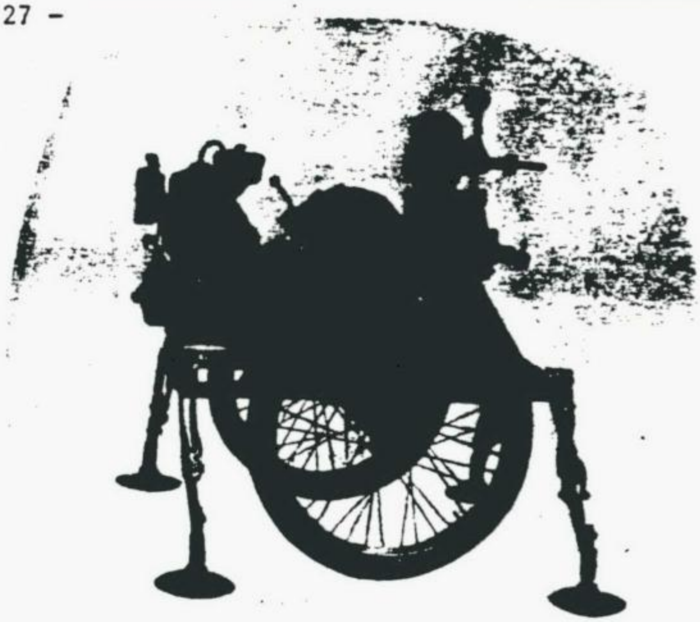


② ↑ QPC—30型安装铁轮一个，利用本身动力，可在田间小道、土坎间自行行走，並具有一定的爬坡能力，适合南方丘陵地区使用。



3

在QPC—30型底座和水泵底座上安装胶轮，搬迁可用人力推行，钻探时放下活动支撑即可开钻，适合北方平原地区使用。



特　　点

转盘口径大，既能无岩心钻进，也可提取岩心。

结构紧凑，布局合理，可拆性好，减少了拆装搬迁时间。

稳定性好，操作使用方便可靠，配有行星给进机构进行自动调节给进，机械化程度高。

根据不同的生产特点，该钻机有多种装载方式可供用户选择。

钻机重量轻，体积小，灵活机动性好，在浅孔钻探的同等条件下，与同类钻机比较，节省劳动力，节约木材，安装、搬迁省时、省力、省事，且占地面积小，具有效率高，消耗低，经济效益好约优点。

4 [illegible]前将水箱注满水，[illegible]，保持钻机的稳定性，钻孔结束后把水放掉，即可搬迁。

ng depth 1. 钻
diameter 2.
ed diameter 3.
machine 4.
figuration
Weight 5. 钻机重量
ble speed 6. 转盘转速
of drilling 7. 给进方式
pability (Max.) 8. 提升能力（最大）
pelling speed 9. 自行行走速度
g tower 10. 钻 塔 单桅杆
11. 动 力（湖南滨湖柴油机厂）power
hine type 机 型
ted power 额定功率 4.5 马力 hp
speed 转 速 2400转/分 rev./
t weight 净 重 42 公斤 kg
pump 12. 水 泵
hine type 机 型 BW120/10型卧式
x. displacement 最大排量 120
mping pressure 最大泵压 10公斤
weight 重 量

三、

本厂负责成套设备的供给、
钻 机 drilling machines
附 件（钢丝绳、
钻探工具（钻杆，
钻 塔（单桅、

new design 设计新颖
fittings supplied 供应配件
contracts upheld 信守合同

厂 址：湖南省长沙市左家
Plant Address: Zuojiatang, Changsha, H

11/23/83
CE-78/84
Dept.: WUD
Fernando Kung

Portable Drilling Machine

I. A Word on Our Products

The QPC - 30 and QP - 30 Portable Drilling Machines have been designed and manufactured on the basis of experiences accumulated over the years through repair and production of drilling machines in our plant. In the process of their manufacture, many features found in Chinese and foreign drilling machines have been incorporated. The machines have been tested on different types of soil (including top soil, red sandstone, limestone, and other geological layers under Grade 7) in such provinces as Hunan, Hubei, Sichuan, Guangdong, Henan, Fujian and Guizhou. The tests carried out were productive ones and results have been satisfactory. Our products are suitable for the following drilling purposes: petroleum physical prospecting, geology, coal mining, building materials, hydro power, and construction. The drilling machines were certified in November 1981 at a technical evaluation meeting called by the Equipment Industry Bureau under the Ministry of Geology. The certification was confirmed in the Ind-Dr Document No. 81 - 09 issued by the Ministry of Geology. The evaluation reads in part: "Type QPC - 30 and Type QP - 30 Portable Drilling Machines were designed under correct thinking. While aiming to satisfy the needs posed by blast tunnelling technology in physical prospecting, the machines creatively solved problems such as portability, dependability, mobility, and scope of adaptibility. These are new-type machines that are economically efficient and technically advanced for use in physical prospecting and for other purposes. These products have been well received by clients. They are the more advanced types of trial pit drilling machines that China has succeeded in developing so far. We therefore recommend their production in quantities and according to specified standards."

II. Features

1. The turntable has a long radius. The machine can be used both

for coreless drilling and for coring.

2. The machines are compact in structure, economically put together and easy to take apart; it saves time to dismantle, move and re-assemble.

3. The machines are stable; and convenient and dependable in operation. They are equipped with a planetary releasing mechanism, which adjusts forward drilling automatically. The degrees of mechanization is high.

4. Geared to different production requirements, the machines have many loading capacities to choose from.

5. The machines are light-weight, compact, and handy. Given similar working conditions in shallow bore drilling, our products save labor and lumber. They also save time and labor when being installed or moved. And they enjoy some further advantages:they take up very little space and are highly efficient, energy-saving, and cost-effective.

(Key)

1. QP - 30 Drilling Machine has done away with the self-propelling mechanism and has been changed into the assembled model. It is now easy to take apart and re-assemble, and is therefore suitable for mountanous areas and undulating topography.

2. QPC - 30 Drilling Machine is equipped with an iron wheel. Using the power in itself, it can move along paths between fields and earth mounds, and has a certain capacity to crawl up slopes. It is suitable for use in the hilly country in South China.

3. When rubber-tired wheel are installed on the QPC - 30 machines or on water pumps, the machines can easily be pushed along. When used for drilling,

the only step needed is to push down the support stand. This wheeled machine is suitable for China's northern plains.

4. It is also possible to add a water-tank bottom to the QP - 30 machine. Before drilling, inject water into the tank to increase its body weight and to maintain stability. After drilling, let the water off and the machine is ready for moving.

WATER SUPPLY SITUATION IN THE FIELD TRIAL AREAS
NATIONAL LEVEL AND PROVINCIAL COMPARISON

1. On a national level, the urban water supply situation in China is far better than most developing countries. Of the 247 cities in China, 221 have been provided with piped water systems. Industrial consumption is slightly higher than household consumption (53.4 percent for industry and 37.9 percent for domestic consumption). The service level has increased 6.9 times during the past 20 years and as many as 77.3 million urban people are served with piped water, which means 48 percent of the total urban city population in 1983.

2. In China, a difference is made between a town and a city. A town is a small area in a county with high density of people. There are 3.200 towns in China, of which 1.600 have no piped water. It is believed that more than 50 million people live in these towns. Thus in the urban cluster areas in the countryside of China, more than 25 million urban dwellers lack safe and reliable water supply.

3. According to the July 1, 1982 census, the total population in China (census includes Taiwan) is 1.021.882.511 people. The city urban population is approximatel 162 million and the town urban population is 50 million. Thus, the total rural population is approximately 819 million. According to incomplete statistics, 40 percent of the rural population is served with safe water from a reliable water supply. Thus an estimated 490 million rural inhabitants in China still lack an adequate and safe water supply.

4. Out of the two Provinces in which handpumps field trials will be located, Shanxi Province has improved rural water supplies for 33 percent or 6.78 million rural inhabitants, while in Hunan Province it is only 210.000 people, a negligable number in percentage terms. For comparison, in Shannxi Province (to the west and adjacent to Shanxi Province) 46 percent or 11.74 million people have improved rural water supplies, and in Liaoning Province it is 68 percent or 13.99 million people. (See Table VII-I).

5. The average coverage for these five Provinces is 35.8 percent. This figure should be compared with the national incomplete figure of 40 percent. Should this lower percentage be applied to the entire nation, as many as 526 million people in the rural areas will be in need of improved water supplies.

SHANXI PROVINCE, NORTHERN DISTRICT OF TAIYUAN CITY

6. The population in this district is 180.000 people, 50.000 of whom receive their water from the piped supply of Taiyuan City and another 70.000 are served with piped water from individual shallow or deep wells operated by the brigades. The remaining 50.000 people or 28 percent draw water for domestic use from open wells.

PROVINCIAL POPULATION AND WATER SUPPLY DATA

INDICATORS	SELECTED PROVINCES					CHINA
	Shannxi	Liaoning	Sichan	Shanxi	Hunan	
Total Population	29.041.000	35.720.00	10.022.000	25.960.000	52.800.800	1.031.882.511
Rural Population	25.343.000	20.590.000	8.588.000	20.710.000	47.800.000	819.000.000
Urban Population	3.698.000	15.130.000	1.463.200	4.750.000	4.980.000	212.882.000
Rural Population Served with Improved Watersupply	96% 11.743.000	68% 13.990.000	32% 2.748.000	33% 6.786.000	0% 210.000	35.8% 293.202.000
Urban Population Served with Improved Watersupply	3.000.000	NA	706.768	2.450.000	4.500.000	48% 102.300.000
Number of Counties	106	45	182	101	95	NA
Number of Communes	2.521	1.199	5.455	1.890	NA	NA
Number of Brigades	30.800	16.334	NA	31.689	42.500	NA
Number of Districts		10	NA	7	15	NA
Number of Cities	6	3	16	7	16	247
Number of Boreholes	NA	NA		85.330	NA	NA
Number of Handpumps	NA	NA	241.900	92.000	NA	NA
Number of Electric Pumps	2.600	NA	49.800	102.500	NA	NA

Table (con'd)

INDICATORS	PROVINCES					CHINA
	Shannxi	Liaoning	Sichan	Shanxi	Hunan	
Number of Open Wells	2.600	NA	49.800	102.500	NA	NA
Number of Handpump Factories	NA	NA	NA	0	1	NA
Number of Plastic Pipe Factories	NA	NA	NA	10		NA
Annual Average Income	Yuan 319	Yuan 336	Yuan 484	Yuan 400	Yuan 200	Yuan 600
Number of People Served with Handpumps in rural areas	NA	NA	241.900	92.000	NA	NA

7. The service level is fairly high in this district with 30 percent of the consumers connected to the piped system into the house. Another 30 percent have a standpipe at the yard while the remaining 40 percent have to walk some short distance to a standpipe outside the yard.

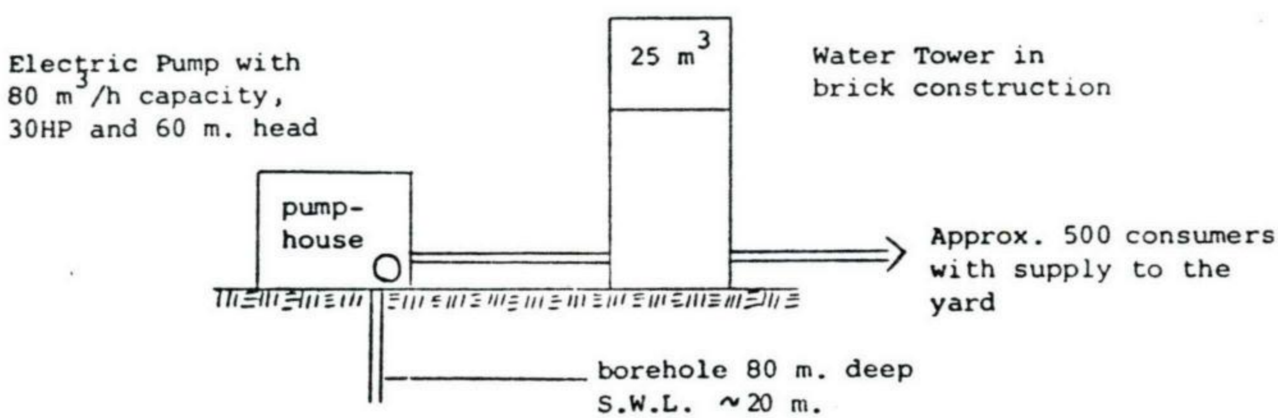
8. The consumers, served with piped water from the city supply, pay through the brigade 0.11 Yuan per consumed m^3. When flow meters are not available, a flat rate of 0.10 Yuan per person per month is applied. The collected revenue is used mainly to cover maintenance cost. The piped water supply from individual wells through the brigades is supplied without charge.

9. The brigade drill a borehole upon request from the villagers via the brigades. The brigade pays a subsidized rate of 18 Yuan per meter drilled borehole (without casing) with 12" diameter.

10. Depending on the formation, casing of sizes 8", 10" and 12" are used and screens are applicable when required. The screen consists of a galv. iron pipe with several drilled holes with diameters between 5-20 mm. The pipe is then wrapped with either nylon net or fibers from a special plant. Finally, a wire mesh is applied in order to hold the net in position. The screen is gravel packed. This screening method, which seemed to be commonly used throughout China had been used since 1971 and according to the brigades no problems have been observed so far. Compressed air is normally used for well development.

11. The drilling method used in the district is either Auger or Percussion which are also common throughout China. All drilling equipment is locally made.

12. <u>A Typical Brigade Set-Up in the District</u>:



13. The pump is primarily operated for irrigation purposes about 5 hours daily to irrigate approximately 800 mu (1ha=15mu). The priority given to agricultural production was demonstrated several times throughout the mission. Earnings from brigade factories is used to finance operation and maintenance costs.

Jincheng County, Shanxi Province

14. This county is one of our project sites. The county has an average rainfall of 400 mm. per year and is populated with 600.000 people. 50 Percent of the population is served with piped water from either groundwater or nearby springs. The remaining 50 percent is drawing water from open wells with an average static water level of 20 meters. The longest distance consumers will have to walk to fetch water is 2.5 kms. The water fetchers use their own buckets (2 buckets each time) twice daily.

15. In the county, approximately 810 boreholes have been drilled, 60 holes with S.W.L. 100 m. or more, 350 holes with S.W.L. 30-70 m. and 400 holes with S.W.L. less than 30 meters. In addition, the county has dug 5.000 open wells with S.W.L. at approximately 20 m; 15 Springs have been developed. More than 1.000 handpumps have been installed in the county, all are of the suction type similar to the Bangladesh made cast iron pump. The design differs from pump to pump mainly because the pumps are normally for family use and individually manufactured.

Bei Yicheng Commune, Jincheng County

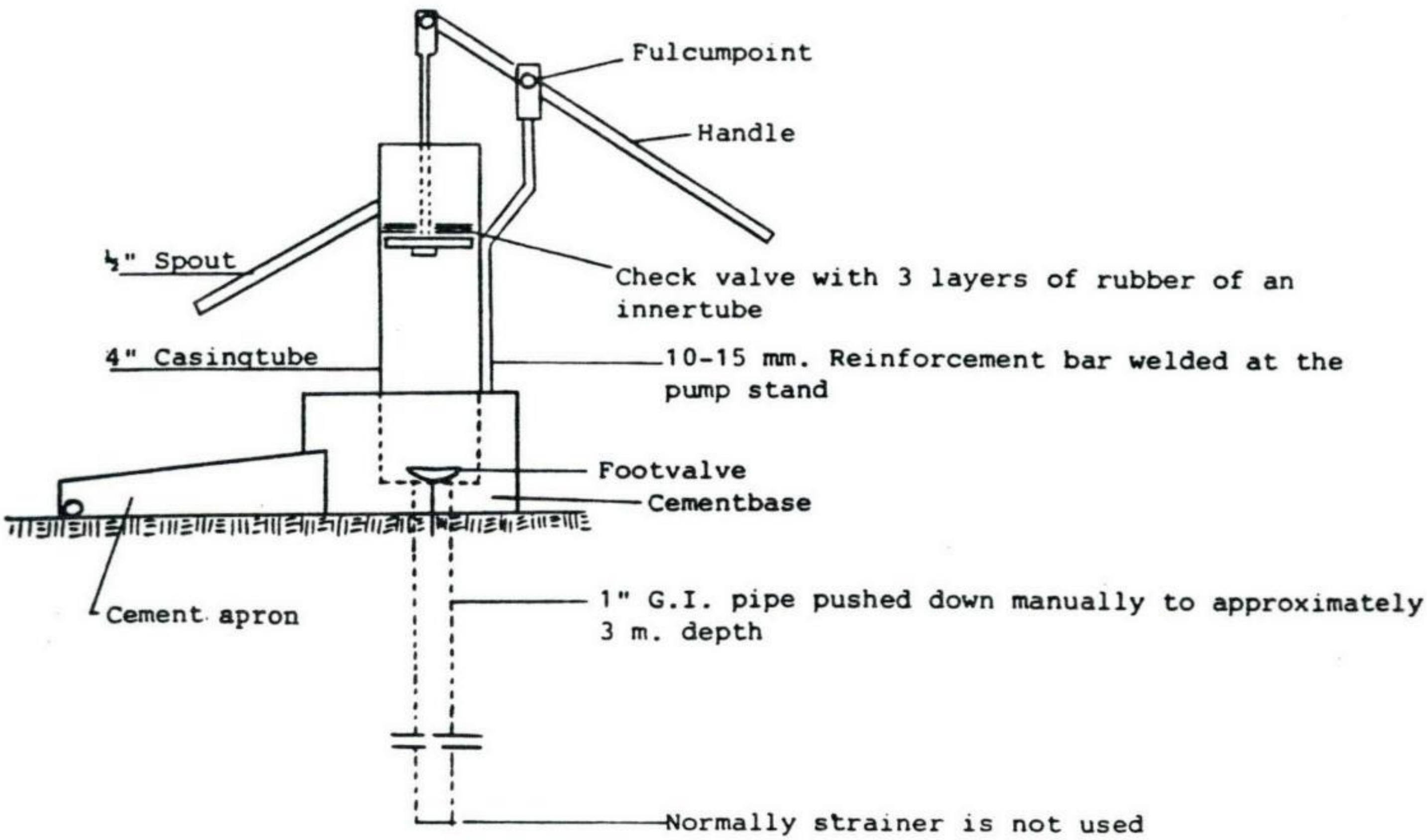
16. The commune has 20.000 inhabitants and is located approximately 30 kms. north of Jincheng City.

17. The commune depends mainly on open wells for drinking purposes and is served with 27 open wells. In addition, ten electric pumps are used for irrigation purposes. Some villagers have access to piped water from neighbouring communes. The water quality is good according to the local Authorities. Most of the wells are very old, and was constructed over 100 years ago. The difference in water table between dry and wet seasons is 4 m. according to the local Authorities but the wells never go dry. The wells are cleaned up every three years.

Chaundi Commune, Jincheng County

18. This commune is located 30 kms. west of Jincheng City and the population number is 18.000. The inhabitants main water supply is from the existing 120 open wells. Some 50-60 handpumps are in use in the commune by families. In most cases these handpumps (all suction type) are manufactured by the family members. The cost for one such pump is 10 Yuan including the 1" drop pipe. Another 3 Yuan is charged for the drainage work material. Labour is provided by the family.

19. A Typical Locally-made pump is shown below:



20. Inspite of the low price (13 Yuan totally excluding labour cost) for this kind of suction pump, only 50-60 families had adapted the technology. The reason for this low utilization will be further investigated in future missions to China.

Zhouchuen Commune, Jincheng County

21. This commune is located 30 kms. west of Jincheng city and is populated with 23.000 people. The entire population is depending on the existing 70 shallow wells. One borehole is used for irrigation. No handpumps are used in this village. Many of the wells are as old as 400 years. Most of the wells in most of the communes had a roof-structure to provide shelter for the well-users. The roof-structure is illustrated below:

22. This permanent roof-structure is constructed with great skill. These structures will be to some extent of a hindrance in those places where deep set pump will be installed. Our project should look into a redesign, in order to save the structure.

Bagong Commune, Jincheng City

23. The commune, located 20 km north of Jincheng city, has 36.000 in population. The entire commune population depends on 101 open wells. In addition, there are 10 boreholes equipped with electric pumps for irrigation. The commune has no handpumps installed.

24. The depth of the wells ranges from 15-20 m and most of them are old but suitable for our project with one exception - one well is located at the downhill slope with drainage water pouring into the well. Several pig houses were located near the well.

HUNAN PROVINCE

Changsha County

25. The county is the location for part of our second project activity in China. The total population is 728.000 with 680.000 living in the rural areas. In the rural areas of the commune, 149.000 people use handpumps for their daily drinking water consumption. The total number of handpumps are 2.741 with approximately 60 percent for family use and 40 percent for community use. Approximately 1.000 people get their water from electric pumps. About 440.000 people (65 percent of the rural population) draw their water from open wells. The remaining 90.000 people (13 percent of the rural population) still get their water from surface water sources such as rivers and lakes. All the 2.741 handpumps were installed during the past 10 years, with 300 installed last year. All the handpumps are the suction type and 90 percent of the installation was made by hand and 10 percent by drilling machine.

26. The total number of open wells is 50.486 in the county with 60.7 percent for individual use and 39.9 percent for community use. Only about 10 percent of the wells has the pulley system. Note that all consumers have their own buckets.

Huanghua Commune, Changsha County

27. The commune is located 20 kms northeast of Changsha City and has population of 26.430; 18 handpumps in the commune are serving four percent of the population Two of the handpumps are for community use, and the remaining 16 are for family use. All he handpumps are suction type and are installed in hand-dug wells.

28. The commune has totally 3.874 open wells serving 80 percent of the rural population. The wells are equally distributed for family and community use. Only one percent of the wells are equipped with pulley. 15 Percent of the wells are very shallow with S.W.L. at 1-2 m. The remaining 16 percent of the rural population drink surface water from nearby lakes and rivers.

Chuenhua Shan Commune, Changsha County

29. This commune is located approximately 30 km northeast of Changsha City. The total population is 21.000 people. The commune has 750 pumps installed which is most probably because a factory is located nearby; 80 percent of the handpumps are for family use and 20 percent for community use; 15.000 people (71 percent) are served by the handpumps; 6.000 people drink water from open wells. The users are very happy with the handpumps and the only part that needed attention is the rubber seal. The factory charges 1 Yuan for a seal and it is easily obtained in this particular commune.

30. The installation cost of one handpump is 100 Yuan and details are as follows:

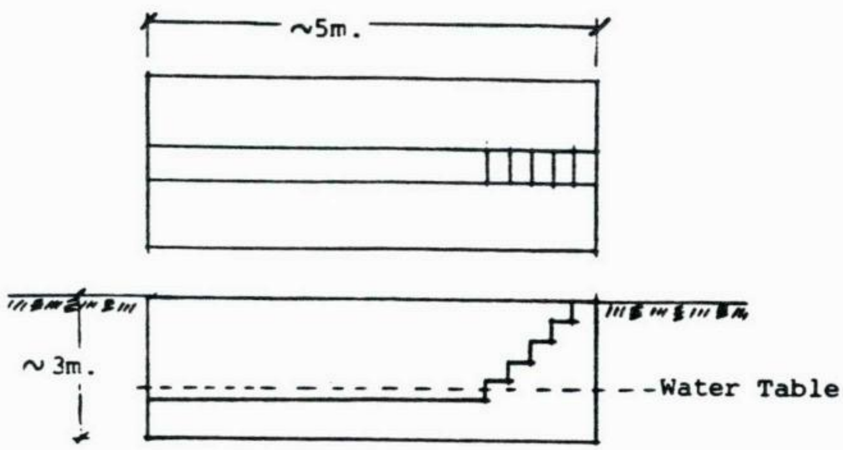
Handpump	35 Yuan	
Forced Pipe Well	40 Yuan	
Installation with material	25 Yuan	
Total	100 Yuan	(1 Yuan - US$0.5)

31. The service level in this commune is very high and this fact clearly demonstrated the importance of close links between the potential buyers and the factory (or selling point).

Langli Town, Changsha County

32. Langli Town is an urban area in Changsha County with 16.800 inhabitants. The town has 3 handpumps installed but the water can only be used for washing because of high iron content (0.8 p.p.m.). In addition, the town has 3 shallow open wells serving approximately 6.000 people. The remaining 10.800 urban dwellers fetch their water from the Lui Jang River. Thus, the entire population of the town is drinking polluted water from unprotected water sources. The river is known to carry pollution from fertilizers. Two of the handpumps are made by the families while the third one is purchased from the Changsha County Factory of Light Industry Machienry (the only handpump factory in the province).

33. The open wells used in the town are very large and the fetchers can walk into the well and dip their buckets which is attached to the yoke. The typical well is illustrated below:



Wangcheng County, Hunan Province

34. The County has 666.838 people living in 34 communes and 5 towns. The rural population is 595.016 people and the urban town population is 71.822. The average family has 3.8 members.

35. The county has 24.575 open wells including 1.700 open wells in the mountain areas and 2.500 ponds. 244.500 People (37 percent) get their water from polluted open wells. 7.100 People get their water from 310 handpumps. 31.000 People are served with piped surface water through slow sand filter treatment plants. 170.000 People (25 percent) fetch their water from rivers and 180.000 people draws their water from lakes and ponds. Thus, almost the entire population or 628.738 (94 percent) in the county are in need of an improved water situation.

36. Some statistics from the 310 handpumps over a 3-year period:

- 150 rubber seals changed
- 60 pins changed
- 38 handpumps dried out or broken down
- 185 need priming regularly

Gaotang Lin Commune, Wangcheng County

37. The commune is populated with 14.200 people and is located 30 kms northwest of Changsha. The average family size is 4.13 people.

The commune population have access to 760 wells serving 30 percent of the people. The remaining 70 percent fetch water from nearby lakes, rivers and ponds.

50 Percent of the wells serve water all year round while the other half goes dry or almost dry by the end of the dry season. 510 Wells were dug in 1982 and 250 wells after the liberation. The average water table in the well is 3-4m.

20 handpumps were installed serving 100 people, thus all the handpumps are for family use. All 20 handpumps are homemade suction pumps.

The entire population is in need to improve their water supply situation.

Xikang Town, Wangcheng County

38. This small urban area is populated with 1.600 people. The town has 4 open wells serving approximately 100 people. The remaining 1.500 (94 percent) draw their water from the nearby river.

The four wells have an average depth of 14.5 m. with 10 m. S.W.L. which drop 3 m. at the end of the dry season.

In this town, all the urban population drinks polluted water.

Jinggang Town, Wancheng County

39. This town is the centre of trade in the Jinggang District. 6.000 People live in the town and all of them draw their water from the nearby Xiang River. The average family has 3.3 membes.

The water in town has high content of Mn. 1.0 ppm while iron and zinc is below standard. The water has never been bacterialogically tested.

Huangjin Commune, Wangcheng County

40. The commune has 20.000 people in population with an average family of 4.3 members. The commune has 3 handpumps installed for family use and 1.661 open wells with an average water table of 5 m from which 90 percent of the commune population draws their water. The water table drop 2 m at the end of the dry season. The remaining 10 percent of the population fetch their water from nearby surface water sources such as lakes and ponds.

41. Electric pumps were installed in 50 wells for the brigade factories. The commune is a main centre for noodle production and as many as 50 families use more than 10.000 litres of water/day. The largest factory use 15.000 litres/day.

The 3 handpumps in the commune were purchased from the Changsha Handpump Factory and the owners have paid 200 Yuan per installation including wells lined with cement rings.

According to the commune Authorities, the water quality in this commune is the best in the whole county.

Conclusion

42. The water service level in rural areas varies between provinces, between counties in the same province and between commune in the same county. Below is a brief summary of the service level as described by various government sources:

Place	Percent of rural population In Need of Improved Water Supplies	
National Level	60%	
Shannxi Province	54%	)
Shanxi Province	67%	)
Lianing Province	32%	) Average 64.2%
Sichan Province	68%	)
Hunan Province	~100%	)
Northern District of Taiyuan City	28%	
Jincheng County	50%	
Bei Yicheng Commune	100%	
Chandi Commune	100%	
Zhouchuen Commune	100%	
Bagong Commune	100%	
Changsi County	78%	
Hunghua Commune	96%	
Chuenhua Shan Commune	29%	
Wangcheng County	94%	
Gaotang Ling Commune	100%	
Huangtin Commune	100%	

The average service level in the urban areas is fairly good. However, many urban towns at the country side lack access to safe water from a reliable water source. Below is a brief summary of the service level as described by various government sources:

Place	Percent of urban Population in Need of Improved Water Supplies
National Level Cities	52%
National Level Town	50%
Shannxi Province	9%
Shanxi Province	50%
Sichan Province	50%
Hunan Province	10%
Langli Town	100%
Xinkang Town	94%
Jinggang Town	100%

It is interesting to note that all the communes and towns visited had a very low service level of water supply with one exception, Chuenhua Commune, where a handpump factory is located. It is obvious that the non-existent infrastructure for marketing and distribution of handpumps is reflected in the low number of handpumps installed in many perfectly suitable areas for the locally made suction pump model SYB-100.

Another observation is that the service level to some extent is related to the level of income as well as place of living in China.

Most striking is, perhaps, the extremely low service level in some urban clusters (towns) in Hunan Province and the tremendous impact the handpumps will have in such areas. Our project alone - which is primarily for handpumps testing - will, because of its impact per handpump, become a water development project in thses urban town areas.

ENT/81/026 yellow

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street, N.W.
Washington, D.C. 20433
U.S.A.

(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

December 16, 1983

Mr. Manning
Fluxinos
Viale Europe 6B
20060 Bussero (MI)
Italy

Dear Mr. Manning:

Thank you for your letter of September 7, 1983. I sincerely apologize for this late reply, but I have been away from the office and my Senior Project Officer left your letter for my reply. Copies of your letter have been sent to our senior professionals for their views; we await their replies.

First of all, let me again thank you for your most appreciated hospitality and for the interesting visit.

Secondly, I wish to briefly reply to your letter. Our group is waiting for the results of the tests in Gosfield carried out by the Consumers' Association Testing and Research (CATR); however, preliminary views made before the results arrive are as follows:

1. We cannot make the general assumption that handpumps for developing countries will be imported. The handpump is a piece of machinery that can be successfully manufactured by these countries in order to attain standardization in the rural areas where conditions are unthinkable for the long-term application of a variety of pumps.

2. If this assumption is correct, the second decisive elements are the selection of pump type; ease of on-site maintenance; and the type of spare parts required, their costs and local availability.

For example, a pump like the India Mark-II, which has a simple rigid head (like the MALDEV), can be manufactured in African countries and modified to the VLOM concept by having plastic belowground components. Its cost in Africa, with appropriate quality control, could be approximately 250-300 USD. If you were a decision maker in an African country, would you decide to produce a pump like the Fluxinos or the Mark-II?

Please note that the Mark-II is only an example; a different pump with the characteristics of the Mark-II that has already proven itself for deep applications in over 200,000 boreholes would be acceptable.

3. Please let me stress that we do not claim that the market should concentrate only on pumps like the Mark-II. For shallow and intermediate applications, we foresee a variety of pumps in different countries. This market sector will contain millions of units, primarily in the plains of Asia and other parts of the world where static water tables are between 0-15 meters.

You will hear from me again in the near future when I have received the replies to your letter from our senior professionals and the complete results from the CATR tests. Thank you again for your kind hospitality.

Sincerely yours,

S. Arlosoroff, Chief
Applied Research & Technology Division (WUD)
(UNDP Projects Manager, INT/81/026, GLO/80/004, INT/82/002)

cc: Messrs. Tschannerl, Journey, Langenegger, Grey, Rosenhall, McLeod

INT/81/026 yellow

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE December 16, 1983

TO Files

FROM G. Tschannerl

EXTENSION 61785

SUBJECT Visit by Mr. J. Boode, Plastic Screen Manufacturer

On December 15, I met with Mr. J. Boode to discuss the Boode Plastic Screens. The following points were made:

1. The cost of a 53mm Boode Robo Screen is $5.00 per meter.

2. For extruding screens, Mr. Boode has had great difficulties with (a) uneven cooling of the extruded material as it leaves the machine (the solution of which was operating the machine at 1/5 of the normal speed), and (b) composition and quality of PVC material (the solution of which was using non-standard compounds and dimensions).

3. He is interested in some testing of screens; I told him that testing is donor-funded and suggested he contact Dutch Aid.

4. Mr. Boode has supplied plastic screens for testing to UNICEF in Pakistan, Bangladesh, Ethiopia and Sudan. He is still awaiting the performance results.

cc: Messrs. Arlosoroff, Journey, Langenegger, Grey, Rosenhall, Sternberg, Mills

GT/rkb

FORM NO. 27 - OCR
(3/82)

WORLD BANK OUTGOING MESSAGE FORM Cable, Telex

)RTANT—PLEASE READ INSTRUCTIONS BELOW BEF TYPING FORM

INT/81/026

FR/RLA

Typewritten Character Must Fall Completely in Box!

PAGE 1 OF 3

OFFICIAL DEPT/DIV ABBREVIATION 61790

MESSAGE NUMBER

TEST NUMBER (FOR CASHIER'S USE ONLY)

START HERE

ATTENTION TORE LIUM, NVE - AVD. VU, P.O. BOX 5091 MAJORSTUA, OSLO 3, NORWAY. OUR TELEX NO. 1591. AAA THIS IS IN REPLY TO YOUR TELEX TCP HC ON HANDPUMPS EXPERIENCE OF DECEMBER 2 TO MR. ARLOSOROFF, WHO IS PRESENTLY ON MISSION. WE REGRET THE DELAY. BBB TEST RESULTS FROM THE LABORATORY HAVE BEEN CIRCULATED. IN ADDITION THE EARLIER ODA SPONSORED TESTS ARE SUMMARIZED IN THE ANNEX OF OUR WORLD BANK TECHNICAL REPORT NO. 6 ON LABORATORY EVALUATION OF HAND-OPERATED WATER PUMPS FOR USE IN DEVELOPING COUNTRIES.

CCC FIELD TESTS ARE IN AN EARLY STAGE AND NO LONG-RUN PERFORMANCE DATA ARE AS YET AVAILABLE. THEREFORE WE CANNOT AT THIS TIME MAKE SPECIFIC RECOMMENDATIONS. WE SHALL, HOWEVER, SHARE WITH YOU OUR EXPERIENCE TO DATE.

DDD INDIA MARK II TESTED AT CATR UNDER ODA SPONSORSHIP. THE PUMP PERFORMED VERY WELL. UNICEF FIELD EXPERIENCE IN INDIA HAS ALSO BEEN GOOD. OUR FIELD EXPERIENCE TO DATE IS ALSO POSITIVE. HOWEVER, THE BELOW-GROUND STRUCTURE OF THE MARK II REQUIRES HEAVY MOBILE EQUIPMENT FOR EVEN A SIMPLE REPAIR (SUCH AS CUPSEAL REPLACEMENT), MAKING IT UNSUITABLE FOR VLOM (VILLAGE-LEVEL MAINTENANCE). WE HAVE RECENTLY STARTED FIELD R AND D IN INDIA TO MODIFY THE

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2	3	61790		

PUMP'S BELOW-GROUND STRUCTURE, LEAVING THE PUMPHEAD AS IS.

EEE PETRO WAS ALSO TESTED UNDER ODA SPONSORSHIP AND HAD PERFORMANCE PROBLEMS. NO NEW POSITIVE PERFORMANCE RESULTS HAVE SINCE THEN BEEN RECEIVED, BUT THE DESIGN CONCEPT REMAINS AN INTERESTING ONE.

FFF DUBA WAS NOT LAB TESTED. BOTH THE TROPICA II AND VII ARE VERY EXPENSIVE AND MASSIVE, LIKELY TO BE QUITE DURABLE BECAUSE OF OVERDESIGN. BUT THEIR REPAIR IS VERY DIFFICULT AND MOST SPARES EXPENSIVE. THEY MIGHT BE APPROPRIATE ONLY FOR SPECIAL APPLICATIONS.

GGG SWN WAS ALSO NOT LAB TESTED. NEITHER DO WE HAVE RELIABLE FIELD RESULTS. THE DESIGN LOOKS INTERESTING, BUT IS NOT VLOM. THE INSTALLATION OF THE PUMP HAS BEEN ACCOMPANIED WITH GOOD MOBILIZATION OF THE PEOPLE AND GOOD BACKUP SERVICES.

HHH SOME RECOMMENDATIONS: FOR WATER TABLES TO 10-12 METERS, DIRECT ACTION (WITHOUT LEVER) PUMPS USING PLASTIC PARTS ARE APPROPRIATE. THE MOST POPULAR OF THESE IS THE BLAIR (ZIMBABWE AND MALAWI). OTHER SUCH PROMISING MAKES ARE TARA (BANGLADESH), ETHIOPIA BP50, AND PEK (CANADA). FOR DEEPER WATER LEVELS THE PUMP HEADS OF MARK II AND MALDEV (MALAWI) PROBABLY COME CLOSEST TO VLOM, BUT A CONVENTIONAL BELOW-GROUND STRUCTURE

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PAGE 3 OF 3

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HAS TO BE USED WITH THEM FOR NOW. ONCE PROVEN VLOM BELOWGROUND ASSEMBLIES EXIST, THEY CAN BE RETROFITTED ON TO THE EXISTING MARK II OR MALDEV PUMP HEADS.

III FOR FURTHER EAST AFRICAN EXPERIENCE YOU MAY WISH TO CONTACT OUR REGIONAL PROJECT OFFICER, MR. DAVID GREY AT THE WORLD BANK OFFICE, NAIROBI. HE WILL BE IN NAIROBI AFTER JANUARY 20.

JJJ WE HOPE THIS INFORMATION WILL BE HELPFUL. WE SHALL BE GLAD TO ANSWER FURTHER QUESTIONS. REGARDS, TSCHANNERL/ARLOSOROFF, INTBAFRAD

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DRAFTED BY: GTSCHANNERL:PH, EXTENSION: 61790

CLEARANCES AND COPY DISTRIBUTION:

cc: Messrs.D.Grey, K. Mills
K. Kayser, NORAD

AUTHORIZED BY (Name and Signature): G.TSCHANNERL G. Tschannerl

DEPARTMENT: TWD

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BOOK OF FOUR (SEE MESSAGES ATTACHED)

F (1) WHITE 845

UNV (TELEX NO. 28.96.20)

GENEVA, SWITZERLAND

F (2) ROSENHALL

INTBAFRAD (TELEX NO. 788-82817) #1761

BANGKOK, THAILAND

F (3) KRESSE 841

GTZ (TELEX NO. 415 230 GTZ)

FRANKFURT, FEDERAL REPUBLIC OF GERMANY

F (4) KULESSA 716

UNDP (TELEX NO. 22314 DPBJG CH)

BEIJING, CHINA

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1 OF 1	WUD/UNDP		

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ATTENTION WHITE, UNV GENEVA. FOR INFORMATION ROSENHALL, INTBAFRAD BANGKOK; KRESSE, GTZ, FRANKFURT; AND KULESSA, UNDP BEIJING. OUR REF. NO. 1590. RE INT/81/026 HANDPUMPS PROJECT; KYAW MYINT -- CHINA. AAA FOLLOWING IS TELEX TO RESIDENT REPRESENTATIVE UNDP RANGOON, BURMA, FROM ROSENHALL, INT/81/026 REGIONAL PROJECT OFFICER, BANGKOK. QUOTE. RE APPOINTMENT OF UNV MR. YAP CHOKE CHONG TO WORLD BANK EXECUTED HANDPUMP PROJECT IN JINCHENG, PEOPLE'S REPUBLIC OF CHINA. GRATEFUL YOU CONTACT UNV AND REQUEST HIM TO URGENTLY PRESENT HIS PASSPORT TO CHINESE EMBASSY IN RANGOON IN ORDER FOR HIM TO OBTAIN VISA ASAP. PARA CHINESE AUTHORITIES HAVE OR WILL WITHIN A FEW DAYS TIME TELEX THEIR EMBASSY IN RANGOON TO GIVE CLEARANCE FOR VISA. UNQUOTE. BBB WE HAVE ARRANGED A SHORT TRAINING FOR KYAW MYINT IN THAILAND FOR THE FIRST WEEK OF FEBRUARY 1984. HE SHOULD THEN CONTINUE TO BEIJING FOR APPROXIMATELY 10 DAYS BRIEFING AND ASSUME HIS DUTIES IN JINCHENG ON FEB. 25. PLEASE ARRANGE FOR HIS TRAVEL ACCORDINGLY, TO ARRIVE IN BANGKOK FEB. 1. REGARDS, TSCHANNERL/ARLOSOROFF, INTBAFRAD.

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SUBJECT: INT/81/026

DRAFTED BY: G. Tschannerl:kb   EXTENSION: 61790

CLEARANCES AND COPY DISTRIBUTION:

cc: Messrs. Sud (AEP);
Freedman (WUD);
Koch-Weser (AEA);
Potashnik (UNDP)

AUTHORIZED BY (Name and Signature): G. Tschannerl G. Tsch

DEPARTMENT: WUD

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INT/81/026

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The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street, N.W.
Washington, D.C. 20433
U.S.A.

(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

December 15, 1983

Mr. A. Scott Faiia
c/o Foundation CARE
P.O. Box 773
Port au Prince,
Haiti

Dear Mr. Faiia:

Thank you for your letter of September 23, 1983. We apologize for our delayed reply, as well as for our having missed you when you were in the United States.

Thank you for the informative report on handpumps performance in Haiti and elsewhere. We have some reservations about the long-run performance of AID/Battelle pumps in developing countries, mainly because they are not VLOM (Village-Level Operation and Maintenance) designs. VLOM pumps are designed for manufacture in the developing countries and repair by trained village operators. Unlike the conventional pumps, VLOM pumps can be repaired locally without incurring the delay and expense of employing mobile maintenance units.

It has again been suggested that our project undertake field trials in Haiti, and we are seriously considering it. What do you think about such a proposal, including the possibility of our collaboration?

Thank you again for your report. Enclosed for your information are our handpumps monitoring forms and a guide to their use. These are the standard forms employed in our field trials. Please feel free to use them if you wish in your future handpumps evaluations.

Sincerely yours,

G. Tschannerl

Gerhard Tschannerl
Senior Project Officer
Applied Research & Technology Div., WUD

Enclosures

cc: Mr. Arlosoroff

GT/rkb

INT/81/026

December 15, 1983

Mr. K. Mills
Testing Manager
Harpenden Rise Laboratory
Harpenden Hertfordshire
AL5 3BJ, England

Dear Ken:

1. Many thanks for your letter of December 8 and enclosures. We shall react to the section on the weighting tree shortly and then the volume can hopefully go to print.

2. We concur with the return of the Moyno pump to Robbins & Myers. Considering the heavy use the pump has been subjected to in the laboratory, the remaining salvage value is very small, making it impractical (and perhaps unwise) to charge Robbins & Myers for the pumps. However, you may want to recover some costs connected with the return shipment. See my enclosed authorization letter to you.

3. We agree with your suggested modification of the chemical-type water monitors contained in your Ref. 2788/JW. The cost for the entire batch will be US$40.

4. Regarding the invoices for the study tour of the Chinese team and for other costs that you submitted, we still have to prepare the work agreement with you which will cover retroactively the work you have done and your future work program, including our share of the joint activities with ODA. I regret that payment of the invoices you submitted will therefore be delayed.

5. We are looking forward to your visit to Washington in January and to your progress report. We shall meet your hotel and food expenses in Washington. The Urban and Water Training Seminar in which all the Department staff will participate is scheduled to end on the evening of January 12. Our project meeting will be January 13 and 16. I therefore suggest you arrive in the evening of January 12. We shall make your hotel reservations for 6 nights, starting January 12. Besides Saul and myself, the project meeting will be attended by our four Regional Project Officers, Tony Ramuglia and our other economist, Nick Burnett. Charles Gunnerson from the Resource Recovery Project and Letitia Obeng from the Training Project will attend some of the time, as well as Mike Potashnik.

6. We have agreed with Mr. Bulman to a slight revision of your proposal for plastics development, which he will communicate to you.

7. Unfortunately I cannot find a pamphlet on the Korat pump, and the passage in the report may have to remain as is.

8. I am not sure where we stand on Don's help with the Maldev and UNIDO's position. The matter is becoming more urgent now with increased pressure on us to recommend VLOM pumps. The Maldev head is an obvious candidate, considering the good field performance results from Malawi, but its manufacture is still limited to small workshops in East Africa. This is one of the subjects to be discussed here in January.

Sincerely yours,

Gerhard Tschannerl
Senior Project Officer
Applied Research & Technology Div., WUD

GTschannerl:phm

cc: Messrs. S. Arlosoroff, D. Grey, O. Langenegger, T. Journey, L. Rosenhall,
A. Ramuglia, N. Burnett, B. Gross
Ms.C. del Castillo

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

yellow
INT/81/026

DATE December 15, 1983

TO Mr. K. McLeod, Consultant

FROM Gerhard Tschannerl, Acting Project Manager G. Tschannerl

EXTENSION 61785

SUBJECT UNDP/World Bank INT/81/026 Rural Water Supply Handpumps Project Terms of Reference: Mission to the People's Republic of China, February 27 - March 14, 1983

1. On or about February 27, you will meet Mr. L. Rosenhall in Hong Kong to be briefed on our handpumps field trial arrangements in China.

2. You will proceed to China on or about February 28 with Mr. Rosenhall for the following purposes:

a. Take part in the training activities of the Caretakers' Training Course in Changsha on March 2-4 and in Jincheng on March 7-9. You will give a brief practical introduction to the design, installation and maintenance of the major pump types to be brought into China for field trials.

b. Give technical advice on improvements of locally available pumps.

c. Visit handpump manufacturers in Changsha and PVC extruders in both Changsha and Jincheng, and comment on production procedures and quality.

d. Based on the above, as well as other observations, advise on possibilities of the local manufacture of foreign metal and plastic pumps.

e. Give technical advice on expanding the laboratory for pump testing in Changsha and for the new laboratory in Beijing.

f. Assist in preparing for the August handpumps workshop in China.

g. Give CAAMS in Beijing a short introduction to foreign pumps operation and maintenance.

3. Upon your return to Australia on or about March 14, you will mail to Mr. Arlosoroff a full trip report within 15 days.

cc: Messrs. Kresse (GTZ, Frankfurt); Potashnik (UNDP, New York); Kulessa (UNDP, Beijing)

cc: Messrs. Cohen, Beier, Middleton, Costa, Pettigrew, Freedman, Arlosoroff, Rosenhall, Journey, Ramuglia, Burnett (WUD); Sud, Bruestle (AEP); Koch-Weser (AEA)

GT/rkb

INT/81/026

12-14-83

Back to office report

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

TO: Mr. Saul Arlosoroff, Chief, Applied Research & Technology Div., WUD

DATE: December 14, 1983

FROM: Nicholas Burnett, Economist, WUD/ART N. F. Burnett

SUBJECT: UNDP Project INT/81/026: Rural Water Supply Handpumps Mission to West Africa: October 1 - November 7, 1983 Complete Back-to-Office Report

cc: Messrs. Beier, Cohen, Costa, Freedman, Gunnerson, Middleton, Pettigrew, Ramuglia, Tschannerl, Ms. Obeng (WUD); Messrs Gibbs, Hinkle (WA1); Skillings (WA2); Al-Khafaji (WAP).

Mrs. de Merode (WB/Bamako), Messrs. Grey (WB/Nairobi), Journey (WB/Dhaka), Langenegger (WB/Abidjan), Rogerson (WB/Ouagadougou), Rosenhall (WB/Bangkok), Schelzig (WB/Accra).

Messrs. Coppini (UNDP/Bamako), Mubanda (UNDP/Accra), Rotival (UNDP/Abidjan), van Hulten (UNDP/Ouagadougou). (For appropriate in-country distribution).

Messrs. Beyer (UNICEF/NY), Potashnik (UNDP/NY).

TABLE OF CONTENTS

F. GHANA

Accra:	(a)	Meetings with Government, UNDP and World Bank officials and German consultants about rural water supply costs:
Kumasi:	(b)	Visit to INT/81/026 KfW field trial site;
Bolgatanga:	(c)	Visit to planned INT/81/026 CIDA field site.

ANNEXES

A. INTINERARY AND INTRODUCTION

I performed my mission according to my Terms of Reference signed by you on September 1, 1983, with a minor rerouting to reach Bolgatanga in northern Ghana via Ouagadougou in Upper Volta rather than via Accra. I was accompanied by Mr. Otto Langenegger, INT/81/026 Regional Project Officer for West Africa, in Upper Volta and Ghana and also for much of the mission in Ivory Coast, his duty station.

The principal purpose of the mission was to collect cost data on rural water supply (RWS). A paper analyzing the data collected or to be sent to Washington will be completed in the first half of 1984. A secondary purpose was to attend a number of RWS conferences in Ouagadougou.

Copies of the documents obtained on the mission (Annex IV) may be obtained from me.

B. GENERAL OBSERVATIONS AND RECOMMENDATIONS

(a) Public relations in West Africa. As evidenced by the Ouagadougou conferences, attention should be paid to explaining clearly INT/81/026's origins, objectives and methods of operation, especially in countries where there are no field trials and with regard to regional RWS organizations like CIEH.

(b) Release of field trial data. This will continue to be an issue and consideration should be given to mechanisms for making our results available very early, as soon as we are certain that we have enough data to support conclusions, even preliminary ones.

(c) INT/81/026 field trials and monitoring forms. The country monitoring engineers in Upper Volta and Ghana are impressive and doing a good job.

Neither, however, has arranged for the completion of Form 4 (logbooks), principally and understandably because village pump attendants do not exist. One has not yet begun to complete Form 5. Both have only just received Forms 6.

There are a number of specific problems in completing the forms, notably:

Form 1, Section C	No "Remarks" box.
Form 3, C8	The instructions are poorly worded and should be revised to indicate that the point is the number of visits to one pump to effect the repair, NOT the number of pumps visited.

Form 3, C1-C5	Needs expansion to allow for the reconditioning of parts in the workshop and later replacement on other pumps, as in the Kumasi area.
Form 6	Should separate foreign and local costs.
Form 6, B1	Same point about reconditioned parts.
Form 6	Needs a section for overnight subsistence allowances.
Form 6, Instructions	Section on "overhead" is not clearly worded and should be revised.

(d) Cost Data Questionnaire. This should also be revised to distinguish local and foreign exchange costs and to provide more space for all answers, especially that summarizing the maintenance system.

(e) Confidentiality of cost data. Much of the data provided or to be provided is on the understanding that it can be published only so long as the specific project and country not be identified. This must be borne in mind when cost analysis papers are prepared.

(f) Quality of RWS data. All the data collected or promised on this mission is fairly incomplete. Capital cost data is much more comprehensive than that on recurrent costs. It will not be possible to link historical reliability and usage to costs for any of the projects examined, although this might be possible for some in the future if special arrangements are made e.g. Upper Volta FED, Mali UNDP, Mali Helvetas, Ghana CIDA.

This means that the cost data now being collected in our field trials may prove useful not just in the comparative evaluation of handpumps but also in providing the first accurate and monitored estimates of rural water supply costs ever made. Thus we should consider:

(i) the collection of detailed capital costs for the projects within which our field field are conducted;

(ii) ensuring that due attention is paid to cost data colletion and that it is not viewed as a secondary objective by our Regional Project Officers and country monitoring engineers;

(iii) carefully reviewing our cost collection forms to ensure that they are comprehensive.

Consideration should also be given to briefly surveying the costs to rural families of traditional water supply sources i.e. of equipment like buckets and ropes.

No good data appears to be available on RWS systems in the countries visited other than that for boreholes and wells equipped with handpumps.

Further investigation may be warranted into the widely divergent prices paid for the same handpump by different projects within West Africa and indeed within single countries.

(g) RWS projects in West Africa worth further historical cost study. A decision on this must await the data to be sent from the various projects (Annex V). At this stage, however, the Upper Volta USAID and the Mali Aqua Viva projects can be ruled out, as can the Ghana CIDA one except for the last year.

(h) Cost recovery/charging for RWS. This is increasingly important, both as the World Bank considers further RWS efforts and in West Africa where a number of countries have recently begun (Ivory Coast) or propose (Ghana) to charge people for water, handpump maintenance, etc. In cooperation with others in WUD and other departments of the Bank, we should consider focusing more on this issue, and linking it directly to affordability.

(i) Sociocultural issues. It is apparent even from brief visits to a number of projects that these issues are critically important in determining the success of RWS projects. We should consider paying considerably more attention to matters like the reasons people use/do not use traditional water points when boreholes or wells with handpumps are provided, the sort of minimal hygiene education that is essential to complement investment in pumps, and so on. There is a risk that our project could be successful in its objectives of evaluating pumps and promoting VLOM pumps only in the hardware sense; we must also consider the complementary steps necessary to ensure their adoption.

(j) Local handpump manufacturing. More market studies and production possibilities exist in West Africa than I at least was previously aware of. We should consider a quick global survey of these market assessments that others have completed before moving into this area ourselves.

C. UPPER VOLTA (October 3-8)

(a) Participation in the CILSS and CATEES/CIEH rural water supply conferences (Ouagadougou: October 3-8)

Mr. Langenegger and I attended the consecutive rural water supply conferences of the Comite permanent Interetats de Lutte contre la Secheresse dans le Sahel (CILSS) (October 3-5) and the Conference Africaine sur les Techniques d'Exploitation des Eaux Souterraines (CATEES)/ Comite Interafricain d'Etudes Hydrauliques (CIEH) (October 6-8) at the Hotel Silmande. Both were technical meetings and I believe I was the only social scientist at either. Their principal value was in the contacts established with officials from all the countries except Ghana to which I was to travel during the mission.

(i) The CILSS conference devoted part of October 4 to handpumps. Mr. DiLuca (CIEH) spoke on the need for VLOM pumps, for field tests in West Africa, and for local manufacturing capacity. He emphasized that systems based on villagers are the sole solution for handpump maintenance and referred to INT/81/026. Mr. Kabore (CILSS) spoke about recurrent costs, based on a report prepared but not completed in time for the conference by the Canadian consultants Agrovet (I am taking steps to obtain this). Mr. Langenegger spoke about INT/81/026 in general terms, emphasizing its West African activities. We distributed general information about the project, including Technical Paper No. 6.

The ensuing discussion was notable for three reasons. First, according to a number of participants, it was the first time that recurrent costs had been openly discussed in a regional rural water supply forum in West Africa. Second, considerable comment was devoted to Mr. Kabore's claim that the maintenance costs of a handpump are less per family than those of traditional sources (I await the Agrovet report to see the basis for this, but, even if correct, it takes no account of the difference between one family purchasing buckets and a village having to set up a communal system to meet maintenance expenses). Third, a number of remarks were made about INT/81/026's cooperation and sharing of data with CIEH and other West African organizations. In particular, we were requested to make field trial data available.

The final report of the CILSS conference (Annex II) notes on page 6 and in Recommendation Number 4 that the participants hoped that CIEH could be associated with the data from INT/81/026 and that it could be distributed throughout the member countries of CLISS and CIEH. The report also emphasizes village participation, calls for the standardization of pump bases to permit easy interchange of models, and asks for a study of the possibility of establishing a regional handpump manufacturing factory.

(ii) The CATEES/CIEH conference was more of a trade exhibition, with many presentations by consultants and pump and drilling manufacturers and an equipment exhibition. There was an interesting and hotly contested debate about the value of geophysical methods in locating groundwater.

Pumps on display included Abi, Abi-Vergnet, Monarch, Pulsa 3, VEW A-18, Moyno, Domine UPM2 and two India Mark IIs, one from Inalsa in India and one from Pumpenboese in the Federal Republic of Germany. Pumpenboese believe they can make a cheaper and better quality India Mark II for Africa in Germany than in Africa, even allowing for transport costs. They estimate their ex-factory cost at $210, exlcluding pipe (30 m of which would sell for $200). Mr. Winckler of Pumpenboese also admitted their plastic pump has not proved a success in the field.

(iii) Both Mr. Langenegger and I held side discussions with Dr. Rob Wijdemans of the Banque Ouest Africaine de Developpement (BOAD) who pressed further BOAD's earlier written request to you for INT/81/026 assistance in setting up a handpump factory using a Western manufacturer and BOAD capital. BOAD has made no decisions yet about which pump, which country, how big a project, etc. He also asked that INT/81/026 field data be made available to BOAD, explaining that they are now or will soon be financing projects in Upper Volta (FDR III, cofinanced by the World Bank and Netherlands bilateral aid) and Ivory Coast. For these and other projects, BOAD would greatly appreciate our field data to help them decide which pumps to install. They have our laboratory test results but are unconvinced of their applicability to the field. BOAD intend to write formally to you to request our field reports.

Mr. Wijdemans also indicated that there is considerable rural water supply cost data available in Lome which could be obtained by writing to or preferably visiting Mr. Fall, Director of the Departement des Operations de Developpement Rural et d'Infrastructure at BOAD.

(iv) I had a long meeting with Mr. Maurice Meunier, Chef du Service Technique, CIEH, who is also very interested in our West African field data. He also is going to write to you with a formal request. He is preparing a proposal for a study trying to link rural water supply costs and reliability in the CIEH member countries, perhaps beginning with a pilot study in Upper Volta. I recommend that we stay in touch with this study and even consider financing/participating in it.

(v) I obtained a report prepared by the Societe Africaine D'Etudes et de Developpment (SAED) on the possibilities of establishing handpump manufacturing in Niger aimed at the regional market of Niger, Upper Volta, Benin, Togo and northern Nigeria. The report contains a preliminary market assessment.

(b) Lecture at the CEFIGRE/CIEH rural water supply course (Ouagadougou: October 5)

The French training institution Centre de Formation Internationale a la Gestion des Ressources en Eau (CEFIGRE) organizes courses on rural water supply for young engineers, held partially in France and partially in Africa. For the entire afternoon of October 5, Messrs. Langenegger, Guindo and I spoke to the course for some 30 francophone participants then being held jointly with CIEH in Ouagadougou.

Mr. Langenegger spoke about INT/81/026 in general. Participants raised two sets of questions. Who, they asked first, began the project? Did developing countries ask for it or was it imposed on them? Secondly, and even more sensitive, they wanted to know the criteria by which countries were selected for field trials. We answered straightforwardly but it was clear there was dissatisfaction, expecially among those from countries without field trials.

I spoke about rural supply costs, economic methodology, global investment needs for the Decade, maintenance systems and the like (see summary in Annex III). I appealed to the participants for help in collecting cost data and left forms and instructions with them. I also made some useful contacts with Malians and Ivoirians with a view to the rest of my mission.

Mr. Guindo spoke about his work monitoring the field trials in Upper Volta.

(c) Meetings with Government, UNDP, World Bank, Netherlands, FED and USAID officials about rural water supply costs
(Ouagadougou: October 3-7)

During the above conferences and on some separate visits, Mr. Langenegger and I briefed various officials on INT/81/026 and informed them of my search for cost data. Mr. Langenegger is reporting on our general discussions and I here confine myself to the cost aspect.

Mr. Victor Ouedraogo, Directeur, Direction de l'Hydraulique et de L'Equipement Rural (HER), agreed to the release of cost data to INT/81/026. The new government in Upper Volta remains committed to rural water supply based on village operation and maintenance. It has designated 1984 the Year of Water. We also briefed the UNDP and World Bank Resident Representatives both on arrival and before departure.

Three handpump projects in Upper Volta appear to have potentially useful cost data: those financed by the Netherlands aid program, the Fonds Europeen de Developpement (FED), and USAID. The records of the first two are orderly and comprehensive and Messrs. Bom (Dutch) and Ebersberg (FED) undertook to supply all the cost information they could, following guidelines I left with them. This information should arrive by the end of December, but will probably be fairly limited. Information will be harder to obtain from USAID, where records are more dispersed and less systematic. No arrangements were made to collect USAID data, pending discussion with Mr. Tschannerl who was once involved with this project.

The FED project in the Yatanga-Comoe area employs Vergnet pumps and strongly emphasizes village level involvement. By June 1983, there were 156 Vergnets installed. All figures are collected and summarized every three months. Nothing is yet available on maintenance costs as it has been only 15 months since the pumps were installed. Each village pays CFAF 40,000 (US$100) for the pump. Commercial agencies are selling spare parts and every part can be obtained locally and replaced by a local artisan, usually a Mobylette mechanic. A village may turn to a repairman from another village if it wishes. It must pay for repairs. The FED will commission an evaluation by outsiders in April 1984 with a report to be ready by September 1984, concentrating on mobilization issues - financial and economic ones are covered by the existing monitoring system. Mr. Ebersberg provided copies of current project reports.

The Dutch project maintains records on all Volanta pumps and will supply us with cost information for those installed in the Dedougou area by the end of November.

I also contacted Mr. Antoine Ouedraogo, Directeur, Fonds du Developpement Rural, manager of a World Bank-financed agricultural project, from whom we had requested rural water supply cost information. None is available that meets our needs.

(d) Visits to INT/81/026 field trial headquarters (Ouagadougou: October 3,5)

Mr. Guindo is duly completing INT/81/026 monitoring Forms 1, 2, 3 and 5. He is also performing water quality analyses. No water meters have yet been installed in Upper Volta. No Forms 4 (caretaker logbooks) are being kept for the pumps he is monitoring. There are, however, village pump caretakers who could complete such logbooks in at least some projects in Upper Volta, including the Netherlands and FED ones and, nominally, that of USAID.

I briefed Mr. Guindo on Form 6 (cost data), copies of which he had not yet received as it had only recently been translated into French.

Mr. Guindo kindly obtained various HER cost documents for me. There was no opportunity to get out of Ouagadougou and observe the collection of data in the field as only one afternoon was available outside the conferences.

(e) Visit to Volanta handpump factory (Saaba: October 5)

Messrs. Langenegger, Guindo and I visited the small Volanta factory set up in the village of Saaba, 15 km from Ouagadougou, by the missionary Fr. Hilaire Cob. In his absence, Fr. Pierre showed us around. The factory employs 9 workers and 9 apprentices, uses a modern lathe and welding equipment, imports some parts from the Netherlands, has so far manufactured about 100 pumps and is about to produce a second 100. Fr. Pierre had no information on manufacturing costs; this rests with Fr. Hilaire. We inspected a number of Volanta pumps installed in the village.

D. MALI (October 8-16)

(a) Meetings with Government, UNDP, World Bank, UNICEF, UNIDO and FED officials about rural water supply costs, local handpump manufacturing, and the possible inclusion of Mali within INT/81/026 field trials (Bamako: October 8-11, 13, 15)

I briefed UNDP and World Bank Resident Representatives' staff on my mission on arrival and before departure. I also briefed the UNICEF Representative.

I discussed INT/81/026 and rural water supply costs both in general and with specific reference to the UNDP/UNICEF Eaux Souterraines project based in Bamako with Messrs. S. Traore (Directeur, Direction Nationale de l'Hydraulique et de l'Energie DNHE), S. Diawara (DNHE official in charge of the project) and L. Moullard (UNDP project manager).

Messrs. Traore and Diawara are very keen that Mali be included in INT/81/026 field trials. I indicated that this is still very much under consideration.

The UNDP/UNICEF project (originally MLI/76/004 and now MLI/82/005) had by June 1983 about 800 productive boreholes, 393 of which were equipped with handpumps. A further 200-250 boreholes will be drilled in the remaining two years of the project. Pumps will continue to be installed at the rate of about 100 per year. Every village with boreholes now has at least one pump in place. Project planning calls for about 200 people per pump; the reality is about 250. The target is two pumps per village, the first provided by the project and the second purchased by the village at full market price. Most (230) of the pumps are Vergnets. These are provided as the first pump because the project has a large stock of them. The only other pump installed in large numbers (130) is the India Mark II (which the villagers prefer to the foot-operated Vergnet), including about 14 from the EMAMA factory at Sikasso in Mali. When the first pump is installed, a village pays 50% of the the cost of the second one as a down payment. Vergnets with 30 m of pipe cost FM 600,000 (US$750), India Mark IIs from India cost FM 350,000 (US$470) and India Mark IIs from Sikasso have so far cost FM 285,000 (US$360).

The project has three regional maintenance bases, each with a staff of three, a Land Rover, and a stock of spare parts. Two of the three bases also have two Mobylette motorcycles each. Until 1981, the crews at these bases carried out all pump repairs free, averaging 3.8 visits per year for a Vergnet pump. Since 1982, however, the villagers have had to pay for all repairs by these crews and the number of repair trips per year has fallen to 0.6. If the villagers call in the repair crew, they are charged the actual cost of all spare parts plus FM 5000, regardless of the time the repair takes. This charge contains a small subsidy element. When the villagers repair a pump themselves, they purchase spare parts from the three project bases at cost and usually a local mechanic donates his labor.

Record cards on each pump are kept at the relevant regional base and also at project headquarters in Bamako. These record all repairs carried out by the base crews, all spare parts replaced, and the time the pump is out of action (though this is frequently and necessarily only an estimate), but not the time spent on the repair itself. They do not record repairs carried out by the villagers, which now represent the bulk of all maintenance. However, these could be determined from the records kept at the three regional bases on the sale of spare parts to villagers. All these records could be collated and analyzed but DNHE have no one who could spend the necessary time. They would welcome its being done by an outsider.

Mr. Diawara explained thoroughly the basis for the cost estimates in the paper he had previously sent to the World Bank, provided a copy of the project's progress report for October 1982 - June 1983, and made copies of typical pump record cards. Mr. Diawara is extremely interested in the question of recurrent costs and undertook to send additional data to me in Washington.

The FED expected to receive a formal request from the Government of Mali in mid-October to finance the next phase of the UNDP/UNICEF project for EUA 7 million. Mr. Guicheteau, FED Counsellor in Bamako, indicated that the FED expected to agree to this request and also that it would be favorably disposed toward the inclusion of INT/81/026 field trials within the project.

I phoned Dr. B. Sy, Compagnie Malienne pour le Developpement de Textiles (CMDT), manager of a World Bank-financed agricultural project, to whom we had previously sent a request for rural water supply cost data. CMDT do not have the type of detailed data that we seek.

I did not visit the UNIDO-supported EMAMA India Mark II handpump factory at Sikasso as I learned that both the Directeur General, Mr. Doucoure, and the UNIDO managerial expert, Mr. Stimbre, were away. Another UNIDO expert, Mr. Cotharel, has now left the factory. I did meet in Bamako with Mr. Goiffon, the UNIDO technical expert. Production should be 100 pumps per month for November-December 1983 and then 150 per month for January-June 1984. The market is both Mali and other countries in the region. So far sales have been confined to Mali and Guinea-Bissau. Almost all raw materials are imported. Local raw materials have been tried without success. Initial quality problems with the valve have been resolved; this was confirmed by DNHE officials. The price of a pump with 30 m of pipe has been FM 285,000 (US$360) but should drop to FM 155,000 (US$200) in the near future.

There are rumors of a new India Mark II factory to be set up in Bamako by a private entrepreneur (whom I could not identify) who is said to have held talks with an Indian manufacturer.

(b) Visit to Mali Aqua Viva project to investigate rural water supply costs
(San: October 12-13)

The Mali Aqua Viva project is financed principally by the French Caisse Centrale de Cooperation Economique (CCCE) but also receives contributions from NGOs including Misericordia and Caritas. As of October 1, 1983 it had 598 pumps installed, of which 585 were Vergnets, supplied at a delivered price of FM 550,000 (US$690). The average borehole depth is 65m. Between 100-150 people use each pump. Vergnets are chosen because they can be easily lifted out by village repairmen. This is not so for the India Mark II in which the project has no interest as a result.

The Vergnet parts that break down the most are (in order) the piston, piston ring, valve, leather parts(?), right angle, and lift valve.

The maintenance system consists of a headquarters team and 25 village repairmen, each responsible for 10-15 pumps. More repairmen are now being trained. Each village repairman has a stock of spare parts.

Once a month the headquarters team in its Toyota Landcruiser visits the repairmen to replenish their spare parts stock and to collect the money paid for those parts used. The headquarters team is also responsible for educating the villagers about the pumps and hygiene and for training the village repairmen. The villagers pay the local repairmen for the actual cost of the spare parts plus a fixed fee of FM 3000 per repair. On very rare occasions, the headquarters team will carry out a major repair that is beyond the village repairman's capacity. No fee is levied in these cases.

The project does not keep detailed records on repairs or costs. Mr. Soumarre, Directeur Adjoint, said that they think in terms of a total annual maintenance cost per pump of approximately FM 50,000 - 60,000 (US$60-75).

The lack of complete, accurate and detailed records means that this very interesting project, based on village maintenance, would not be suitable for further cost analysis. The absence of any accounting set up means that an attempt to ask the project to collect data in the future would be a major imposition and I recommend that this not be requested.

(c) Visit to Helvetas project to investigate rural water supply costs
(Bougouni: October 14)

The Helvetas-financed project emphasizes village level participation, hygiene information, and village repair. As of July 1983, it had drilled 320 productive boreholes (average depth: 63 m) on which were installed 300 handpumps (240 Vergnets, 20 India Mark IIs and 40 miscellaneous) in 216 villages (average population: 700) with about 500 people using each pump. As in the UNDP/UNICEF project, the villagers much prefer the India Mark II arm motion to the Vergnet foot motion; the project prefers the Vergnet, however, because it is suitable for village repair. The delivered prices of pumps equipped with 30 m of pipe to Bougouni are FM 584,000 (US$730) for Vergnets, FM 457,000 (US$570) for Inalsa Mark IIs from India and FM 657,000 (US$820) for Sikasso India Mark IIs. (These India Mark II prices are very different from those paid by the UNDP/UNICEF project in the same country. It is unclear why). The villagers pay 30% of the cost of the pump.

A new maintenance system was introduced in October 1983 and is described in detail in a report prepared by the project and given to me. Each village will contract for 3 years with the project for maintenance, paying FM 26,000 (US$30) for the first year and FM 39,000 (US$50) for subsequent years, to cover repairs carried out by a crew from the project base and, in the third year, a course to train village repairmen. Villagers may do their own repairs and also have them done by regional repairmen, usually Mobylette mechanics, whom the project is training with a target ratio of one mechanic for every 30 pumps. The villagers pay a fixed fee to these repairmen plus the actual cost of spare parts. If the villagers do their own repairs, they pay only for spare parts. The target for introducing the new system is to sign up 60 villages each year. After the initial 3 year contracts, the objective is that each village should be fully responsible for pump maintenance.

A record card is kept for each pump at project headquarters on which is recorded all repairs carried out by the base crew. No record is kept, however, of repairs by regional repairmen or by villagers themselves.

The Vergnet parts which needed replacement most frequently before mid-1982 were, in order, the piston joint, piston, guidance ring, piston ring and the suction valve. New model Vergnets were introduced after July 1982 and the only problem encountered since then has been with the valves. India Mark IIs have been too recently installed for any breakdown data yet to be available.

Mr. Berthod, Helvetas project manager, is very interested in recurrent costs and offered to provide detailed financial information to me in Washington after researching the project's records. This should arrive by the end of 1983.

E. IVORY COAST (October 16-23)

(a) Meetings with Government, SODECI, UNDP, World Bank, UNICEF, CIDA and FED officials about rural water supply costs (Abidjan: October 17-21)

I briefed Mr. Langenegger on my mission to Mali; together we briefed the UNDP Resident Representative on my mission prior to departure.

Mr. Hubert, UNICEF Regional Water Supply Adviser for West Africa, expressed considerable interest in my cost data collection program and offered to attempt to obtain data from UNICEF projects in Benin, Cameroun, Liberia, Niger and Upper Volta. I left questionnaires with him for this. There are no UNICEF water supply activities in Ivory Coast, I had already visited the UNDP/UNICEF project in Mali, and there is only a very minor UNICEF RWS program in Ghana.

Officials of Direction Centrale de l'Hydraulique (DCH), notably Mr. Djouka, Directeur, and Mr. Seri, Chef de la Section Hydraulique, were most helpful. Two RWS systems are in operation in Ivory Coast: canalization and boreholes equipped with handpumps. Outline cost data for the canalization schemes were provided but do not include many essential components like personnel, nor do they show the numbers of people served and other necessary information for further analysis. The average capital cost of a canalization system supplying 20-25 lcd to a 3000 person village is about CFAF 80 million (US$ 200,000), although it varies widely according to the village's spatial configuration, population concentration, etc.

For the last decade the country has had the most extensive handpump program in West Africa and as of October 1983 boasted about 7000 boreholes (average depth: 60 m) and 3500 wells (25 m) equipped with handpumps. The average cost of a borehole or well is CFAF 2.75 million (US$6900). There are about 5500 Abi pumps (average cost CFAF 325,000 or US$810), 3500 Vergnets (CFAF 375,000 or US$940) and 1500 Abi-Vergnets (CFAF 455,000 or US$1140). Each pump serves an average 375-400 people. This is a most impressive achievement. The program has, however, concentrated on drilling, which is contracted to private companies, to the relative neglect of hygiene education and handpump maintenance.

Maintenance is the most difficult problem. It is also contracted to a private company, la Societe de Distribution d'Eau de la Cote d'Ivoire (SODECI), which is also responsible for urban water supply. Until 1981, all handpump maintenance costs were paid directly to SODECI by the Government. Since 1981, the villagers have been required to pay and a system based on training villagers and having them report breakdowns to SODECI has been instituted. Unfortunately, however, experience has shown that villagers frequently fail to report breakdowns. The entire RWS handpump maintenance system was the subject of a recent study by the Canadian consulting firm Geomines. The study indicated that a large number of pumps were not working properly or were out of action. DCH have reservations about the report's conclusions because of the small size of the sample studied (about 100 villages) compared to the number of handpumps installed throughout the Ivory Coast.

SODECI is the sole repository of maintenance cost data and was asked by DCH to supply it to me. Mr. Talbot, Directeur General Adjoint, agreed to do so following a meeting of their regional managers that was to take place on October 25. This will be for Abi and Vergnet pumps only; the Abi-Vergnets are too recent for them to have good data available.

SODECI plans to establish a maintenance team and a base for each of the country's 40 new departements. Currently there are 28 teams at 28 bases. Villagers now pay zero for the first year of maintenance when the pump is under guarantee, CFAF 60,000 (US$150) for the second year and CFAF 55,000 (US$140) for the third year. It is intended that they should pay CFAF 40,000 (US$100) for the fourth year and then CFAF 27,000 (US$70) a year for all subsequent years. The declining payment schedule is based on the assumption that villagers will themselves carry out an increasing proportion of repairs. SODECI will provide training for this. So far, however, village cooperation has been relatively poor in terms of making the annual payments.

Contacts with representatives of bilateral and multilateral agencies including CCCE, CIDA and the FED indicated that only DCH and SODECI have, respectively, the investment and recurrent cost data that we seek.

(b) <u>Field visit with a SODECI rural water supply handpump maintenance team</u>
(Abidjan area: October 21)

Accompanied by Mr. Joseph Biagne, SODECI director for the region around Abidjan, Mr. Langenegger and I visited a number of villages. We observed very different pump usage, repair status, conditions, cleanliness and payment records.

Mr. Biagne's region has 600 pumps and two two-man maintenance teams, each travelling in a Saviem panelled truck for 40,000 km per year on dirt roads and tracks. The truck costs CFAF 6 million (US$15,000), lasts three years and carries CFAF 280,000 (US$700) of equipment. Each team uses between CFAF 2 and 3 million (US$5,000-7,000) of spare parts each year. Only 20% of the villages in this region pay the annual maintenance fee, which is apparently below the national compliance record. The maintenance teams carry out repairs regardless of payment, however.

On our return to Abidjan, we were shown the SODECI Centre des Metiers de l'Eau (CMEU), a training centre for all functional specialties from cashiers through plumbers to regional administrators, including RWS handpump maintenance teams. Training is also provided to nationals of other countries for direct payment, including so far water supply personnel from Guinea, Mali, Niger, South Africa and Togo. We were also shown the experimental "La Bonne Fontaine", a coin-operated public standpost (CFAF 10 i.e. US$0.025 for 20 litres) installed in a shanty town area of Abidjan.

(d) <u>Visit to the ABI handpump factory</u>
(Abidjan: October 21)

This company manufactures both Abi and Abi-Vergnet pumps. Between 3-4,000 are manufactured each year, although existing capacity would permit 25,000 without further capital investment. For the year from October 1982 to September 1983, 600 Abi and 3600 Abi-Vergnet pumps were sold. Pumps represent about one quarter of the company's business, which also includes agricultural implements, the remanufacturing of railway rolling stock, air conditioning equipment and general foundry work.

The Abi pump is manufactured almost entirely from local parts. Only three parts, representing CFAF 5,000 of the delivered sales price of CFAF 275,000 (US$690), are imported, including the leather cupseal. The price has remained constant for three years and includes a one year guarantee. Pipe for the Abi sells for CFAF 3440 (US$8.60) per meter. Each Abi pump costs the company CFAF 52,500 (US$130) for raw materials and CFAF 27,000 (US$70) for direct labor (about 18 hours at CFAF 1500/hour), plus other direct costs (energy, etc), overhead and profit. Abi buys pipe for CFAF 2150 (US$5.40) per meter and then galvanizes it itself.

The Abi-Vergnet is sold at virtually the same delivered price: CFAF 274,000, representing CFAF 134,000 to Abi and CFAF 140,000 which the company pays Mengin for the below-ground assembly. Pipe sells for CFAF 1310 (US$3.20) per meter. The CFAF 134,000 Abi share is made up of direct costs of CFAF 57,000 (US$140) for raw materials and CFAF 22,500 (US$56) for direct labor (about 15 hours), plus other direct costs, overhead and profit.

Both pumps' delivered prices include an element of CFAF 7-10,000 (US$18-25) for transport. These prices hold in surrounding countries including Mali and Niger.

Messrs. Piquemal-Baron, Directeur General and Trabucco, Directeur General Adjoint, told us of a proposal they intended to present to DCH on October 25 for supplying their pumps in Ivory Coast for CFAF 800,000 (US$2,000) with a ten year guarantee. CFAF 300,000 would be paid initially and the remaining CFAF 500,000 over the ten years with interest. ABI would field two-man repair teams, each responsible for 4000 pumps, sleeping in the bush but in radio contact with headquarters, who would replace every broken pump and bring it back to the factory for reconditioning. No repairs would be carried out in the field. These numbers are based on an assumed 2-2-1/2 hours to replace an Abi and 1 hour for Abi-Vergnet. ABI want a minimum test area of 1000 pumps to try out their idea. Their proposal did not in October exist on paper but was for general discussion with DCH. It has the advantage of putting the manufacturer in direct contact with the villager users of the pumps. I do not know the outcome of the meeting between ABI and DCH.

F. GHANA (October 23 - November 1)

(a) Meetings with Government, UNDP and World Bank officials and German consultants about rural water supply costs (Accra: October 24-25, 28)

Mr. Langenegger and I briefed the UNDP and World Bank Resident Representatives on our missions on arrival. There is no longer any need to have government permission to travel outside Accra; the government must be informed, however, and the UNDP Resident Representative sent a letter to the Ministry of Foreign Affairs. We also met Mr. Myat INT/81/026 country monitoring engineer at the Kumasi field trial, who came to Accra to see us.

Ghana Water and Sewerage Corporation (GWSC) officials, notably Messrs. D.A. Nunoo-Quarco, Managing Director, and E.F. Quashie, Chief Engineer, offered GWSC's full cooperation with our search for cost data and cleared the way for German and Canadian consultants to release data to me. GWSC has recently proposed (but the Government has not yet agreed) that rural families using handpumps be charged for water supply at the same rate as urban families using standpipes.

In a series of meetings, Mr. W.R. Schottler, International Drilling Consultants (IDC), Manager for the KfW-financed 3000 Well Project, explained the availability of cost data. With the completion of Phase Two of the project, IDC is demobilizing in Ghana. All foreign exchange (DM) capital costs met by KfW are available and were provided in a special paper. Local direct and indirect capital costs met by GWSC will have to be sought from Schottler's GWSC counterpart, Mr. Sam Owusu. These costs are critical as they include labor, fuel, etc. Mr. Owusu was unfortunately not available while I was in Accra but Mr. Schottler suggested writing to him and Mr. Quashie simultaneously for this (I shall do so).

Maintenance costs fall into four categories: direct foreign exchange (DM) costs for expatriates; direct local costs for such things as labor and fuel; indirect local costs for pensions, workshop amortization, etc; and foreign exchange costs for pump spare parts. The first two are available from the GWSC/IGIP Maintenance Unit. We met with Mr. Sarpong, GWSC Project Manager for this unit, who provided some of the local costs. The IGIP manager, Mr. Wollschied, was out of Ghana but both Messrs. Sarpong and Schottler undertook to obtain and forward the foreign exchange costs and a complete accounting of direct local costs to me once he returned. Indirect local costs present a severe problem and GWSC will have to be approached further for these, though they are not readily available from GWSC. Pump spare parts costs are included in the foreign exchange capital costs because the pumps were shipped with considerable spares. Obtaining and separating out these various costs will be a difficult task but a good start has been made.

The maintenance system being built up by the GWSC/IGIP unit for the 3000 Well Project will in 1984 consist of 16 5-man crews (4 in each of 4 districts), each handling an average of two pumps per day for 240 annual working days i.e. 7680 pump maintenance visits per year, or an average of 2.56 visits per pump per year. A record card is kept for each pump. Each crew consists of one man on a Yamaha motorcycle who will inspect 120-150 pumps per month and four men (foreman, junior foreman, pump mechanic and driver) on a Unimog (Mercedes) truck who will repair 40 pumps per month. Detailed cost data on these vehicles and on labor were provided. There is no preventive maintenance.

(b) <u>Visit to INT/81/026 KfW field trial site (Kumasi: October 25-27)</u>

Mr. Langenegger and I drove to Kumasi with Mr. Myat to observe the field trial and to attempt to collect further cost data.

Mr. Myat works with a GWSC counterpart, Mr. Joseph Monney, and a driver. We spent a day with them on their routine visits to a number of villages to monitor handpumps. They visit 12-17 pumps per day and are monitoring 138 in total (57 Moynos and 81 India Mark IIs). The team collects more data than are called for by our monitoring forms, both on the condition of the pumps and on water quality, and then transcribe it onto our forms when they return from the field. Mr. Monney and the driver collect the pump data and Mr. Myat does the water quality analysis, including both chemical and physical characteristics.

Forms 1, 2 and 3 have been completed for all pumps. There are a number of problems in filling out Form 3, Questions C1-C5 in Ghana where reconditioned as well as new parts are used. The instruction for Form 3, Question C8 is very unclear and must be revised. There are no Forms 4 (local logbooks) as there are no village pump attendants in practice whatever the theory. Form 5 has not yet been completed on Mr. Langenegger's instructions, and Form 6 was only provided to Mr. Myat when we arrived. I briefed him fully on how to complete it, including some worked examples of overhead costs. It is apparent that Form 6 should include a place for recording overnight subsistence allowances for maintenance teams (Question C2 does this only ambiguously)and should separate local and foreign costs. Mr. Langenegger took note of a number of other difficulties that Mr. Myat has encountered in completing the Forms.

The condition and usage of the pumps varied widely in the villages visited. In one, people were coming from other villages 6-8 km away to take water and the pumps were very dirty; in another four working India Mark IIs were virtually unused by the people who instead walk over 500 m to a preferred traditional water point (diarrheal disease and bilharzia were visibly prevalent); etc, etc. Generalizations are difficult on the basis of limited field exposure and the very mixed situations observed. Two can be made, however. First, there has been no attempt to educate villagers about hygiene and this is having serious consequences for the success of the project which are beginning to worry the project and maintenance managers. Second, village pump attendants exist only in theory - Mr. Myat has never met one when he has been to any of the pumps he is monitoring.

We met with two GWSC/IGIP regional maintenance supervisors, Messrs. Claus Riexinger (Kumasi district) and Bendit. They provided much general information that will prove useful when interpreting the maintenance cost data that are to be sent from Mr. Wollschied. Mr. Riexinger observed that water quality was a serious issue - the villagers are complaining ever more frequently about the taste of the water from the project's wells and he is concerned both that some wells may be becoming contaminated and that people may revert to polluted traditional sources. He requested assistance with water quality analysis. Another problem is that villagers rarely report pump breakdowns so it is hard to repair them promptly and correspondingly pump record cards cannot accurately record the time a pump is out of action between a breakdown and a repair). No repairs are done in the field. Everything, even the replacement of leather cupseals, is done in the district workshops. The maintenance system thus consists of removing broken parts and replacing them with new or reconditioned ones.

Mr. K. Akato, GWSC Regional Engineer for the Ashanti region, provided rudimentary cost data on a number of mechanized boreholes in larger villages. These data are, however, old and very incomplete and cannot be used for even rough cost comparisons with boreholes equipped with handpumps.

(c) Visit to planned INT/81/026 CIDA field trial site (Bolgatanga: October 31 - November 1)

We met with Messrs. Jon Nunoo, GWSC Regional Manager for the Upper Region, George Yanore, Officer-in-Charge of Handpump Maintenance, and Alan Foy, Canadian consultant for the CIDA-funded Upper Region project. Mr. Nunoo indicated his wish to cooperate as fully as possible. Mr. Langenegger and he discussed the forthcoming assignment of an INT/81/026 country monitoring engineer to Bolgatanga while I concentrated on costs with the others.

Records only exist for the period before 1980 and since mid-1982. There is a complete gap for 1980-82. For the last year, however, reasonably complete cost data are available or can be developed on labor, fuel and other direct costs and on spare parts. There is much less available on vehicle and workshop costs and general overhead. New pump record forms are now being introduced in the project and very comprehensive data may be available in perhaps another year or two.

Maintenance for the project is carried out by 10 artisan/pump inspectors on Honda CT110 motorcycles and 8 3-man repair teams in Bedford 1-ton trucks. Each team consists of a driver, an artisan and an apprentice. A complication in analyzing maintenance costs is that some handpump maintenance is also carried out by the parallel CIDA Water Utilization Project in the same region.

We began to draw up detailed cost estimates and Messrs. Nunoo and Foy undertook to complete these in detail and send them to Washington. Historical data from this project are of limited value but that for the past year and particularly the next several years should prove very useful.

LIST OF PERSONS CONTACTED

A. UPPER VOLTA - based in Ouagadougou

UNDP	Michel VAN HULTEN, RR Kya GITERA, DRR Ms. Maarit HIRVONEN, PO Diawoye GUINDO, UNV for INT/81/026 field trials.
WB	Andrew ROGERSON, RR
CILSS	Francois KABORE, Hydrogeologist Rudolf REICHELT, Technical Adviser
CIEH	Charles DILUCA, Hydrogeologist Maurice MEUNIER, Chief of Technical Services
Upper Volta Government	Adama OUANDAOGO (Yatenga/Comoe Project) Jean Leonard COMPAORE (Yatenga/Comoe Project Antoine OUEDRAOGO, Director, FDR Victor Ouande OUEDRAOGO, Director, HER
EEC/FED	Reinhard EBERSBERG
Netherlands	Gert-Jan BOM
USAID	John FIGUEIRA, Chief, Office of Human Resources, USAID
Volanta factory, Saaba:	Frere PIERRE, Centre d'apprentissage.

B. UPPER VOLTA - attending conferences in Ouagadougou

Mali	Charles Henri BERTHOD, Helvetas Project Manager, Mali-Sud (Bougouni) Alpha Oumar BALDE, DNHE Engineer, Helvetas Project (Bougouni) Karim DEMBELE, Chief, Groundwater Division, DNHE (Bamako) Ely CAMARA, Technical Director, Operation Puits (Bamako) Djime SOUMARE, Dep. Director, Mali Aqua Viva (San) Lamine KEITA, Ingenieur Hydraulicien, Ancien Ministre
Club du Sahel (OECD, Paris)	Yves GARNEAU, Counsellor

BOAD (Lome)	Rob WIJDEMANS, Hydrogeologist
Manufacturers	Christian RIVET, DOMINE, France Hans WINCKLER, PUMPENBOESE, Federal Republic of Germany
Consulting Firms	Gerald CLEMENT, CGG, France Alain MARTIN, BRGM, France Jacques LEMOINE, President, BURGEAP, France Yves VAILLEUX, Engineer, BURGEAP, France Hubert SOMMELET, Technical Director, Geomines, Montreal, Canada
CEFIGRE	Mme Janine FORKASIEWICZ, Hydrogeologist, CEFIGRE, Sophia Antipolis, France Mlle Marie Noelle TIXERONT, Admin. Asst, CEFIGRE

C. MALI

UNDP	Jean-Marie LORGE, DRR Ms. Agnes ANDRE, JPO (Michel MICHAAN, AO)
WB,	Mr. TAPO
UNICEF	Mme A. Miske TALBOT, Administratur des Programmes
EEC/FED	Bernard GUICHETEAU, Conseiller
DHNE	S. TRAORE, Directeur Sinalon DIAWARA, Hydrogeologist, Responsable Service Pompes Louis MOULLARD, Directeur des Eaux Souteraines, Project PNUD

CMDT	Dr. B. SY
Mali Aqua Viva (San)	Mr. SOUMARE, Directeur Adjoint Yacouba TRAORE Chef, Equipe des Pompes
Project Mali-Sud DHNE/Helvetas (Bougouni)	Charles BERTHOD, Helvetas Project Manager Alpha BALDE, Ingenieur responsable Jacques KOME, Contre-maitre mecanicien
E.M.A.M.A. (Sikasso)	Roger GOIFFON, UNIDO Expert (Production Mgr.)

D. IVORY COAST

WB	Otto LANGENEGGER, RPO, INT/81/026
UNDP	Alexander ROTIVAL, RR Y.S. WONG Sin Wai, PO
Embassy of Canada	Mme Suzanne LAPORTE Leopold BATTEL, First Secretary (Development)
UNICEF	Christian HUBERT, Regional Water Supply Adviser
DCH	A. DJOUKA Anzeni, Directeur SERI, Zahiri Paul, Chef de la Section Hydraulique Villageoise Ramy SELA, Pump Monitor
SODECI	M.K. ZADY, Directeur General Jean-Francois TALBOT, Directeur General Adjoint Gbaloan SERI, Directeur des Exploitations Joseph BIAGNE, Directeur Regional AKPES, Responsable Regional, Hydraulique Villageoise Coffi ADOU Coordinateur des Enseignements, CMEU. Henri GBOZIA, Directeur

EEC/FED	Robert KREMER, Conseiller Jean-Pierre PIQUEMAL-BARON, Directeur General Isidore TRABUCCO, Directeur General Adjoint

E. GHANA

UNDP	Alfred K. MUBANDA, RR B. NYARKO-MENSAH, PO Ms. Claire HAMILTON, AO
WB	Werner SCHELZIG, RR
GWSC	
A. Accra	D.A. NUNOO-QUARCO, Managing Director E.F. QUASHIE, Chief Engineer Mr. SARPONG, Project Manager, IGIP/GWSC 3000 Well Maintenance Unit
B. Kumasi	Mr. ARKATO, Regional Engineer, Ashanti Region
C. Bolgatanga	Jon NUNOO, Regional Manager, Upper Region George YANORE, Officer-in-charge, Handpump Maintenance, Upper Region
Consultants	W.R. SCHOTTLER, Project Manager, International Drilling Consultants, Accra Claus RIEXINGER, Supervisor, IGIP/GWSC Maintenance Unit, Ashanti Region, Kumasi Alan FOY, Project Manager, W.L. Wardrop and Associates, Upper Region Maintenance/Stabilization Project, Bolgatanga

INT/81/026 Field Trial, Kumasi

Thint MYAT, UNV
Joseph MONNEY, GWSC counterpart to Mr. Myat

N. Burnett

COMITE PERMANENT INTERETATS DE LUTTE
CONTRE LA SECHERESSE DANS LE SAHEL
(CILSS)

REUNION REGIONALE DE SYNTHESE SUR L'HYDRAULIQUE VILLAGEOISE AU SAHEL

OUAGADOUGOU, 3 AU 5 OCTOBRE 1983

RAPPORT

FINAL

INTRODUCTION

Du 3 au 5 Octobre 1983, s'est tenue dans la Salle de Conférence de l'Hôtel Silmandé à Ouagadougou, la réunion régionale de synthèse sur l'hydraulique villageoise. Cette réunion est une étape importante du Projet "d'Appui aux Directions Nationales de l'Hydraulique des pays membres du CILSS dont l'objectif essentiel est la mise en place d'une meilleure politique de l'eau.

La séance d'ouverture de la réunion présidée par Monsieur le Ministre du Développement Rural de la République de Haute-Volta a eu lieu à 9 heures dans la Salle de Conférence de la CEAO.

Dans son allocution, Monsieur le Ministre du Développement Rural de la République de Haute-Volta a souligné "la nécessité d'une maîtrise de l'eau qui demeure une priorité tant il est vrai qu'aucun véritable développement socio-économique n'est envisageable sans eau".

Cette réunion a regroupé :

a) Six des huit pays membres du CILSS (Haute-Volta, Mali, Mauritanie, Sénégal, Niger, Tchad), le Cap Vert et la Gambie n'ayant pas pu faire le déplacement.

b) Les pays membres du CIEH non membres du CILSS, invités à titre d'observateurs (Bénin, Cameroun, Côte d'Ivoire, Gabon, Togo et Congo).

c) Les Agences de coopération bilatérale et multilatérale : FAC, FED, Club du Sahel, CCE, UNSO, ACDI, HELVETAS, KFW, GTZ, MULPOC, BOAD, UNESCO, UNICEF, PNUD, Banque Mondiale.

d) Les bureaux d'études ayant participé à l'élaboration des rapports nationaux et du rapport de synthèse : SEMA, BRGM, BURGEAP, CIEH et des bureaux d'études observateurs.

Le bureau a été constitué comme suit :

- Présidence	HAUTE VOLTA
- Vice Présidence	MALI
- Rapporteur Général	SENEGAL
- Co Rapporteur Général	TCHAD
- Rapporteurs de séance	CILSS, CLUB DU SAHEL, CIEH.

L'ordre du jour, donné en annexe 1 a été adopté après quelques amendements.

Le document principal de travail était le suivant : "Développement de l'Hydraulique Villageoise dans le Sahel - Bilan et Perspectives".

Ce rapport a été établi à partir des rapports nationaux : (Sénégal, Mali, Mauritanie, Niger, Gambie, Cap Vert, Haute-Volta) et du rapport CIEH sur les conditions d'utilisation et d'entretien des moyens d'exhaure.

Après une présentation du projet du document de synthèse, la réunion a procédé à l'examen des thèmes ci-après :

- Les structures administratives,
- La participation des populations
- Les ressources hydrauliques
- La formation
- Les moyens d'exhaure et la maintenance des points d'eau
- Les coûts recurrents du secteur hydraulique
- L'aspect socio-économique des points d'eau.

La réunion a écouté avec intérêt les exposés sur :

Le projet HELVETAS/MALI
Le projet YATENGA/COMOE/HAUTE VOLTA
L'évolution de la problématique de l'hydraulique rurale dans la sous-région
Les réalisations de l'UNSO durant ces dernières années
X L'expérimentation des pompes.

I. - STRUCTURES ADMINISTRATIVES

Dans son exposé introductif, le rapporteur a fait une analyse des structures administratives actuelles crées dans les différents pays pour résoudre le problème d'approvisionnement en eau des populations rurales. Cependant, constate le rapporteur, le niveau actuel des réalisations n'a pas été à la hauteur des investissements malgré une amélioration de la situation qui s'amorce depuis quelques temps. Les résultats décevants sont dûs au fait que les administrations, avec des moyens limités, ont voulu exécuter toutes les tâches des programmes d'hydraulique villageoise :

- Connaissance des ressources
- Connaissance des besoins
- Conception des programmes
- Lancement, réalisation et contrôle des ouvrages et des équipements
- Maintenance des ouvrages et des équipements.

C'est pour cela qu'il propose une nouvelle répartition des tâches, l'administration devant accomplir les tâches relatives à :

- La programmation des actions
- La conception et l'évaluation des projets
- La maîtrise d'oeuvre et le contrôle des travaux
- Le suivi de l'après-projet,

et les fonctions d'exécution et de maintenance des ouvrages et des équipements étant confiées à d'autres structures (entreprises nationales ou étrangères, artisanats, etc...)

La réunion a fait ressortir la nécessité d'élaborer un principe directeur d'une programmation rationnelle des aménagements hydrauliques. De même, un concensus général s'est vite dégagé pour confier la programmation des actions, la conception et l'évaluation des projets ainsi que la maîtrise d'oeuvre et le contrôle des travaux à l'administration. L'attribution des fonctions d'exécution et de maintenance a par contre fait l'objet d'un long débat. Tout en reconnaissant que les structures administratives sont mal équipées pour l'exécution des travaux (manque de moyens matériels et humains) la réunion a demandé que tout soit mis en oeuvre pour aider l'administration à participer effectivement à la réalisation des programmes grâce au renforcement de ses structures. Toutefois, un accent a été mis sur la promotion des entreprises privées nationales et la revalorisation de l'artisanat.

II. - PARTICIPATION DES POPULATIONS

Le document introductif sur la participation des populations a reconnu la nécessité d'une association des populations bénéficiaires à toutes les phases des projets d'approvisionnement en eau :

- Conception des programmes
- Réalisation des ouvrages
- Maintenance.

Cette participation réalisée sous forme contractuelle entre l'Administration et les Collectivités doit pouvoir garantir la prise en charge effective de l'entretien des points d'eau.

Le débat qui a suivi a permis de faire un consensus autour du principe de la participation des populations du reste largement amorcée dans plusieurs pays. La réunion a permis l'échange d'expériences au niveau des méthodes utilisées dans les pays pour arriver à une participation effective. Il reste néanmoins nécessaire de poursuivre la réflexion sur la participation en vue d'une meilleure définition de son Contenu Social.

III. - LES RESSOURCES EN EAU

Les formations aquifères de la région sont nombreuses et diverses et l'on peut admettre d'une façon générale qu'il y a actuellement une adéquation entre les ressources et les besoins. Cependant malgré l'abondance apparente et compte tenu d'une demande toujours croissante, il importe de mettre en place les outils nécessaires à la connaissance et au contrôle des ressources en eau car elles ne sont pas inépuisables.

- Une meilleure connaissance des ressources implique dans un premier temps, de rassembler et de traiter les nombreuses études et documents déjà disponibles mais sous forme éparses dans divers services, bureaux d'études, etc. Dans un deuxième temps, il faudra normaliser l'information nouvelle. Enfin, il importera d'engager assez rapidement des études sur les potentialités réelles de certaines formations discontinues mal connues, en standardisant notamment les procédures des essais de débit.

- Le contrôle de la ressource nécessitera la mise en place de réseaux de surveillance piézométrique permanente afin de connaître les variations de réserves des nappes. Il sera nécessaire de déterminer si les prélèvements sont compatibles avec la recharge et en cas de surexploitation évaluer l'évolution probable de la nappe.

IV. LA FORMATION

Aucun programme d'hydraulique villageoise n'est envisageable sans une formation adéquate. A ce sujet, l'exposé introductif a eu à poser trois questions :

- qui former ?
- qui forme ?
- quel est le contenu de la formation ?

Concernant le premier point, l'exposé introductif a classé les différents acteurs intervenant dans la formation : femmes, villageois, comités, artisans réparateurs, magasiniers, administrateurs locaux et régionaux, etc...).

Concernant le deuxième point, il est souhaité que les formateurs acceptent de vivre dans les conditions des villageois afin de mieux faire passer l'information.

Enfin, le contenu de la formation doit viser en priorité :

- une bonne maintenance des moyens d'exhaure
- une bonne éducation sanitaire
- des activités productives incidentes

Des débats qui ont suivi l'exposé, il ressort que dans le cadre d'un programme d'hydraulique villageoise, la formation doit toucher tout le monde, à commencer par les cadres. Il a été constaté d'une part une évolution constante du volet animation dans les programmes et d'autre part la nécessité de faire participer les sociologues lors des phases de programmation, d'animation, de formation et de suivi.

V. - LES MOYENS D'EXHAURE ET LA MAINTENANCE DES OUVRAGES

Dans ce domaine des moyens d'exhaure et des systèmes de maintenance à mettre en place, il apparait que la participation des communautés rurales constitue un préalable au succès des programmes d'hydraulique rurale.

En ce qui concerne le choix des moyens d'exhaure, il a été demandé de suivre avec intérêt les expériences nationales. Les participants ont souhaité que le CIEH soit associé au dépouillement des données du programme d'expérimentation lancé par la Banque Mondiale et que l'information soit diffusée dans tous les Etats du CIEH et du CILSS.

Les participants ont souhaité une standardisation des embases des pompes, afin de faciliter le remplacement d'un modèle de pompe par un autre.

Dans le domaine de la maintenance des ouvrages, la participation villageoise doit être suscitée dès la conception du projet. Selon ce principe, l'administration doit jouer un rôle de supervision du système mis en place. Il a été retenu le principe de la création de Fonds Nationaux de l'Eau dont le mode d'alimentation est à définir pour chaque pays, tout en reconnaissant les limites de cette entreprise financière.

VI. - CHARGES RECURRENTES

Une insuffisance de financement des charges de fonctionnement d'entretien des installations a été constatée dans la plupart des pays.

Il est apparu nécessaire de comprendre le phénomène afin de mieux évaluer les charges correspondantes.

La répartition des coûts de fonctionnement et d'entretien des ouvrages aux différents partenaires nationaux du secteur doit être clairement définie.

La réunion a néanmoins, estimé que la situation spécifique de chaque pays doit guider cette répartition.

D'une manière générale, les Administrations sont invitées à prendre toutes les dispositions nécessaires pour que les dépenses récurrentes soient prises en charge par les bénéficiaires:

- Restructuration des services
- Meilleure sensibilisation des populations
- Mise en place de fonds national de l'eau.

VII. - ASPECTS SOCIO-ECONOMIQUES DES POINTS D'EAU

Sur ce point, le rapport introductif a plutôt mis l'accent sur l'utilisation de l'eau à des fins économiques, estimant que les aspects socio-économiques de points d'eau sont très complexes car ils nécessitent de replacer le point d'eau dans le contexte plus vaste du système de développement économique et social du milieu rural.

Il a été constaté que, jusqu'à présent, les investissements en Hydraulique Villageoise ont joué un faible rôle dans le développement des activités économiques des villages, l'accès a été surtout mis sur l'aspect social.

La réunion estime que les populations pourraient dans certaines conditions faire une utilisation multiple de l'eau de façon à rentabiliser les équipements et permettre un développement réel à l'échelle du village.

Il existe néanmoins des contraintes diverses qui entravent cette valorisation. Il convient donc de réflechir sur les problèmes de l'eau et établir un dialogue entre l'Administration et le village sur l'utilisation de l'eau et l'organisation de la vie au village.

VIII. - PRINCIPES GENERAUX D'INTERVENTION

La réunion se plaît à souligner l'évolution de la réflexion dans le domaine de l'hydraulique villageoise dont une étape importante a été la rencontre ACP/CEE de Bamako du 8 Novembre 1979, les principes de base approuvés par le Conseil des Ministres ACP/CEE sont joints en annexe 2.

RECOMMANDATION N° 1

La réunion des responsables de l'Hydraulique des pays membres du CILSS et du CIEH tenue du 3 au 5 Octobre 1983 à la Salle de Conférence de l'Hôtel SILMANDE à Ouagadougou, après une analyse, avec la participation de la Communauté Iternationale intervenant dans le secteur de l'hydraulique,

CONSIDERANT l'importance des programmes d'hydraulique villageoise,

CONSIDERANT les progrès réalisés par les structures administratives,

CONSIDERANT les capacités de réalisation limitées de ces structures,

CONSIDERANT que toutes les possibilités de l'artisanat local ne sont pas exploitées dans le secteur,

R E C O M M A N D E

- Un renforcement des structures nationales
- Une promotion des entreprises privées nationales
- Une meilleure exploitation des capacités des artisans.

-ooOoo-

RECOMMANDATION N° 2

La réunion des responsables de l'Hydraulique des pays membres du CILSS et du CIEH tenue du 3 au 5 Octobre 1983 à la Salle de Conférence de l'Hôtel SILMANDE à Ouagadougou, après une analyse, avec la participation de la Communauté Internationale intervenant dans le secteur de l'hydraulique,

DEVANT la nécessité d'une meilleure compréhension du contenu de la participation communautaire,

CONSIDERANT la prédisposition des populations à une participation effective dans la mise en oeuvre des programmes d'hydraulique villageoise,

R E C O M M A N D E

- Que tout soit mis en oeuvre pour un approfondissement des méthodes de sensibilisation et de formation des populations dans chaque pays, en vue de leur grande participation à la gestion communautaire de leurs équipements

- Que le CIEH et le CILSS continuent et renforcent les échanges d'informations sur les expériences en cours.

-ooOoo-

RECOMMANDATION N° 3

La réunion des responsables de l'Hydraulique des pays membres du CILSS et du CIEH tenue du 3 au 5 Octobre 1983 à la Salle de Conférence de l'Hôtel SILMANDE à Ouagadougou, après une analyse, avec la participation de la Communauté Internationale intervenant dans le secteur de l'hydraulique,

CONSIDERANT les lacunes sérieuses existant encore dans le domaine des connaissances relatives aux Ressources en eau souterraine,

R E C O M M A N D E

- Qu'à chaque programme d'hydraulique villageoise soit associé un volet de surveillance des nappes.

- De poursuivre les études relatives au comportement hydraulique des aquifères.

-ooOoo-

RECOMMANDATION N° 4

La réunion des responsables de l'Hydraulique des pays membres du CILSS et du CIEH tenue du 3 au 5 Octobre 1983 à la Salle de Conférence de l'Hôtel SILMANDE à Ouagadougou, après une analyse, avec la participation de la Communauté Internationale intervenant dans le secteur de l'hydraulique,

<u>CONSTATANT</u> la diversité des pompes installées dans les programmes d'hydraulique villageoise,

<u>CONSTATANT</u> la dépendance vis-à-vis des fournisseurs,

<u>R E C O M M A N D E</u>

- De standardiser les embases des pompes de façon à pouvoir remplacer rapidement les modèles de pompes

- De suivre les expériences de fabrication locale d'étudier l'opportunité de création d'un atelier communautaire de fabrication de pompes à motricité humaine.

- Que le CIEH et le CILSS continuent et renforcent les échanges d'informations sur le matériel existant.

-ooOoo-

RECOMMANDATION N° 5

La réunion des responsables de l'Hydraulique des pays membres du CILSS et du CIEH tenue du 3 au 5 Octobre 1983 à la Salle de Conférence de l'Hôtel SILMANDE à Ouagadougou, après une analyse, avec la participation de la Communauté Internationale intervenant dans le secteur de l'hydraulique,

CONSTATANT que les investissements en Hydraulique Villageoise ont jusqu'à présent mis l'accent sur l'aspect social,

CONSIDERANT que dans certaines conditions favorables les populations pourraient faire une utilisation multiple de l'eau,

R E C O M M A N D E

Que dans leur intervention, les investissements prennent en compte les utilisations à des fins productives de certains équipements afin de permettre un réel développement socio-économique du village.

-ooOoo-

RECOMMANDATION N° 6

La réunion des responsables de l'Hydraulique des pays membres du CILSS et du CIEH tenue du 3 au 5 Octobre 1983 à la Salle de Conférence de l'Hôtel SILMANDE à Ouagadougou, après une analyse, avec la participation de la Communauté Internationale intervenant dans le secteur de l'hydraulique,

CONSIDERANT que les événements qu'a connu le Tchad ces dernières années n'ont pas permis la mise en place dans ce pays du projet d'appui aux Directions Nationales des pays membres du CILSS,

R E C O M M A N D E

Que le CILSS intervienne auprès des organismes de financement pour que soit établie dans ce pays la phase "bilans-diagnostics" du secteur hydraulique.

-ooOoo-

RECOMMANDATION N° 7

La réunion des responsables de l'Hydraulique des pays membres du CILSS et du CIEH tenue du 3 au 5 Octobre 1983 à la Salle de Conférence de l'Hôtel SILMANDE à Ouagadougou, après une analyse, avec la participation de la Communauté Internationale intervenant dans le secteur de l'hydraulique,

CONSIDERANT l'importance des programmes d'approvisionnement en eau engagés dans les pays sahéliens et la nécessaire évolution du comportement des différents acteurs du secteur hydraulique pour une meilleur revalorisation des équipements,

M A N D A T E

Les Secrétariats du CILSS et du CIEH, avec l'appui du Club du Sahel, de poursuivre la réflexion stratégique du secteur de l'approvisionnement en eau des populations rurales en liaison avec les pays membres.

CEFIGRE

Ouagadougou

5 Octobre, 1983 (p.m.)

Présentation

Nicholas Burnett
Économiste
Project PNUD/Banque Mondiale INT/81/026
Water Supply and Urban Development Department
The World Bank
1818 H Street, N.W.
Washington, D.C. 20433
E.U.A.

RESUMÉ

Introduction
- Contexte de la Décennie Internationale de l`Alimentation en Eau et de l`Assainissement
- Besoins de l`alimentation en eau
- Besoins ruraux

Systèmes pour l`alimentation en eau rurale
- Origines d`eau: 1) eau souterraine - puits/pompes à motricité humaine
  - pompes électriques
  - pompes diesels
  - pompes solaires, etc.
- 2) eau de sources
- 3) eau de fleuves
- 4) captage de l`eau de pluie

- Traitement/pas de traitement
- Emmagasinage/pas d`emmagasinage
- Reticulé/pas reticulé
- Service pour chaque maison/autres niveaux de service.

Coûts approximatifs des systèmes
- Coûts individuels (manque de données)
- Coûts pour le monde entier

Seule solution possible pour le reste du 20ème siècle: les puits equippés de pompes à motricité humaine.

Coûts détaillés des pompes à motricitè humaine
- Coûts d`investissement (generalement considerés)
- Coûts d`exploitation et d`entretien (generalement ignorés)
- Possibilité de compensation entre les deux

Déterminants des coûts
- La sécurité de la pompe
- La simplicité (pour produir la pompe, la faire fonctionner, l`entretenir)
- Le pays de fabrication (local, étranger)
- Le système d`entretien (PLUS IMPORTANT)

Systèmes d`entretien
- Centralisé conventionnel
- Centralisé préventif
- "Trois tiers"
- VLOM - Village Level Operation and Maintenance (Pompes exploitées et entretenues au niveau du village).

Comparaison économique des systèmes
Dépenses typiquement omises à prendre en compte:
l`amortissement des véhicules
l`amortissement des ateliers
les salaires des fonctionnaires

Méthode d`actualisation des flux financiers
Exemple numérique

Résultats préliminaires

1. Les frais d`exploitation sont beaucoup plus élevés qu`on ne le croyait.

2. La dépense annuelle d`exploitation dépasse l`annuité économique èquivalente pour tous les types de pompes et tous les types d´entretien.

3. Les frais d`exploitation sont élevés pour toutes les pompes, même pour les pompes VLOM.

4. L`élement clé: les coûts des unités mobiles mécanisées.

5. Les coûts chutent brutalement dès que des responsables villageois où des techniciens se déplaçant à bicyclette sont substitués à des équipes se déplaçant en camion.

Conclusions.

1. Examiner les coûts d`exploitation.

2. S`assurer qu`il y aura un système d`entretien qu`on a les moyens de continuer à faire fonctionner après l`investissement initial.

3. Éviter les véhicules.

4. Aider le développement des pompes VLOM.

Travail économique du project PNUD/Banque Mondiale.
Manque de données complètes sur l`alimentation en eau.
Appel pour aide - fiche affixée.
Prier de l`envoyer a Washington.

LIST OF DOCUMENTS OBTAINED

Copies of the documents listed in this annex may be obtained on request to my office (61776).

CILSS/OCDE: Club du Sahel.

1. L'Hydraulique Villageoise dans les Pays Membres du CILSS:
   a) Situation au Cap Vert, BURGEAP, Sept 1982 (Doc. SAHEL D(83)204)
   b) Situation en Gambie, BRGM, Sept 1982 (SAHEL D(83)200)
   c) Situation en Haute Volta, CIEH, June 1983 (SAHEL D(83)206)
   d) Situation au Mali, BURGEAP, Sept 1982 (SAHEL D(83)205)
   e) Situation en Mauritanie, BURGEAP, Sept 1982 (SAHEL D(83)203)
   f) Situation au Niger, BRGM, Sept 1982 (SAHEL D(83)201)
   g) Situation au Senegal, BRGM, Sept 1982 (SAHEL D(83)202)

2. Le Developpement de l'Hydraulique Villageoise dans le Sahel: Bilan et perspectives (Synthese et Annexes), SEMA, May 1983 (SAHEL D(83)207)
   Also available in English.

3. Conditions d'Utilisation et d'Entretien des Moyens d'Exhaure, CIEH, Jan 1983 (SAHEL D(83)208)

4. L'Evoltion de la Problematique de l'Hydraulique Rurale dans la Sous-Region, BRGM/AGE, Sept 1983

Ivory Coast

1. ABI Industrie
   1983 Brochures on a) Pompe ASM (Abi-Vergnet)
   b) Pompe MN (Abi)

Ghana

1. IDC, Letter to N. Burnett itemizing capital costs of 3000 Well Project, 27 October 1983.

Mali

1. BURGEAP, L'Hydraulique Villageoise dans les Pays Membres du CILSS: Situation au Mali, Sept 1982 (Prepared for CILSS/OCDE Club du Sahel; Document SAHEL D(83)205)

2. UNDP Project MLI/82/005
   (a) Utilisation des Moyens d'Exhaure: Aspects Sanitaires et Economiques, Jan 1983
   (b) Rapport d'Activite de la Campagne, Oct 1982 - Juin 1983

3. Helvetas/DNHE Project, Le Systeme d'Entretien des Moyens d'Exhaure: Organisation et Fonctionnement, August 1983

Niger

1. BRGM, L'Hydraulique Villageoise dans les Pays Membres du CILSS: Situation au Niger, Sept 1982 (Prepared for CILSS/OCDE CLub du Sahel; Document SAHEL D(83)201)

2. Government, Note sur le Dispositif et les Orientations Adoptees par le Niger en Matiere d'Hydraulique Villageoise et la Mise en Place d'un Systeme de Maintenance, February 1982

3. Ministere du Plan/SAED, Etude des Possibilites d'Implantations Industrielles au Niger, December 1982

4. Ministere du Plan, Project de Recommandations a l'Atelier National sur les Charges Recurrentes, 6 June 1983.

Upper Volta

1. CIEH, L'Hydraulique Villageoise dans les Pays Membres du CILSS:Situation e Haute Volta, June 1983 (Prepared for CILSS/OCDE Club du Sahel; Document SAHEL D(83)206).

2. HER, Methode d' Evaluation des Recettes Puits et Forages, 1983.

3. HER/FED, Project d'Hydraulique Villageoise:Yatenga-Comoe

   (a) Etat d'Asancement des Travaux, July 1983, Rapport & Annexes prepared by BURGEAP;

   (b) Presentation du Projet, October 1983.

LIST OF INFORMATION PROMISED TO BE SENT TO WASHINGTON

UPPER VOLTA

1. Dutch project cost data (received 11/28)
   Mr. G.J. Bom
   c/o Ambassade Royal des Pays Bas
   B.P. 1302
   Ouagadougou

2. FED project cost data
   Mr. R. Ebersberg
   Delegation de la Commission des Communautes Europeennes
   B.P. 352
   Ouagadougou

Mali

1. UNDP project cost data
   Mr. S. Diawara
   Direction Nationale l'Hydraulique et de l'Energie
   B.P. 66
   Bamako

2. Helvetas project cost data
   Mr. C. Berthod
   Helvetas/DNHE
   Projet de Forages Hydrauliques: Zone Mali-Sud
   B.P. 34
   Bougouni

Ivory Coast

1. SODECI maintenance cost data
   Mr. J-F. Talbot
   Directeur General Adjoint
   SODECI
   01 B.P. 1843
   Abidjan

2. UNICEF project cost data for Benin, Cameroun, Liberia, Niger and Upper Volta
Mr. C. Hubert
Regional Water Supply Adviser
UNICEF
04 B.P. 443
Abidjan

Ghana

1. 3000 Well Project maintenance cost data
Mr. Wollschied
GWSC/IGIP Maintenance Unit
via Mr. W.R. Schottler
IDC
P.O. Box 14599
Accra

2. CIDA Upper Region project cost data
Mr. A. Foy
W.L. Wardrop & Associates Ltd.
P.O. Box 234
Bolgatanga

ANNEX VI

LIST OF DOCUMENTS AVAILABLE ELSEWHERE

I learned of these documents during the mission but was unable to obtain copies.

1. Regional: Agrovet report to CILSS/OCDE Club du Sahel on RWS recurrent costs West Africa. Possibly available from:

    1. Agrovet, Canada
    2. CIDA, Hull
    3. CILSS, Ouagadougou
    4. OCDE, Paris

2. Mali: Various Helvetas project reports, especially one by H.P. Banziger on a mission in January 1983. Available from Helvetas, Switzerland.

3. Mali: Various UNDP project reports. Available from Mr. E. Fano, UN DTCD, New York.

LIST OF ABBREVIATIONS

BOAD	Banque Ouest Africaine de Developpement (Lome)
BRGM	Bureau de Recherches Geologiques et Minieres (French consulting firm)
BURGEAP	French consulting firm
CATEES	Conference Africaine sur les Techniques d'Exploitation des Eaux Souterraines
CCCE	Caisse Centrale de Cooperation Economique (France)
CEFIGRE	Centre de Formation Internationale a la Gestion des Ressources en Eau (France)
CFAF	Franc of the West African Monetary Union (US1=approx. CFAF 400)
CIDA	Canadian International Development Agency
CIEH	Comite Interafricain d'Etudes Hydrauliques (Ouagadougou)
CILSS	Comite permanent Interetats de Lutte contre la Secheresse dans le Sahel (Ouagadougou)
CMDT	Compagnie Malienne pour le Developpement de Textiles
CMEU	Centre des Metiers de l'Eau (owned by SODECI, Ivory Coast)
DCH	Direction Centrale de l'Hydraulique (Ivory Coast)
DNHE	Direction Nationale de l'Hydraulique et de l'Energie (Mali)
EUA	European Unit of Account
DR	Fonds du Developpement Rural (Upper Volta)
FED	Fonds Europeen de Developpement
FM	Franc Malien (US$1=approx. FM 800)
GWSC	Ghana Water and Sewerage Corporation
HER	Direction de l'Hydraulique et de l'Equipement Rural (Upper Volta)

IDC	International Drilling Consultants (German/Swiss/Ghanaian consortium in Ghana)
IGIP	Ingenieur-Gesellschaft fur Internationale Planungsaufgaben (German consultants in Ghana)
KfW	Kreditanstalt fur Wiederaufbau (Federal Rebulic of Germany)
lcd	litres per capita per day
NGO	Non-Governmental Organization
RWS	Rural Water Supply
SAED	Societe Africaine d'Etudes et de Developpement (Ouagadougou)
SODECI	Societe de Distribution d'Eau de la Cote d'Ivoire
UNDP	United Nations Development Programme
UNICEF	United Nations Childrens Fund
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
VLOM	Village Level Operated and Maintained
WB	World Bank

FORM NO. 27 - OCR
(3/82)

WORLD BANK OUTGOING MESSAGE FORM Cable, Telex

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INT/81/026

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PAGE	OF	OFFICIAL DEPT/DIV ABBREVIATION	MESSAGE NUMBER	TEST NUMBER (FOR CASHIER'S USE ONLY)
1	1	61785	3140	

START HERE

MR. T. JOURNEY, INTBAFRAD, DHAKA. OUR REF. NO. 1581 RE UNDP INT/81/026 HANDPUMPS PROJECT.

AAA. JUST RETURNED FROM A VISIT TO PEK. QUITE IMPRESSED WITH MICHEL'S DETERMINATION AND FRESH APPROACH, BUT SCEPTICAL ABOUT LIKELY FIELD PERFORMANCE. HE NOW USES ONLY POLYURETHANE OF VARIOUS BLENDS AND THEREFORE PROPERTIES, EXCEPT FOR THE DROP PIPE WHICH IS CONTINUOUS PE. THE ROD IS SOLID WITH A DENSITY OF LESS THAN ONE, ALSO PU. COST IS USD 400 BECAUSE OF LARGE R AND D AND INJECTION MOLDS THAT HE HAS TO RECOVER WITH SMALL ORDERS.

BBB. WE ARE PROCEEDING WITH ORDERING PEKS FOR SRI LANKA, 2 FOR DHAKA, 2 FOR CATR AND ABOUT 12 FOR IVORY COAST. MICHEL PROPOSES TO COME TO WASHINGTON TO SEE YOU. CAN YOU GIVE ME A DATE. ONCE THE 2 PUMPS ARE IN DHAKA HE WOULD LIKE TO GO THERE HIMSELF.

CCC. FOR SRI LANKA I WOULD PREFER ALL THE PEKS IN ONE REGION FOR CONTROL AND SIGNIFICANCE REASONS, BUT LEAVE THE FINAL DECISION TO YOU. TWO MODELS, RATED TO 25 M SWL WITH 33 MM CYLINDER, TO 50 M SWL WITH 23 MM SWL. MOST WATER GUSHES OUT ON THE DOWN STROKE.

DDD. EYE PRESUME SAUL BRIEFED YOU ON BAUMANN. EYE TELEXED A PRO-POSAL FOR 2 YEARS TO OBRIST, BEGINNING JULY 84.

EEE. WE FORWARDED YOUR DHA 2737 TO MILLS ON 11/28.

END OF TEXT

REGARDS, TSCHANNERL, INTBAFRAD.

PINK AREA TO BE LEFT BLANK AT ALL TIMES

INFORMATION BELOW NOT TO BE TRANSMITTED

CLASS OF SERVICE: TELEX   950 ~~TELEX NO.~~: 64302 IDA BJ   DATE: DEC 14, 1983

SUBJECT:	DRAFTED BY:	EXTENSION:
INT/81/026	GTschannerl:slj	61785

CLEARANCES AND COPY DISTRIBUTION:	
cc: Mr. S. Arlosoroff	AUTHORIZED BY (Name and Signature): G. Tschannerl G. Tschannerl
	DEPARTMENT: WUD
	SECTION BELOW FOR USE OF CABLE SECTION
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INT/81/026

December 14, 1983

David Grey

Letitia Obeng

61789

Submodules on Wells and Handpumps 10, a, b, c.

Please find enclosed, the Wells and Handpump drafts (submodules 10a, 10b, 10c and a training manual for 10a) 2 Rainwater Catchment illustrated scripts and training manuals and an illustrated script for a case study on sanitation in a squatter settlement (these are for your information).

As I explained during our phone conversation, 10c is the submodule that needs the most work. 10a, b also require information on intermediate and deep wells. If you do find time to make some changes/additions before you come to Washington that will indeed be very helpful. In reviewing the material there are a few key points to bear in mind.

a) There is a maximum of 80 slides allowed per slide sound show.

b) The slide sound show is meant to be used to stimulate the discussion which follows its viewing and to lead the participant to at least consider its relevance to local conditions.

c) A full submodule consists of 5 min. introduction a slide-sound show (approximately 20 mins) a 35 min. discussion period backed up by the training manual. (This session is designed to last 1 hour). In addition, the training manual contains material for an optional 3 hr. practical period.

I look forward to meeting you soon and I will be available to help and answer the many questions I am sure you will have. Thanks for your assistance.

cc: S. Arlosoroff
G. Tschannerl

LObeing/11

INT/81/026

December 14, 1983

Mr. O. Langenegger, Regional Project Officer (WB/Abidjan)

Nicholas Burnett

61776

Cost of Handpumps in West Africa

On collating my mission notes, I have discovered very wide discrepancies in the prices that different projects appear to be paying for the same pump (see attached list).

Before I start drawing any conclusions from this, I would appreciate any information you may have confirming or challenging my figures.

cc: Messrs. Arlosoroff, Ramuglia, Tschannerl

NB:slj

Information obtained in West Africa on the price of pumps (including 30m of pipe), October 1983

Pump (place of manufacture)	Country (source of information)	Cost ($)
Abi (Ivory Coast)	Ivory Coast (Factory)	950
	Ivory Coast (DCH)	810
Abi-Vergnet (Ivory Coast/France)	Ivory Coast (Factory)	780
	Ivory Coast (DCH)	1140
India Mark II (India)	Mali (UNDP project)	470
	Mali (Helvetas project)	570
India Mark II (Mali)	Mali (UNDP project)	360
	Mali (Helvetas project)	820
Vergnet (France)	Mali (UNDP project)	750
	Mali (Helvetas project)	730
	Mali (Mali Aqua Viva project)	690
	Ivory Coast (DCH)	940
	Upper Volta (FED project)	1000
Volanta (Netherlands)	Upper Volta (Netherlands project)	875

As quoted in local currency and converted to US$ at the exchange rate of US$1 = CFAF 400 = Francs Maliens 800.

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1	1	61790	1789	

START HERE

LANGENEGGER, INTBAFRAD, ABIDJAN, IVORY COAST. OUR TELEX NO. 1584.
AAA IN DISCUSSIONS WITH KRESSE, GTZ, HE EXPRESSED CONCERN ABOUT OUR NIGER OPERATIONS. SINCE UNV GENEVA UNABLE TO FIND EVEN A SINGLE SUITABLE CANDIDATE, PLEASE TAKE URGENT ACTION TO FIND A WEST AFRICAN MONITOR, EVEN FROM NIGER, AND EVEN IF HE IS ONLY TEMPORARY.GTZ IS CONCERNED THAT THEIR PROJECT PERIOD MIGHT BE OVER BEFORE WE FINISHED THE FIELD TRIALS IN NIGER.
BBB EYE NEED A TARGET ARRIVAL DATE FOR JOSHI. UNV GENEVA KEEP ASKING WHEN WE WANT HIM TO TRAVEL.
CCC RECEIVED YOUR DRAWING OF THE STANDARD BASE FOR THE 3000 WELLS PROJECT. THIS MIGHT INCREASE THE COST OF THE MALDEVS CONSIDERABLY, BUT WE'LL SEE. EYE PRESUME THE VOLANTA IS EXEMPT FROM THIS REQUIREMENT.
DDD LOOK FORWARD TO SEEING YOU IN JANUARY. REGARDS, TSCHANNERL/ ARLOSOROFF, INTBAFRAD

END OF TEXT

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DRAFTED BY: GTSCHANNERL EXTENSION: 61790

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cc: Mr.S.Arlosoroff

AUTHORIZED BY (Name and Signature): G.TSCHANNERL:PHM G. Tsch

DEPARTMENT: WUD

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PAGE 1 OF 1

OFFICIAL DEPT/DIV ABBREVIATION: WUD/UNDP

MESSAGE NUMBER: 1750

TEST NUMBER (FOR CASHIER'S USE ONLY)

START HERE

INTBAFRAD, BANGKOK, THAILAND. OUR REF. NO. 1583. RE CHINA. AAA REYR BAN1479. YOUR MISSION TO CHINA FEB. 27-MARCH 13 APPROVED. I DOUBT IF YOU WILL HAVE IMPORTED HANDPUMPS BY THEN, BUT PERHAPS IT CAN BE IMPROVISED. MORE WHEN WE MEET HERE. BBB YOU WERE SENT A COPY OF DAVID GREY'S MEMO ON FIELD RESULTS FOR CONSALLEN PUMPS. SINCE THE RESULTS ARE BAD, WE CANNOT TAKE ANY CONSALLENS TO CHINA AT THIS TIME. WE'LL DISCUSS IT WHEN WE MEET. PLEASE EXPLAIN TO CAAMS. WE ALSO RUN A RISK WITH THE PREUSSAGS, SINCE WE ONLY HAVE LAB RESULTS ON THEM, SHOULD GO AHEAD WITH TRYING THEM OUT. CCC UNV FOR CHINA. PLS COMMENT ON OUR TRAINING/TRAVEL ARRANGEMENTS FOR KYAW MYINT. A TELEX WAS SENT TO CHETPAN COPY TO YOU A MONTH AGO. DDD FINANCING TRAINING COURSE IN JINCHENG USD 2200. EYE AM MORE CONCERNED ABOUT THE PRECEDENT THAN THE ACTUAL AMOUNT. THIS SEEMS THEIR RESPONSIBILITY. OTHERWISE WHAT BUDGET LINE? IF THE JINCHENG TRAINING DEPENDS ON IT, THEN GO AHEAD. PLS DECIDE. EEE VEHICLE PURCHASE FOR CHINA. AGREE IN PRINCIPLE WITH THREE VEHICLES AS STATED. IS UNDP BEIJING PREPARED TO ORDER THEM AFTER RECEIPT OF OUR AUTHORIZATION? BUT BEFORE WE TAKE ANY ACTION THE RUNNING COSTS MUST BE CLARIFIED WITH CAAMS AND THE PROVINCES TO AVOID EX-PENSES BEING CHARGED TO US WHEN VEHICLES ARE USED FOR NON-MONITORING PURPOSES. REGARDS, TSCHANNERL, INTBAFRAD.

END OF TEXT

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CLASS OF SERVICE: TELEX   TELEX NO.: 788-82817   DATE: 12/13/83

SUBJECT: INT/81/026

DRAFTED BY: G. Tschannerl:kb

EXTENSION: 61785

CLEARANCES AND COPY DISTRIBUTION:
cc: Messrs. Kresse (GTZ); Potashnik (UNDP); Sud (AEP); Freedman, Arlosoroff (WUD)

AUTHORIZED BY (Name and Signature): G. Tschannerl

DEPARTMENT: WUD

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BOOK OF TWO (SEE MESSAGES ATTACHED)

le (1) BULMAN

ODA (TELEX NO. 263-907)

LONDON, ENGLAND

(2) MASHLER

UNDP (TELEX NO. 422-862) /125980

NEW YORK, NEW YORK

END OF TEXT

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CLASS OF SERVICE: TELEX NO.: DATE: 12.12.83

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1 OF 1		WUD/UNDP		

START HERE

ATTENTION BULMAN, ODA, LONDON. INFO MASHLER, UNDP, NEW YORK.
OUR REF. NO. 1577. RE INT/81/026 HANDPUMPS PROJECT. AAA FOLLOWING OUR TELEPHONE CONVERSATION TODAY AND OUR TELEX NO. 1521 OF NOV. 21, I AM PLEASED TO CONFIRM OUR COMMITMENT TO FUND ONE HALF OF POUNDS STERLING 69,550. THIS SUM IS COMPOSED OF POUNDS 64,550 FOR (1) PLASTIC BELOWGROUND COMPONENTS, (2) DRY BEARINGS FOR MALAWI PUMPHEAD, AND (3) LIGHTWEIGHT PUMP RODS (AS DETAILED IN KEN MILLS' LETTER TO YOU OF NOV. 21), PLUS POUNDS 5000 FOR CONTINGENCIES. BBB WE ALSO AGREE TO RESCHEDULE THE WORK ON LIGHTWEIGHT PUMP RODS, TO BEGIN IN SEPTEMBER 1984 AND TO END IN MID-1985. CCC WE ARE LOOKING FORWARD TO THIS JOINT UNDERTAKING. REGARDS,
TSCHANNERL/ARLOSOROFF, INTBAFRAD.

END OF TEXT

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SUBJECT: INT/81/026

DRAFTED BY: G. Tschannerl:kb

EXTENSION: 61785

CLEARANCES AND COPY DISTRIBUTION:
cc: Messrs. Cohen, Gross
Ms. del Castillo

AUTHORIZED BY (Name and Signature): G. Tschannerl G. Tschannerl

DEPARTMENT: WUD

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File Title UNDP/INT/81/026 - Rural Water Supply Handpumps Project - Fields, Trials and Technology Development Project - 1981 / 1983 Correspondence - Volume 17	**Barcode No.** 30192462
Document Date December 12, 1983	**Document Type** Outgoing wire

Correspondents / Participants
To: Mr. Paul Obrist, Division of Financial Services, Switzerland

Subject / Title
Employment of Mr. Erich Baumann

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Personal Information

Additional Comments

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File Water Supply Handpumps

MINISTERE
DU DEVELOPPEMENT RURAL

RECEIVED — UPV MISSION
08 DEC 1983

REPUBLIQUE DE HAUTE-VOLTA
UNITE - TRAVAIL - JUSTICE

DIRECTION DE L'HYDRAULIQUE
ET DE L'EQUIPEMENT RURAL
(H. E. R.)

Ouagadougou, le 08 DEC. 1983

F338 - INT/81/026

No 3618 /CNR/DR/HER/SES.

BORDEREAU RECAPITULATIF

des pièces adressées à Monsieur le Représentant Résident de la Banque Mondiale.
-= OUAGADOUGOU =-

SOMMAIRE	NOMBRE de PIECES	OBSERVATIONS
docs - Troisième Rapport Bimestriel de Suivi et d'Essais de Pompes a Motricité Humaine. (Août - Septembre 1983)	1	" Pour attribution "

Date Received: DEC 22 1983
Action (date):
Routed to: ~~SB~~ BS/HB
Project: UPV - General

~~W. A. Files~~ F338.

LE DIRECTEUR DE L'H.E.R.

Ministère du Développement Rural — Le Directeur de l'Hydraulique et de l'E.R.

ZABRE Hado Paul
Ingénieur de l'E.R.

INT/81/026

December 5, 1983

Mr. Alexander Rotival
Resident Representative
UNDP
01 Boite Postale 1747
Abidjan, Republique de Cote d'Ivoire

Dear Mr. Rotival:

Re: UNDP INT/81/026 Handpumps Project

We were pleased to receive your letter of November 10 with the letter from the Canadian Ambassador to the Ivory Coast enclosed. Preparations for executing the Canadian sponsored program in the Ivory Coast have begun. We shall keep you informed of all future developments and, in the meantime, wish to thank you for your assistance.

Sincerely yours,

S. Arlosoroff
Applied Research and Technology Div., WUD
UNDP Projects Manager, INT/81/026, GLO/80/004, INT/82/002

Enc.

GT:slj

OFFICIAL FILE COPY

INT/81/026

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE: December 5, 1983

TO: Mr. S. Arlosoroff, Chief, Applied Research and Technology Division WUDOR

FROM: David Grey, East Africa Regional Project Officer - INT/81/026

SUBJECT: Consallen Pump Peformance June 1982 to mid-November 1973: Livulezi Integrated Project for Rural Groundwater Supplies: Malawi.

1. Installation of 1982 - model Consallen pumps in boreholes of the Livulezi Project started in June 1982. Due to the problems that have been encountered with this unit this report has been prepared to record their performance through to mid November 1983.

2. Pumps currently under test in the Project are as follows:

Maldev Pumps	96
India Mk II Pumps	24
Consallen Pumps	14 (16 originally)
National Pumps	0 (20 originally)
Madzi/Blair Pumps	10 (5 in boreholes, 5 in dug wells)
Malawi Shallow Well Mk V	57 (all in dug wells)
(Total	201, of which 139 are borehole and 62 are dug wells)

however, of these the following are not used as the boreholes are virtually dry 3 Maldev, 2 India Mk II, 2 Consallen. So 132 pumps in boreholes are being monitored.

3. A total of 16 Consallen pumps have been installed with the first thirteen in June to August 1982, one in December 1982, one in January 1983 and one in October 1983. Two pumps (C10 and C8, see Table) were completely removed in November 1983 as the pumpheads needed replacement (due to broken flange brackets), one was replaced with a Maldev, and one with an India Mk II. Two pumps are installed on boreholes (drilled on a ridgetop) which are virtually dry, so they are not used. So 12 Consallens are currently being monitored and 14 altogether have been monitored.

4. Of the 14, 4 pumps have not broken down at all during an accumulated period of pumping of 52 months (one of these has only been installed for 1 month). With the remaining 10 there have been 66 breakdowns in total during an accumulated period of pumping of 127 months. These breakdowns have involved the following:

- 6 broken pumphead support brackets (new pumpheads fitted)
- 1 collapsed fulcrum brass bush (new handle fitted)
- 1 collapsed rod hanger bearing (new handle fitted)
- 8 seized cylinder plungers (new cylinders fitted)
- 1 perished cylinder footvalve (new footvalve fitted)

......./2.

48 broken rising main (all replaced)
- of which 13 were top lengths and 8 were bottom lengths. (average no. for these 10 pumps is 7 lengths of rising main) 27% of breaks were top lengths, 17% were bottom lengths and 56% were one of the 5 intervening rods.

The following points should be noted:

(a) Where new cylinders or handles are fitted, this is for convenience in the field and the old units are then reconditioned, if possible, in the camp.

(b) There have been no cases of breakage of in the pump body to bottom flange weld.

(c) Since October 1982 San Shwe Aung is certain that every Consallen pump has been correctly installed (i.e. correct stroke length) - ref. para 6 of Mr. Allen's letter of February 9, 1983. We have had over 30 rising main breakages since October 1982. If for some reason we are hitting one end or another of the cylinder, the design is inadequate. If a Mechanical Engineering graduate with 10 years post graduate experience cannot get it right who in a rural water supply project anywhere can?

5. The Table in Annex 1 summarises the most significant results. In general it would appear that those pumps with a maximum pumping water level around 20 m or more break down often (every 2 weeks to 4 months), with the variation roughly depending on how busy they are. Those with water levels of 10 - 15 m show a full range of breakdowns (from every 2 months to not at all in 17 months) again broadly corresponding to how busy the pumps are. Although the results are not wholly conclusive yet, it would appear that the 1982 Consallen is inappropriate for use where pumping water levels (PWLs) will exceed 15 m, and should probably not be used in a normal busy village location where PWLs are likely to exceed 10m, if an interval of about 12 months between breakdown is required. It is quite likely (but unsubstantiated) that at a PWL of c.5m (which is perhaps the average case in Liberia?) that the pump will be very reliable. However at this head a very cheap direct action unit will be equally reliable - only 6 of the 10 Madzi ('Malawi-Blair') units installed in November 1982 have broken down, with a total of 8 breakdowns, in 12 months, at pumping level of up to 8 m. A further point to note is that Consallens C10 and C8 were replaced with a Maldev and India MK II pumps respectively in November 1982 (one year ago). C10 was breaking down on average every 0.6 months and C8 every 1.3 months. Since the units were replaced, the Maldev pump has had 1 set of cup leathers and the India Mk II has not been touched.

......./3.

6. Observations made and discussions held by the writer in Ethiopia in September/October 1983 tend to substantiate the Malawi monitoring data. Units were visited in the village of Korekadd (Central Region). All 3 Consallen pumps had been broken for 2 years or more, and one unit that was closely inspected had a break on the threads of the top rising main and also had damaged bearings due to a loose fulcrum bolt. It is worth noting that 4 out of 5 UK Mono pumps in the same village were still operating. All the units were installed during 1978/79 under a UK aid project. Ethiopia Water Works Construction Authority staff informed the writer that they had had problems with the Consallen pumpheads being used in Hararghe Province and it had become common practice to reinforce the pumphead handle support bracket with angle iron welded to either side of the bracket, as separation of the bracket had occured in several cases (apparently in exactly the same way as we are seeing it occur in Malawi).

7. Clearly it is up to Consallen to use the information from the testing programme to improve the weak points identified so far. There is much evidence that Mr. Allen is energetically attempting to do this and we look forward to receiving units with strengthened handle support brackets and improved rising main, to replace some of the problem units in Malawi. The seized plungers are a puzzle which Mr. Allen should investigate - this seizure generally results in rising main breakage due to extra loading. I will attempt to contact Mr. Allen to discuss these issues when I am in U.K. in early January.

cc: Mr. K. Mills, Testing Manager CATR, UK.
for information and onward transmission to Mr. Allen of Cansallen.

ANNEX 1

Pump No.	Months/ Breakdown	Use*	Est Max** PWL(m)	Setting	Notes
C10	0.6	VERY BUSY	c 18	+ 18 m	7 breakdowns in 4 months
C 9	0.9	VERY BUSY	20-25	27	18 breakdowns in 16 months
C14	1.3	BUSY	20-25	27	9 breakdowns in 12 months
C 8	1.3	BUSY	21	+ 21	3 breakdowns in 4 months
C4	2.1	VERY BUSY	10-15	++ 18	8 breakdowns in 17 months
C 5	2.4	BUSY	c.20	21	7 breakdowns in 17 months
C13	3.8	NOT BUSY	c.20	21	4 breakdowns in 15 months
C15	5	BUSY	c.10	21	2 breakdowns in 10 months
C 1	5.7	VERY BUSY	10-15	++ 28	3 breakdowns in 17 months
C12	8	BUSY	c.15	15	2 breakdowns in 16 months
C 6	>17	NOT BUSY	c.12	18	0 breakdowns in 17 months
C 3	>17	NOT BUSY	c.12	12	0 breakdowns in 17 months
C 2	>17	NOT BUSY	c.10	15	0 breakdowns in 17 months
C16	>1	VERY BUSY	c.10	15	0 breakdowns in 1 month

* v. approx guide: VERY BUSY av. 300 people or even more
BUSY av. 150 people
NOT BUSY av. 150 people or even less

** approximate max pumping water level

\+ pumphead fulcrum bracket broken (++ - twice)

FORM NO. 27 - OCR
(3/82)

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PAGE OF

EXTENSION 61469

MESSAGE NUMBER

TEST NUMBER (FOR CASHIER'S USE ONLY)

TO:

BOOK OF TWO

1) MR. JOURNEY, INTBAFRAD, DHAKA, BANGLADESH 950- (TELEX 642302) #3065

2) MR. LANGENEGGER, INTBAFRAD, ABIDJAN, IVORY COAST

TELEX 969-3533 # ~~3~~ 1743

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PAGE 1 OF 2 | EXTENSION 61469 | MESSAGE NUMBER | TEST NUMBER (FOR CASHIER'S USE ONLY)

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FOR JOURNEY OF INT/81/026 INTBAFRAD DHAKA AND COPY LANGENEGGER OF INT/81/026 INTBAFRAD ABIDJAN. REFERENCE OUR TELEX NO. 1567. THE PROCEDURE FOR CIDA ACCOUNTS IS AS FOLLOWS:

ALPHA THERE HAS TO BE SEPARATE BUDGETS, SEPARATE COMMITMENT DATA, SEPARATE EXPENDITURE LEDGERS FOR REGULAR INT/81/026 AND FOR EACH CIDA COUNTRY PROJECT:

CID/026/01	BANGLADESH
CID/026/02	GHANA
CID/026/03	IVORY COAST
CID/026/04	SRI LANKA

BETA LIKE REGULAR 026, YOU MUST OBTAIN PRIOR APPROVAL FOR LARGE COMMITMENTS REFERENCING THE SOURCE OF FUNDING AT THE ONSET EXCEPT FOR PREVIOUSLY COVERED CEILING AMOUNTS FOR ROUTINE EXPENSES SUCH AS OFFICE, RENT, SUPPLIES, SUNDRY, ETC.

GAMMA SEND ORIGINAL DOCUMENTATION PLUS TWO COPIES OF ALL CIDA ACCOUNTS DIRECTLY TO S. ARLOSOROFF AND WE WILL ONFORWARD THE COPY TO CONTROLLERS ATTENTION HWANG, LOA. THIS IS EXACTLY THE OPPOSITE OF PRESENT PROCEDURE FOR REGULAR INT/81/026 EXPENDITURES. I REPEAT ALL ORIGINAL CIDA EXPENDITURE REPORTS

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PAGE 2 OF 2 EXTENSION 61469

MESSAGE NUMBER

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MUST BE ROUTED THRU ARLOSOROFF, WATER SUPPLY AND URBAN DEPT.
AND NOT CONTROLLERS.
DELTA COPY OF DHAKA IMPREST OF THE REGULAR INT/81/026 SHOULD
BE SENT TO CARMEN DEL CASTILLO (WUDOR) AT THE TIME YOU SEND
THE ORIGINAL IMPREST REPORT TO HWANG. REPEAT DO NOT SEND DEL
CASTILLO'S COPY OF IMPREST REPORT THROUGH CONTROLLERS. WE DO
NOT RECEIVE COPY OF IMPREST REPORT FOR PROCESSING UNTIL
MONTHS LATER IF SENT CARE OF CONTROLLERS.
EPSILON ALL REPORTS SHOULD FOLLOW UNDP BUDGET LINES FOR
UNIFORMITY. SEND MONTHLY REPORTS ITEMIZING CIDA EXPENSES.
ETA THERE SHOULD NOT BE SPLIT CHARGES IF POSSIBLE BETWEEN
CIDA OR REGULAR 026 ESPECIALLY EQUIPMENT/SUPPLIES. IF THIS
IS IMPOSSIBLE (E.G. TRAVEL), SUBMIT TOTAL SPENT AND INDICATE
PERCENTAGE CHARGED TO CIDA AND TO INT/81/026. REGARDS
ARLOSOROFF INTBAFRAD

END OF TEXT

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CLASS OF SERVICE: Telex

TELEX NO.:

DATE: 12/5/83

SUBJECT: INT/81/026--CIDA budgets for Dhaka and Abidjan

DRAFTED BY: CdelC CdelCastillo:aq

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AUTHORIZED BY (Name and Signature): Gerhard Tschannerl G. Tschannerl

DEPARTMENT: WUD

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2 HERE

BOOK OF TWO

1. GREY, INTBAFRAD, NAIROBI, KENYA (TELEX 963-22022) #4401

2. UNDEVPRO, LILONGWE 3, MALAWI (TELEX 988 4466)

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GREY, INTBAFRAD, NAIROBI. INFORMATION UNDEVPRO, LILONGWE.

OUR TELEX NO. 1565. PLEASE ORDER FROM MANUFACTURER IN BLANTYRE MALDEV HEAD - CUT SO THAT ALL INNER PARTS CAN BE SEEN FOR SHOWING TO VISITORS IN OUR OFFICE. TO BE PAID BY UNDEVPRO, LILONGWE, CHARGED TO INT/81/026 BUDGET LINE 41. BILL US BY IOV. SEND ORIGINAL TO MS. N. HWANG, LOAN DEPARTMENT, DISBURSEMENT 2, AND TWO COPIES TO MS. C. DEL CASTILLO.

ARLOSOROFF/TSCHANNERL, INTBAFRAD

END OF TEXT

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CLASS OF SERVICE: TELEX NO.: DATE: DEC.5,1983

SUBJECT: INT/81/026

DRAFTED BY: SARLOSOROFF:PHM

EXTENSION: 61790

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cc: Ms. C. del Castillo

AUTHORIZED BY (Name and Signature): G.TSCHANNERL G. Tschannerl

DEPARTMENT: WUD

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INT/81/026

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street, N.W.
Washington, D.C. 20433
U.S.A.

(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

December 5, 1983

Mr. Enzo Fano
Division of Natural Resources & Energy
Department of Technical Cooperation
for Development
United Nations
New York, New York 10017

Dear Enzo:

Thank you for your letter and Mr. Navaro's report on the Malawi meeting.

We did not produce the technical report on Malawi. We had summarized their large manual, decreasing it to a reasonable size. We sent it to Malawi for clearance and they started to review it. We have recently inquired about it and have received a rather vague reply. We shall let you know the moment we have it for publication.

I wish to thank you for your staff participation in the meeting we held. The issue of an appropriate drilling rigs to fit our needs is a complex one. The moment you define the specification as a low cost - low maintenance - small diameter drilling rig appropriate for most geo-hydrological conditions in developing countries, you immediately run into a set of questions and problems. However, the issue is highly important, even if we deal with parts of Africa only.

We have already promoted the interest of a few leading industries like Ingersoll-Rand (USA), Atlas Copco (Sweden) and Dando (U.K.). These three have informed us they are accelerating their R and D for the production of rigs to match the growing handpump applications in Africa, South Asia and East Asia. If you assume that by the end of the century 80% of the rural population of these regions will have adequate water supply, there is no feasible realistic option to achieve it except by a few million boreholes, dug wells and handpumps. This fact is really the basis for the revived interests of drilling rigs manufacturers in the smaller and simpler machines.

Malawi and India could be our best indicators. If local crews without any expatriate support can manage a multi-machine operation, drilling large number of boreholes at an average rate of one per week, up to 100 meters deep (in India 50 meters in over burden and 50 meters in hard rock) for an average cost of US $1,000! It means that it can be done in Africa and Asia and the earlier we shall have the new generation of rigs in the field the savings will be substantial and the reduction of human misery will be evident.

Returning to Malawi: the results obtained in our joint field trial with DLVW indicate the strong support that such efforts can provide to rural water supply reliability as a result of appropriate management. Well designed, executed and completed boreholes, installed with handpumps, have already operated for almost two years in Malawi with hardly any breakdowns. This is drastic change from the other 4000 handpumps operating there.

A number of active donor agencies who are collaborating with us in the handpumps program agreed to diversify the types of the drilling rigs in their on-going rural water supply projects and to enable us to evaluate and assess their performance (from the technical, economic and social aspects) in parallel to the monitoring activities we are undertaking on handpumps.

You need a good borehole, and a reasonable handpump that can be repaired by village attendants (one or two hours work for regular maintenance operations) for a cost of US $10-12 per capita. This can change the rural life in most developing countries. All these efforts are worthwhile: 1-1.5 billion people are in need of such systems.

Sincerely yours,

S. Arlosoroff, Chief
Applied Research & Technology Division (WUD)
(UNDP Projects Manager, INT/81/026, GLO/80/004, INT/82/002)

SArlosoroff:lgl

cc: Messrs. W. Mashler, M. Beyer, M. Potshnik, M. Cohen, R. Middleton
G. Beier, G. Tschannerl, D. Grey, O. Langenegger, W. Journey,

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cc. INF/82/002

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BOOK OF THREE

(1) KNIPSCHILD

BMZ (TELEX NO. 886 9452)

BONN, FEDERAL REPUBLIC OF GERMANY

(2) EYLERS

GTZ (TELEX NO. 415 230)

FRANKFURT, FEDERAL REPUBLIC OF GERMANY

(3) MASHLER

UNDEVPRO (TELEX NO. 422 862)

NEW YORK, NEW YORK

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PAGE 1 OF 4

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ATTENTION KNIPSCHILD, BMZ AND EYLERS, GTZ. FOR INFORMATION MASHLER, UNDP. OUR REF. TELEX NO. 1560. RE BMZ/GTZ PROPOSED CONTRIBUTION TO UNDP/WORLD BANK DECADE-RELATED ACTIVITIES DURING 1984 AND 1985 -- PROVISIONAL PROGRAMME. (I) INT/81/026 - HANDPUMPS PROGRAMME. AAA THE BASIS IS FOR JOINT ACTIVITIES IN ONGOING BMZ/GTZ RURAL WATER SUPPLY OPERATIONS. BBB THE OBJECTIVES ARE: ALPHA CONTINUED EVALUATION OF NEW GENERATION OF VLOM HANDPUMPS UNDER VARIED FIELD CONDITIONS. BETA THE TECHNICAL-FINANCIAL AND MANAGEMENT PERFORMANCE EVALUATION OF DRILLING RIGS -- CABLE, HYDRAULIC AND ROTARY. PURPOSE OF EXERCISE TO PROMOTE THE USE OF LOW-COST -- LOW-MAINTENANCE SMALL DIAMETER RIGS FOR THE MULTI-MILLION BOREHOLES NEEDED FOR HANDPUMPS APPLICATION BETWEEN 1985 AND THE YEAR 2000. CCC THE FINAL OBJECTIVE IS TO REDUCE THE COSTS AND INCREASE THE RELIABILITY OF RURAL WATER SUPPLIES BASED ON GROUNDWATER AND HANDPUMPS. THEREFORE THE PERFORMANCE EVALUATION WOULD NOT ONLY DEAL WITH THE DRILLING EQUIPMENT BUT ALSO WITH THE MANAGEMENT OF THE WATER SOURCE EXECUTION, BOREHOLE DESIGN, BOREHOLE COMPLETION, MATERIALS FOR CASINGS AND SCREENS, PREPACKED SCREENS, ETC. DDD WE WOULD PREFER TO HAVE 2 OR 3 DIFFERENT DRILLING SYSTEMS IN EACH PROJECT OR REGION, HOWEVER, IF THIS WOULD NOT BE POSSIBLE, COMBINATION OF TWO DIFFERENT RIGS AT EACH PROJECT WOULD BE

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REASONABLE. EEE WE WOULD PREFER TO HAVE A GEOGRAPHICALLY AND SOCIALLY BALANCED OPERATION, E.G. 1 - 2 COUNTRIES IN EACH OF THE FIVE REGIONS: EAST AFRICA, WEST AFRICA, SOUTH ASIA, EAST ASIA, AND LATIN AMERICA. ONGOING BMZ/GTZ PROJECTS IN SOUTH SUDAN, TANZANIA, GHANA, SRI LANKA, PARAGUAY, ETC., ARE HIGHLY SUITABLE FOR US, AS WE ARE ALREADY OPERATING THERE OR IN THE REGION. FFF AS WE ASSUME THAT DRILLING RIGS ARE PROCURED FROM THE GTZ/BMZ BUDGET IN ANY CASE, OUR NEEDS WOULD BE THE FOLLOWING PER EACH COUNTRY: ALPHA PERFORMANCE EVALUATION ENGINEER WHO WOULD DEAL WITH THE DRILLING ACTIVITIES AND THE HANDPUMPS AS WELL. IF WE ASSUME EUROPEAN ENGINEER PLUS TRAVEL AND ALL OTHER FRINGE BENEFITS COSTS PER YEAR ARE BETWEEN 100-120,000 USD. HOWEVER, WE MAY MIX U.N. VOLUNTEERS AND EUROPEANS IN THE INTERREGIONAL PROJECT SO AS TO REDUCE THE AVERAGE COSTS TO 60-70,000 USD PER YEAR PER PERSON. IF IN 1984 WE CAN EMPLOY 3 PERSONS IN 3 COUNTRIES FOR 9 MONTHS AND 12 MONTHS IN 1985 ALTOGETHER FOR APPROXIMATELY 60 MANMONTHS AT AN AVERAGE COST OF 400,000 USD PER 2 YEARS GLOBAL OPERATION. BETA ADDITIONAL PROCUREMENT OF BOREHOLE MATERIALS FOR EVALUATION OF PERFORMANCE LIKE PVC CASINGS, SCREENS, PREPACKED SCREENS, SPECIAL SAND AND GRAVEL, AND CHEMICALS FOR EXPERIMENTS IN ACIDATION.

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THESE WOULD BE APPLIED TO A LIMITED NUMBER OF BOREHOLES IN EACH SITE SO AS TO EVALUATE DIFFERENT ENGINEERING SOLUTIONS TO BOREHOLES DESIGN AND COMPLETION. ESTIMATED SUM APPROXIMATELY 50,000 - 100,000 USD. GAMMA SUPPORT SERVICES BY REGIONAL PROJECT OFFICERS AND OTHERS, ENGINEERING ANALYSIS AND SUPERVISION, ECONOMIC AND FINANCIAL ANALYSIS, CONSULTANTS, REPORTS WRITING AND DISTRIBUTION. TOTAL INPUT APPROXIMATELY 110-150 USD. GGG TOTAL BUDGET REQUEST FOR THE GLOBAL OPERATION IN 1984 AND 1985 SHOULD BE APPROXIMATELY 600-700,000 USD. HHH ADDITIONAL SUPPORT FOR THE JOINT OPERATION IN CHINA, AS THE SCOPE OF THE PROGRAMME HAS EN- LARGED AND BROADENED. FUNDS NECESSARY FOR 1985, ESTIMATED AT 350-450,000 USD, MAINLY USED FOR EXTENDED MONITORING TO OTHER PROVINCES, AND THE TECHNICAL ASSISTANCE AND DEMONSTRATION OF PLASTICS EXTRUSION AND MOLDING EQUIPMENT FOR THE MANUFACTURING OF VLOM PUMPS AND SPARE PARTS, PVC CASINGS, AND SCREENS, ETC.

III INVESTIGATIONS, TECHNICAL ASSISTANCE AND DEMONSTRATION OF PLASTICS EXTRUSION AND MOLDING FOR VLOM PUMPS - LOCAL PRODUCTION. PROGRAM TO BE LINKED TO SECTOR OPERATIONS IN AFRICA, ASIA AND LATIN AMERICA TO EXPLORE AND ASSIST IN THE ESTABLISHMENT OF PLASTICS PUMPS AND PARTS. ESTIMATED COST IS 300-500,000 USD.

END OF TEXT

(II) INT/82/002 - LOW COST TRAINING MATERIALS PROJECTS. FOR FIELD

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TRIALS AND DISSEMINATION OF THE DECISION-MAKING PACKAGE, THE TECHNICAL PACKAGE AND THE COMMUNITY PACKAGE OF THE PROJECT FOR 1984 AND 1985 IN 6-8 COUNTRIES IN AFRICA, ASIA AND LAC, APPROXIMATE SUMS FOR 6 COUNTRIES IN AVERAGE APPROXIMATELY 100,000-300,000 PER COUNTRY SUBJECT TO THE LENGTH, SCOPE AND REPETITIONS OF TRAINING SESSIONS. DIFFERENCE IN COSTS AS A RESULT OF PARTIAL TO TOTAL COVERAGE. TOTAL COST BETWEEN 600,000 AND 1,800,000 USD FOR TWO-YEAR OPERATION. REGARDS, ARLOSOROFF, INTBAFRAD.

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CLASS OF SERVICE: TELEX TELEX NO.:	DATE: 12/02/83
SUBJECT: INT/81/026, INT/82/002	DRAFTED BY: S. Arlosoroff:kb SA — EXTENSION: 61790
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THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

INT/81/026

DATE December 2, 1983

TO Mr. A. Churchill, Director, WUD

FROM S. Arlosoroff, Chief, Applied Research & Technology Division (WUD) and UNDP Projects Manager

EXTENSION 61790

SUBJECT INT/81/026 - Handpumps Program in the People's Republic of China

Attached, please find the revised and signed agreement between the GTZ and UNDP. (It was signed by UNDP on November 28, 1983). The US$500,000 contribution by the GTZ is intended for our handpumps activities in the People's Republic of China starting from 1983 and terminating by the end of 1985.

As we are already operating in China and as the subject is receiving a much larger scope and impact on China rural water supply plans, we have already discussed with the GTZ officials and telexed them that we shall need an additional US$200-300,000 for 1985 and 1986. They have informed us that this would be considered favorably.

Our activities in China are constantly coordinated with the Regional Division.

Attachment

SArlosoroff:phm

cc: Messrs. M. Cohen, R. Middleton, G. Beier, R. Costa, I. Sud,
C. Koch-Weser, G. Tschannerl, C. Gunnerson, A. Ramuglia,
N. Burnett, B. Gross, C. Southall, J. Freedman, L. Rosenhall
Ms. L. Obeng, C. del Castillo, N. Hwang

United Nations
Development Programme
One United Nations Plaza
New York, N.Y. 10017

U. S. A.

512/Dr. K./rd 2194 31. October 1983

Ref.: GTZ Cost-Sharing with UNDP Project INT/81/026

Dear Mr. POtashnik,

We refer to the telephone conversation with Dr. Kemmann of today and the telex no. ZCZC 140913 of 17.10.83 you received from the World Bank.

Our Annex III was changed according to the requests and requirements by the World Bank and enclosed please find two copies each for both our files; we kindly ask you to transfer one fotocopy to the World Bank after the Annex has been duly signed.

As already discussed, the arbitration clause has been prepared as a separate annex since this agreement was stipulated only with you.

During the telephone discussion you and Dr. Kemmann also came to a conclusion with regard to the supplement of the notes in the basic contract of 12.5.83 which you are kindly requested to add to it:

"World Bank's separate letter to GTZ copy of which is added"

We are now looking forward to receiving our original copies of the Letter of Agreement and Annexes III and IV together with the first version of Annex III which in the meantime has been reviewed.

Thanking you for your kind understanding in the matter of all formalities which sometimes are necessary, we remain,

Yours faithfully,

Kresse Dr. Kemmann

Encs

COPY

Annex III

GTZ-Cost-Sharing with UNDP Project INT/81/026

Subject: Laboratory and Field Testing of Drinking Water Supply Handpumps and Animal and Human Powered Irrigation Pumps in the People's Republic of China, in co-operation with the Chinese Academy of Agricultural Mechanization Sciences (CAAMS).

1. This Annex III forms an integral part of the Letter of Agreement with UNDP, dated May 12/August 30, 1983 on the above mentioned subject in conjunction with Annex I
   - Letter of Agreement between UNDP/World Bank and Ministry of Foreign Economic Relations and Trade, signed April 19, 1983

   and Annex II
   - Field Testing and Technological Development of Rural Water Supply, Agreement between UNDP and World Bank, signed April/May 1982.

2. The purpose of Annex III is to stipulate the details and rules for GTZ's participation in this project.

3. GTZ will make available the amount of US$ 500.000,--, which shall be paid in accordance with the GTZ budgetory rules in quarterly instalments, on the basis of the annual schedule on page 2 on the above mentioned Letter of Agreement between UNDP/GTZ upon call for disbursement

by UNDP. These funds shall be used by the World Bank - as the excuting agency for the above mentioned project - for the following items, based on the budget in para 19 of Annex I:

3.1	Purchase of the components of Material and Equipment as detailed in A 1, 3 4; B 1-4 up to	US$ 254.000
3.2	Remuneration of short term expatriate Advisers, in accordance with A 2, i, up to	US$ 52.000
3.3	Remuneration of a long term Adviser, 1,5 years incl. Housing and Travel, in accordance with B4, i + ii, for monitoring and technical assistance up to	US$ 125.000
3.4	Training of Chinese Staff in Europe 6 man/months plus Travel and Expenses up to	US$ 22.000
	Sub Total:	US$ 453.000
3.5	Contingencies, on item 3.1 to 3.4 up to	US$ 47.000
	Grand Total:	US$ 500.000

3.6 Redistribution of funds among item 3.1 - 3.5 requires prior agreement of the GTZ.

3.7 UNDP will provide GTZ, on request, with the following reports prepared in accordance with the organization's procedures:

(a) periodic progress reports and financial reports

(b) an annual report which will provide information on income and expenditure during the previous year,

(c) a final report within six months after the date of completion of the project.

UNDP will also agree to furnish GTZ, upon request, with a copy of its audited financial statements and with any comments concerning its project which are contained in the report of the board of auditors of the United Nations (as and when received) and such information on the status and execution of the project as may reasonably be requested.

4. The purchase of material and equipment will be done in accordance with the normal procurement policies and procedures of UNDP and the World Bank. The same shall apply to the appointment of the short term advisers according to above mentioned item 3.2 and to the training and study tours of Chinese staff according to above mentioned item 3.4.

5. GTZ shall further be invited to participate in the

- technical/organizational decision-making process of this project
- international seminars/workshops for the dissemination/sharing of results;
- arrangement of study tours and training of Chinese staff in accordance with item 3.4,

however, the full responsibility for the implementation of the project shall remain with the World Bank as

6. UNDP shall inform GTZ on all matters requiring GTZ's participation of the project in accordance with item 4 + 5, at least 6 weeks in advance to allow for proper preparation and for arrangements.

6.1 GTZ shall receive 3 copies of the workplan (para 16) and of all project related reports, within 1 month after the respective preparation.
Reporting shall be in English.

6.2 UNDP shall assure:
- that interim and final findings and experiences of this project are shared world-wide without delay with the international community concerned (donors, institutions, manufacturers etc.)

UNDP will do everything within its means to assure:
- that the People's Republic of China shall not make any claims in respect of licences/patents on pumps or part of it developed through this project and that the People's Republic of China agrees to continue the international co-operation and coordination on the joint development and production with other interested countries.

6.3 UNDP shall include medium to deep well handpumps in this programme, in amendment to para 6 of Annex I and shall assure that the output according to para 10 - 17 of Annex I shall include advice and assistance to manufacturers/ suppliers in China and other countries on the improvement, (joint) production, installation and use of the various types of handpumps.

7. An arbitration clause in respect of the above mentioned agreement shall be concluded separately in Annex IV hereto.

Date: August 30, 1983

On behalf of GTZ
(Merz) (i.V. Kresse)

Date:

On behalf of UNDP

GTZ-Cost-Sharing with UNDP Project INT/81/026

Subject: Arbitration Agreement

1. The purpose of Annex IV is to stipulate an arbitration clause in respect of the agreement between UNDP and GTZ concluded by a Letter of Agreement of UNDP dated 12 May 1983/30 August 1983 and Annex III

2. Any dispute between UNDP on the one hand, and GTZ, on the other, which may arise out of or relate to the above mentioned agreement and which is not settled by negotiation or other agreed mode of settlement shall be submitted to arbitration at the request of either party to the dispute. Each party shall appoint one aribitrator, and the two arbitrators so appointed shall appoint a third, who shall be the chairman. If within thirtydays of the request for arbitration either party has not appointed an arbitrator or if within fifteen days of the appointment of two arbitrators the third arbitrator has not been appointed, either party may request the president of the international court of justice to appoint an arbitrator.

The procedure of the arbitration shall be fixed by the arbitrators, and the expenses of the arbitration shall be borne by the parties as assessed by the arbitrators. The arbitral award shall contain a statement of the reasons on which it is based and shall be accepted by the parties as the final adjudication of the dispute.

Date: 28.10.1983

On behalf of GTZ
(Merz) (i. V. Kresse)

Date:

On behalf of UNDP

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

INT/81/026

OFFICE MEMORANDUM

DATE: Dec. 2, 1983

TO: Those Listed Below

FROM: S. Arlosoroff, Chief Applied Research & Technology Div., WUD

SUBJECT: UNDP INT/81/026 - Back-to-Office Report of Tim Journey, Sri Lanka, October 2-15, 1983

I am enclosing for your information a recent back-to-office report on Sri Lanka by Mr. Tim Journey, our Regional Project Officer for South Asia. It contains an overview of the handpump field trial activities in the two test areas of Vavuniya and Kalutara, as well as a description of each pump and Mr. Journey's preliminary assessment of their performance. More definitive results will be available once all the different pump types have been installed and their performance monitored.

Several of the locally-made handpump types in the test areas appear to have major design and/or manufacturing defects, which have to be rectified to ensure easier installation and less frequent maintenance. The observed or suspected defects are detailed in Annex 1.

Distribution:

Messrs. Potashnik (UNDP, NY), Beyer (UNICEF, NY), Mills (CATR, England) Bradshaw (UNDP, Colombo), Diaz (Colombo), Kozel (Res. Rep., Colombo), Kresse (GTZ, F.R.G.), Schroter (GTZ, Colombo), Sharp (IDRC, Canada), McLeod (Australia)
Ms. Timpson (UNDP, NY).

Messrs. Rosenhall (WB/Bangkok), Grey (WB/Nairobi), Journey (WB/Dhaka), Langenegger (WB/Abidjan), Cohen, Freedman, Beier, Costa, Middleton, Pettigrew, Ramuglia, Burnett (WUD), Tsantis (ASA), Sandstrom (ASP)

SA/GT:slj

Back to office report

NOV 17 1983

(1) ~~TR~~ — Comments pl. glad to see that Form 6 is moving forward (see p. 2)
(2) ~~[illegible]~~
(3) SA

WORLD BANK OFFICE MEMORANDUM

DATE: 3 November 1983

Letter # 2707

TO: Shaul Arlosoroff, Division Chief, WUD/ATR

FROM: Tim Journey, Regional Project Officer, INT/81/026 WKJ

SUBJECT: Sri Lanka projects supervision mission 2 - 15 October

1. According to my TOR approved in your telex 1314 dated 15 September 1983, I completed a two week mission to Sri Lanka to supervise the two hand pump field test projects assisted by INT/81/026. I visited the Vavuniya project from 6 - 9 October and the Kalutara project on 12 October. The remainder of the time was spent in Colombo conferring with representatives of GTZ, UNICEF, UNDP and the National Water Supply and Drainage Board.

2. Both projects are progressing satisfactorily. Construction of wells and installation of pumps is on schedule. Monitoring of pump performance has begun according to plan. Twenty three water monitors have arrived and have been distributed to both projects for a three-month field test. Fifty TARA pumps have arrived from Bangladesh and have been fitted in the NWSDB workshop with bushings to receive water monitors for immediate installation in each project.

GTZ VAVUNIYA PROJECT

3. Accompained by Mr. Fritz Schottke, Interim Project Manager and Mr. Johannes Knapp, Assistant Project Manager I visited the Vavuniya project to see the operating environment of the pumps, well construction and pump installation techniques and to confer with project staff on monitoring procedures.

4. Two types of well construction are used. A "shallow well" consists of a large diameter hole (up to 2 m) excavated through the overburden five to ten meters down to bedrock, after which a six inch diameter hole is drilled into the rock with a down-the-hole hammer. The second type is drilled with hydraulic rotary through the overburden to hard rock and cased, after which a down-the-hole hammer continues in hard rock. In a small per centage of cases where the overburden contains a suitable aquifer, a slotted PVC screen is set and gravel packed. I observed drilling of the latter type with a trailer-mounted rotary rig, which is somewhat heavy for the relatively shallow duty. Imported bentonite is used to keep the hole open. I suggested, to the astonishment of the master driller, Mr. Kestner, that he would find cow dung and clay an excellent substitute for bentonite, as is the case in Bangladesh. He reluctantly agreed that it would be worth a try, considering the expense and logistical difficulties of obtaining bentonite. Well depths do not exceed 30 m. Ground water recharge of the wells during pumping is poor, but the large resevoir of the "shallow well" compensates to a great extent. The digital type water monitors should facilitate systematic drawdown testing.

5. Thirty five pumps of three types are currently monitored within the 600 well project. They are the AID/Battelle deep well pump, the Sihalese (Kandy/Sarvodaya) deep well pump and two versions of the India Mk II, one manufactured by Inalsa and the other by a Sri Lankan manufacturer, Diason. Twenty five TARA pumps supplied from Bangladesh will be installed on the "shallow wells" during October/November. Each pump type examined during the mission is discussed in detail in Annex 1. Only five of the ten available Kandy pumps have been installed, since excessive maintenance problems have appeared, and the project manager is reluctant to install more until some of the major problems have been corrected. Fifteen PEK pumps are to be financed with CIDA resources, some or all of which may be installed in the Vavuniya project area. Kardia pumps were to have been installed for testing, but so far have not arrived. The Ego pump was rejected for testing because it ceased to function at heads greater than six meters, presumably because of valve problems.

6. Test pumps are installed at static heads averaging less than six meters. Drawdown rates are not yet documented, but are presumably less than ten meters. While the wells are 20 - 30 m deep, the placement of the cylinders was noted to be as much as eight m from the bottom. Mr. Schroeter, GTZ project manager, commented that the potential of

the well in abnormally dry conditions would not be fully exploited. He intends to lower the cylinders to within one meter of the bottom. Such a low head is unfortunate for deep well testing purposes, but wll provide an adequate environment for the PEK and TARA pumps.

7. Unfortunately, the GTZ monitoring technician, Mr. K. Sivanantharajah, was not available during my visit to Vavuniya. However, project staff report that he is an excellent mechanic and a willing worker. Form 1 for 35 test pumps have been filled out adequately and are checked by Mr. Johannes Knapp, the recently appointed Assistant project manager. Mr. Knapp and I discussed the monitoring format in detail, and went over the operator's manual for the water monitors. Project staff expressed keen interest in the water monitors and hope that a successful field test will result in the supply of more. I will receive a summary report on the performance of the water monitors by telex when the three month test period is completed. Mr. Knapp will supervise monitoring and reporting and has been given the responsibility of developing a maintenance system expected to ensure long term viability of the hand pumps.

8. Mr. Schroeter will be sending the latest quarterly report on the project to have been prepared during October, providing a detailed summary of project progress and future plans. I will forward a copy when I receive it.

UNICEF/KALUTARA PROJECT

9. Seven types of pumps will be installed in the project, amounting to a test sample size of 125. Details are given in Annex 2. This is perhaps too many to monitor effectively, but the UNV monitoring engineer Aung Chein is capable and industrious. He will do a good job, from all apperances, no matter how difficult. For this reason I suggest that the PEK pumps be installed only in Vavuniya. The other reason is that the static head range observed in Vavuniya appears to be more suitable for the PEK and TARA pumps than the deep well pumps presently installed.

10. Aung Chein and I inspected the shipment of 50 TARA pumps from Bangladesh and verified that all components and spare parts were accounted for. The National Water Supply and Drainage Board workshop was used to install 3/8 inch diameter pipe bushings in the TARA pump heads, to fit water monitors after installation. The shipment contained second generation pumps, i.e., without the improved top and bottom connectors, shorter T-bar, PVC/wood top bushing, improved check valve and improved piston with heavier duty seals. I propose to make fifty sets of the connectors, piston and check valve to retrofit the pumps after they have been installed, half to be paid for by UNICEF/Sri Lanka. I will get an estimate of the cost involved and send it to you for approval. Aung Chein supervised the distribution of pump sets to GTZ and UNICEF. In view of potentially greater drawdown in the Vavuniya test area it was decided to provide the Kalutara pumps with 7.5 m settings and the GTZ project with 15 m settings, using available materials. Installation techniques for TARA pumps in cased or excavated wells will be different from Bangladesh, where alluvial material consolidates around the tubewell, preventing deflections during operation. Kalutara installations will be attached to the walls of the excavated wells with wire and shims for alignment, and those in Vavuniya will be installed inside a 5 inch nominal diameter casing with guides, which extends to the hard rock. Fifty sets of 2 m Robo Screens with 0.25 mm slots were furnished to the projects for experimental purposes, although sand aquifers are the exception.

11. Aung Chein and I examined several of each type of pump installed in the test area. Observations are recorded in Annex 1. We discussed in detail the monitoring forms and adopted a common coding for the pumps in Kalutara and Vavuniya. Form 6 was not easy to explain, but the cost items which do not vary much during the year will be collected for review on my next mission to Sri Lanka. These items are the capital cost of pumps, spares and equipment wages and benefits, etc, which are a matter of record. Overhead costs are much less obvious and will require some digging.

12. There is no regular driver appointed for the project vehicle. At present, Aung Chein has to request the Kalutara local government to provide a driver on an ad hoc basis, which is every day. UNDP policy is that UNV's are not to drive a vehicle for business purposes. My assumption, which was not correct, was that the UNV would drive the project vehicle, and I did not budget for a driver. UNICEF do not have sufficient personnel slots available to hire enough drivers for their regular program, let alone providing one for Aung Chein. Most of the staff drive themselves in Colombo, although not on field trips. If our project were to hire a driver, he would have to be a UN employee on the UN local wage scale, rather than GOSL wages, which are considerably lower. I took up the matter with Nigel

Bradshaw, Acting UN ResRep, who wrote a letter to NWSDB, asking them to appoint a driver for the vehicle and agreeing in principle that the vehicle would be signed over to NWSDB when the project is over. I expect that they will go along with the suggestion, but if not, we must make other arrangements. Aung Chein's accident was caused by another driver's recklessness, and could have happened to anyone. However, the accident provoked a very strong negative reaction from UNDP.

13. Aung Chein is in good spirits, even though he is very disappointed with UNV's position regarding his family. He understands the reasons for their policy and will not press the matter. He is a very highly motivated person, which is demonstrated by his work performance and attitude toward his career. Rafael Diaz and I are worried that his marriage will suffer as result of his long enforced separation. Neither he nor I would entertain such a sacrifice, but we are not in Aung Chein's position. Diaz has already started the procedures for recruiting Aung Chein into UNICEF at the end of our project, i.e., personnel action to the point of making Chein an offer when his duties with our project are clearly over. This demonstrates how highly Diaz regards Chein and gives Chein additional support in his determination to deliver outstanding performance. Nigel Bradshaw of UNDP is convinced that UNV can have no objection, however, to Chein's relocating his family at his own expense with no additional claims on UNV on their behalf, i.e., insurance, medical or educational expenses. I certainly think that it would be in the best interests of his family to bring them to Sri Lanka to live with him, if it will not cause difficulties with UNV.

14. I paid a courtesy call on Mr. N. D. Pieris, chairman of the National Water Supply and Drainage Board and briefed him on the progress of both projects. I showed him a water monitor, with which he was impressed. He mentioned the importance of developing more systematic hand pump maintenance procedures in view of the increasing numbers of hand pumps installed in Sri Lanka. I pointed out that the outputs of the field test projects would give him a good idea of expected maintenance requirements of a variety of pumps, and therefore a basis for planning investments in spare parts, transport and manpower. I suggested that we visit the Kalutara project together during my next mission, since he expressed an interest in pumping one of the TARA pumps himself.

15. I met with Ms. Sally Timpson of UNDP's INT/83/003 Promotion and Support for Women's Participation in the IDWSS and briefed her on INT/81/026 projects in the South Asia region. The Bangladesh project will be able to provide her project with useful information. For example, women pump caretakers will be trained to maintain the TARA pumps. The TARA system is designed with that in mind. Knowledge, attitudes and practices survery will be performed at six month intervals to track changes in water use, personal hygiene and defecation practices among women, children and men. Professional social scientists will collect and interpret the information. Information of interest to INT/83/003 could be excerpted from Bangladesh project reports. However, no such capability exists for the Sri Lanka and India projects, nor are resources available to provide professional social scientists to carry out adequate studies, either from INT/81/026 or INT/83/003. We agreed to explore possibilities of cooperation beyond the Bangladesh project when I look more carefully for local institutions who may have the interest and resources to address the issues of women's involvement in water supply and sanitation.

cc. Gerhard Tschannerl, Senior Project Officer, INT/81/026

ANNEX 1

COMMENTARY ON HAND PUMPS OBSERVED IN SRI LANKA

FOREWORD

1. The following comments are subjective, since they are based on observation only and should not be considered definitive. Objective data collected during the course of field testing will provide a sound basis for conclusions about the relative merits of various design features and subsequent recommendations to manufacturers of hand pumps.

AID/BATTELLE DEEP WELL PUMP

2. The AID/Battelle deep well hand pump is a conventional cast iron deep well hand pump, copied by a foundry, Somasiri, in Jaffna, from a basic design developed by the Batelle Memorial Institute on behalf of AID in the late 1960's, later modified by Georgia Tech, also on behalf of AID. The deep well pump stand has a cross-head to guide the pump rod, or to maintain uniaxial reciprocating motion. Two outboard cast iron cleats on the crank pin slide up and down inside cast iron runners, with the fulcrum shaft mounted in a moveable fulcrum stand, which is itself pinned to the pump stand, so that it moves in a arc when the pump rod is jacked up and down. The leverage system is exposed to the environment. This means that grease may accumulate dust, liquefy under the heat of the sun and wash away in heavy weather. Exposed surfaces are thereby abraded or corroded because of the absence of a protective shroud around the moving parts. Field test experience so far indicates that the leverage system needs frequent lubrication, and is subject to rapid wear.

3. The 3 inch nominal diameter PVC cylinder is attached to a 1 1/2 inch diameter galvanised steel rising main by a threaded cap. PVC is a material noted for its sensitivity to notch failure and long term viability of this joint is questionable. The check valve is a rubber hinged flapper attached to the bottom of the cylinder by two bolts, without an upper stop to control valve lift. At high operating speeds volumetric efficiency may be expected to suffer from excessive leakage due to late valve closure. The hinged joint is not ideal for longevity, since stress is concentrated at the hinge. The bolted attachment may be a source of valve failure, either from detachment caused by vibration, or corrosion. The low valve seat is subject to fouling from solids taken in from below, but could be corrected by a higher valve seat. A rubber-faced poppet, with a lift yielding about 25 % of the cross-sectional area of the cylinder, and a higher seat would be an improvement. The present valve has one distinct advantage, however, in that its mass is relatively low, which reduces inertial forces during operation. The small diameter rising main prevents removal of the pumping elements without also removing the rising main. This is a distinct disadvantage from the maintenance perspective.

4. Users of the AID/Battelle like its relatively high capacity compared to most other pumps. It seems also to be more aesthetically pleasing than other pumps. Finally, it is a local product made to reasonable good quality standards. This despite is deficiencies carries a distinct advantage vis-a-vis imported pumps.

AID/BATTELLE SUCTION PUMP

5. The suction version of the AID/Battelle pump is subject the same disadvantages as the deep well pump with respect to the leverage system. It is easier to dismantle and reassemble because of the absence of a rising main. Essentially the same set of components is used to good advantage for both pumps, except for the rising main and deep well cylinder.

SIHALESE (SARVODAYA/KANDY) DEEP WELL PUMP

6. The Sihalese or Kandy pump derives in part from the "open top" cylinder concept, in which the piston a check valve may be withdrawn to the surface for servicing by means of the pump rod. The rising main of an "open top" system is necessarily as large or larger than the piston diameter. The rising main in the Kandy pump is 3 inch nominal diameter PVC pipe. An extractable check valve is a logical feature to combine with a large diameter rising main, otherwise the entire rising main has to be lifted to service the check valve. The Kandy pump has a fixed check valve, which defeats the purpose of open top concept, and is a major flaw in the Kandy pump design. The large diameter rising main is suspended by a clamp hanger. Experience indicates that a PVC rising main should be supported from the bottom to avoid shearing at the connection to the pump stand. A rubber compression fitting at the top connector would be an additional protection against shearing, since the rubber will absorb some of the deflections caused by vibrations during pumping.

7. The 24 mm OD PVC pump rod has a 3 mm wall thickness. It is too small in diameter. It elongates excessively and wastes kinetic energy during pumping, especially at higher operating speeds. Repeated elongation, especially large deflections are likely to result in fatigue of the material. Both laboratory and field tests have demonstrated that PVC pipe pump rods should not be perforated to make a pinned mechanical joint, since stress concentrations at the perforation lead inevitably to cracking and failure. A larger diameter, thick walled PVC pipe with slovent joints would be an improvement to the Kandy pump, or steel tubular rods.

8. Valve lift on both the piston and check valve is too high. The cup seal on the piston has a lip angled in the wrong direction. The high side, or the lip should be outboard rather than inboard. One alternative would be to use the piston and an extractable check valve from an indigenous pump, such as the AID/Battelle pump, corrected for valve lift, in combination with the 3 inch diameter PVC rising main.

9. The Kandy pump has hardwood journal bearings on both the fulcrum and crank, with spare journals built into the bearing blocks, which is probably a sound feature. However, they lack oil impregnation and the projected area appears to be too small, since 1/2 diameter shafts are used. Larger diameter shafts, 3/4 inch nominal diameter galvanised steel pipe in longer journals would make the leverage system more robust. The leverage system is covered with a sheet metal shroud, attached an angle iron frame which supports the bearing blocks. The shroud does not completely cover the concrete pump pedestal, allowing water to stand around the shroud bolts and lower part of the shroud. This sets up corrosion, making it very difficult to remove the shroud bolts. A larger shroud would drain water away from the bolts. A "clam shell" hinged shroud with one bolt or pin could be an improvement.

10. In both the Kalutara and Vavuniya field test projects extensive maintenance is necessary to keep the Kandy pumps operating. Project staff and users are becoming frustrated with the pump for that reason.

SLIMCO DEEP WELL PUMP

11. The Slimco deep well pump is a locally made cast iron pump with a 100 mm diameter brass cylinder. The design closely resembles the Finnish made NIRA pump. However, it has a major defect which must be remedied before UNICEF will permit it to be field tested: The pump rod is guided through a hole in the cast iron top cover, without a guide bushing and the movable fulcrum is without a stop. This means that the pump handle may be lowered to a position such that it will bend the rod against the guide hole, making further pumping impossible, because of the condition of the rod. The cylinder is too large for deep well operation. A maximum of 75 mm is recommended. UNICEF plan to work with the foundry to improve the pump. I will call on the manufacturer during my next mission to Sri Lanka.

INALSA SUCTION PUMP

12. The Inalsa suction pump is an attractive pump with a cast iron body from which the cylinder is machined, and a mild steel head cover. The pump rod is guided through a brass bushing and the fulcrum stand is movable. Bearings are provided for all three shafts. The absence of an upper guide puts uneven pressure on the guide bushing, mostly the side toward the handle. This feature will be a source of long term problems. Frequent problems have been experienced with pump rod seizure in the bushing, caused by slight misalignment of the head cover over the four bolt holes durning attachment. However, it may be aligned properly by experimentation. The mild steel pump handle is sturdy and convenient to operate. The check valve is a caged poppet. The cast iron cage rusts very quickly, however, imparting a disagreeagble taste to the water.

13. Poor quality leather cup seals have proved to be an important source of pump failure. The cup seals swell to an unacceptable degree and cause piston to seize. The Indian Standards Institute quality standards for leather cup seals specify no more than 5 % increase in volume during prolonged soaking in water. The seals furnished with this pump do not meet that standard. The National Water Supply and Drainage Board are reported to have reacted to the problem by grinding the stock cup seals to a lesser wall thickness. This procedure destroys the grain, or hair side structure of the material, weakening it and drastically reducing its working life.

INALSA INDIA MK II

14. The Inalsa MK II's furnished to the Vavuniya project are not standard Mk II's. They do not have a chain and quadrant with a "pull down" pump rod, rather a crank arrangement with a ball bearing. This causes the pump rod to be displaced laterally through an arc on both sides of the vertical axis of the well. It remains to be seen whether pump rod connectors will develop as a result of metal fatigue at the connectors, as was the history of deep well pumps in India before the advent of the chain and quadrant. Presumably this non-standard design is meant to be used for intermediate lifts up to 25 m.

15. The same problem with piston siezing due to cup seal swelling is reported in the Kalutara project. However, it is more difficult to cope with, since the deep well pump is harder to dismantle and reasemble.

SRI LANKA MK II

16. Examples of a local version of the India Mk II were seen in Vavuniya, apparently copies of the Inalsa non-standard version. Welding quality is uniformly poor. All surfaces are painted, rather than hot-dip galvanised. The bearings are poor quality. No cylinders were examined, but I was told that they are imported from India. GTZ have decided to phase them out of their water supply project. One approach to the quality control problem might be for a donor to finance a consultancy by an Indian manufacturer of the India Mk II to introduce GOSL to adequate quality standards and to train the staff of a local manufacturer. A Sri Lankan agency could then assume the role of enforcement of quality norms.

WASP SUCTION PUMP

17. The Wasp suction pump is a much improved version of the classic Maya cast iron suction pump common throughout the Indian subcontinent. UNICEF/India provided encouragement and technical assistance to the Wasp foundry in Bombay. The castings and machine work are excellent compared to its cousin, the Bangladesh New No. 6 pump. The pump rod operates through a brass movable guide bushing set into a slot in the head cover, closing the top of the pump to debris while allowing the rod to move freely. The fasteners are very robust 5/8 inch galvanised bolts with lock nuts. The cylinder is a brass sleeve inserted into the cast iron pump body. The check valve is a robust poppet type. The cost, however, is three times that of the New No. 6.

18. The stroke of the Wasp pump is very short, about 100 mm maximum, compared to about 125 mm for the No. 6 pump. However, to take advantage of the maximum stroke one must push the handle to an uncomfortably low position, while at the top of the stroke the handle is parallel to the ground. This is because the pump handle is curved excessively, resembling a shepherd's staff. If the pump rod shape were straightened more stroke length would be available within the comfortable range for most people between the knee and slightly above the hip, rather than from the ankle to the knee. For small children the pump handle could be raised to shoulder height and the full body weight could be applied to pumping. With this reservation, the Wasp pump is a commendable effort to improve a pump product which has needed improvement for many years.

SARVODAYA L-4 INTERMEDIATE LIFT PUMP

19. The L-4 pump resulted from several years of experimentation with PVC plastic hand pumps, much of it with IDRC support. It has a 3 inch nominal diameter PVC rising main which is used as the pump cylinder as well. The piston may be withdrawn through the rising main, but the check valve is fixed. The pump stand is unusual: a PVC discharge spout is partially covered from above by a metal cover, allowing the spout to be removed without dismantling the mild steel welded pump stand. The leverage system consists of two automotive universal joints, one used as the fulcrum and the other used as the crank. The cross-shafts, or spider shafts are welded to connect the fulcrum and the crank, forming the short lever arm, and the handle is welded to the rear of the fulcrum spider. Universal joints are known to be tough and are manufactured to a high standard. The problem is that when the hardened spiders are welded, they become brittle. The fulcrum U-joint is attached to the pump stand by means of a flange and two stove bolts. This is a very weak connection which experiences constant stress reversals, causing the connection to loosen, resulting in misalignment of the pump rod. The pump rod is 24 mm PVC pipe with pinned connections. The L-4 is basically a good simple concept that got complicated.

TARA LOW LIFT PUMP

20. Unlike the TARA pumps in Bangladesh, the 50 units supplied to UNICEF and GTZ will not be installed in alluvium, which consolidates around the PVC pipe serving as the cylinder/rising main/casing, they will be placed into large diameter excavated wells or drilled wells at least twice the OD of the PVC rising main. This presents the problem of how to prevent the PVC rising main from shearing at the threaded connection to the 2 1/2 inch nominal diameter galvanised steel pump stand when it is subjected to deflections caused by pumping. Two techniques will be tried: in the relatively shallow excavated wells in Kalutara the rising main will be attached to the concrete rings with galvanised steel wire with rubber protective strips underneath. In Vavuniya excavated wells generally are deepened with a drilled hole in the center of the excavation, preventing attachment to the wall. However, the project has available 5 inch nominal diameter PVC casing pipe used for surface casing. This pipe may be used as a casing pipe extending from the center of the concrete platform to the hard rock hole, supported at the bottom on the rock. The TARA pump rising main will be inserted into the casing with guides to prevent deflections and the rising main will rest on the bottom of the hole. intake ports will be drilled into the rising main about one m above the bottom.

21. Installation of TARA pumps was scheduled to begin late October in Kalutara and November in Vavuniya. Third generation piston, check valves and pump rod connectors are much improved over the second generation parts in the units supplied to Sri Lanka. Since they may be easily retrofitted after the pumps are installed, they should be manufacutred in Bangladesh and sent to the two projects within the next three months.

ANNEX 2

KALUTARA PROJECT SEPTEMBER 1983 REPORT

UNICEF

UNITED NATIONS CHILDREN'S FUND
එක්සත් ජාතීන්ගේ ළමා අරමුදල
ஐக்கிய நாடுகள் சிறுவர் நிதியம்

OFFICE OF THE UNICEF REPRESENTATIVE
IN THE REPUBLICS OF SRI LANKA AND MALDIVES
NOS: 5 & 7, QUEENS AVENUE, COLOMBO 3, SRI LANKA

ADDRESS { FOR CABLES: UNICEF COLOMBO
FOR MAIL: P. O. BOX 143
TEL: 86168, 84204, 587282
589101, 84610

FILE NO: SRI/P/W/3.0.3(b)
OUR REFERENCE: FOR 83 - 22W
YOUR REFERENCE:

BY HAND

14 October 1983

Dear Mr Journey,

Monthly Report data on Kalutara Project

Progress report for the month of September 1983 is presented for the shallow wells project in Horana, including the monitoring data of 47 pumps of various types.

New identification code numbers are adopted here and also the whole data sheets are represented.

Yours sincerely

Aung Chein
UNV
INT/81/SRL/026

Mr Tim Journey
Regional Project Officer (South Asia)
World Bank
Dacca
BANGLADESH

cc: Mr L Fernando, UNDP, Colombo.

ADOPTION OF PUMP IDENTIFICATION CODE NUMBER

Country = SRI LANKA (32)

Project = KALUTARA (2)

Pump Type

a) Mark 11 (India) = 01 (Lift)

b) USAID (Sri Lanka) = 03 (Lift)

c) -do- = 13 (Suction)

d) SIHELASA (Sarvodaya - Sri Lanka) = 04 (Lift)

e) TARA (Bangladesh) = 05 (Lift)

f) L-4 (Sarvodaya - Sri Lanka) = 06 (Lift)

g) INALSA (India) = 17 (Suction)

h) WASP (India) = 18 (Suction)

i) SLIMCO (Sri Lanka) = 19 (Suction)

AC/sm
14.10.83

LIST OF MONITORING DATA SHEETS

(1) Pump 32-2-01 (Mark II):

(a) Form 2 (001 to 008) = 8 nos
(b) Form 3 (002,003[1], 003[2], 004, 005 & 008) = 6 Nos

(2) Pump 32 - 2 -03 (USAID - deep):

(a) Form 2 (001 & 002) = 2 nos.

(3) Pump 32 - 2 13 (USAID - shallow):

(a) Form 2 (001 & 002) = 2 Nos.

(4) Pump 32 - 2 - 04 (Sihelasa):
(a) Form 2 (001 to 003) = 3 Nos

(5) Pump 32-2-06 (L-4):

(a) Form 2 (002 to 004) = 3 Nos

(6) Pump 32 - 2-17 (INalsa)

(a) Form 2 (001 to 004) = 4 Nos
(b) Form 3 (001, 003 & 004) = 3 Nos

(7) Pump 32-2-18 (Wasp)

(a) Form 2 (ool to 025) = 25 Nos
(b) Form 3 (oll & o23) = 2 Nos.

14.10.83
AC:rw

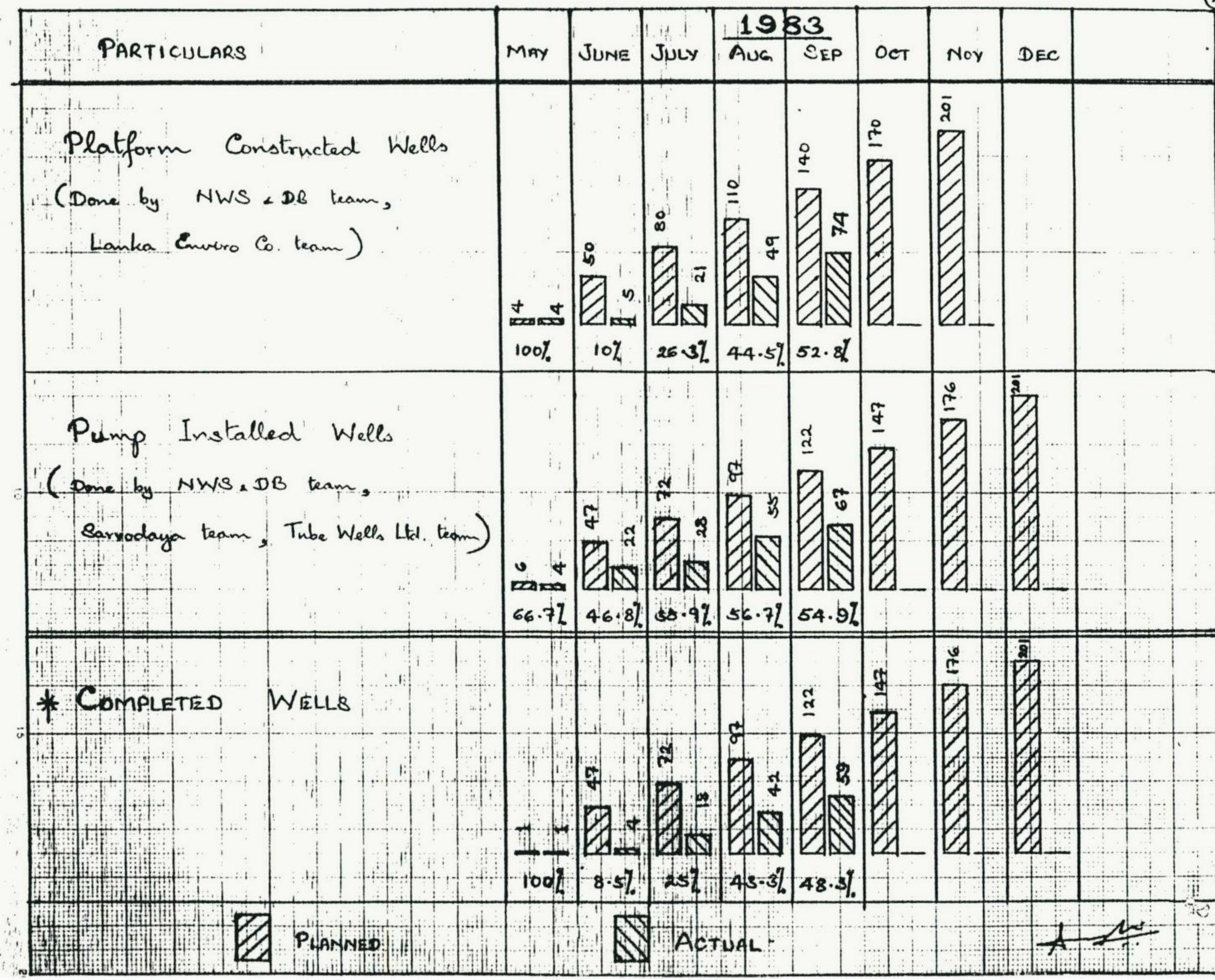
Notable Occurances in September 1983

01.09.83	-	Rehabilitation No.405 tube well in Arunagama by Tube wells Ltd team and small pumps were covered at No.402 & 406.
02.09.83	-	Clean No.401 tube well in Horana
05.09.83	-	Informed of August Progress Report in Horana areas at UNICEF Office
07.09.83	-	Met ACLG's officers at Kalutara and discussed about gravel packing work, half size ring fabrication work.
08.09.83	-	a) Issued 5 USAID (shallow) hadnpumps from the factory. b) Met NWSDB Officers at Ratmalana and discussed about material supply,air compressor and operator, work co-ordination and team programme. c) Constructed 2 handpump pedestal blocks in Bambalapitiya Hindu College, Refugee Camp.
09.09.83	-	Installed 2 'WASP" handpumps in the Refugee camp.
14.09.83	-	Meeting for Scout Camp Training in Horana
16.09.83	-	Met the mission group from UNV headquarters at Horana
19.09.83) to) 23.09.83)	-	Pump caretakers training courses in Horana and Bulathsinghala.
26.09.83	-	Met Sarvodaya team in Horana discussing about L_4 and Sihelasa pumps being installed.
27.09.83	-	Visited DDS project in Kalutara village.
28.09.83	-	Met ACLG's officers at Kalutara discussing about the repairing of vehicles and water pumps, gravel packing work and selected suites.
28.09.83) to) 30.09.83)	-	2 Tube wells were cleaned again by Lanka Enviro Co. Team.

AC:rw
3.10.83
SRI/P/W/3.0.3(b)

PROGRESS OF UNICEF ASSISTED SHALLOW WELLS PROJECT IN HORANA AREA.

PARTICULARS	1983 MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	
Dug and Drilled Wells (Done by Community, Tube Wells Ltd team, Lanka Enviro Co. team.)	145 132 91%	171 153 89·5%	181 165 91·2%	191 171 89·5%	201 161 ← ? 80·1%				
Ring Installed Wells (Dug) (Done by ACLG's team)	50 48 96%	80 60 75%	110 70 68·6%	140 77 55%	170 108 63·5%	190			
Gravel Packed Wells (Dug) (Done by ACLG's team, Community team)	30 26 87%	65 44 67·7%	100 63 63%	135 68 50·4%	170 82 48·2%	190			



1983
PARTICULARS
MAY
JUNE
JULY
AUG.
SEP
OCT
NOV
DEC
Platform Constructed Wells
(Done by NWS & DB team,
Lanka Enviro Co. team)
4
4
50
5
80
21
110
49
140
74
170
201
100%
10%
26.3%
44.5%
52.8%
Pump Installed Wells
(Done by NWS & DB team,
Sarvodaya team, Tube Wells Ltd. team)
6
4
47
22
72
28
97
55
122
67
147
176
201
66.7%
46.8%
38.9%
56.7%
54.9%
* COMPLETED WELLS
1
1
47
4
72
18
97
42
122
59
147
176
201
100%
8.5%
25%
43.3%
48.3%
PLANNED
ACTUAL

SHALLOW WELLS IN HORANA AREAS - KALUTARA			From 1.5.83						To 30.9.83				
	VILLAGE COUNCIL AREA (DIVISION)	SELECTED SITES	DUG WELLS						DRILLED WELLS				
			Excavated	Water Tested	Rings Installed	Gravel Packed	Platform Constructed	Pump Installed	Drilled	Water Tested	Pump Installed	Platform Constructed
1	Horana U.C.Limits (Horana)	4	2	3	2	—	—	—	1	1	1	1
2	Kumbuke Pattuwa (Horana)	17	14	14	13	10	9	8	1	—	1	1
3	Raigama Udugaha Pattuwa (Horana)	34	26	28	22	20	17	12	4	4	4	4
4	Adikari Pattuwa(Bandaragama)	17	11	11	3	1	1	—	4	—	4	4
5	Munwatta West (Bandaragama)	19	16	19	14	8	6	6	—	—	—	—
6	Munwatta East (Bulathsinhala)	16	13	13	13	9	8	8	1	1	1	1
7	Warakagoda(Bulathsinhala)	32	27	30	27	24	16	15	—	—	—	—
8	Wellagampalatha (Bulathsinhala)	22	16	20	14	10	6	7	—	—	—	—
	TOTAL IN TYPES	161	125	138	108	82	63	56	11	6	11	11

DATE 3.10.83 RECORDED BY : [signature] (Sunny Chen) UNICEF - Horana

HAND PUMPS IN SHALLOW WELLS - KALUTARA FROM 1.5.83 TO 30.9.83

	Village Council Area (Division)	Wasp (India)	Inalsa (India)	USAID (SRI LANKA)	Mark II India	Tara (Bangladesh)	L - 4 (Sarvodaya) Sri Lanka	SIHELASA (SARVODAYA) SRI LANKA	INDIAN SMALL PUMP (BY TUBE WELL LTD)	"	TOTAL IN AREA
1	Horana U.C. Limits (Horana)	1	—	—	—	—	—	—	—	=	1
2	Kumbuke Pattuwa (Horana)	2	—	—	3	—	2	2	—	=	9
3	Raigama Udugaha Pattuwa (Horana)	8	2	1	—	—	2	1	2	=	16
4	Adikari Pattuwa (Bandaragama)	1	—	—	3	—	—	—	—	=	4
5	Munwatta West (Bandaragama)	5	1	—	—	—	—	—	—	=	6
6	Munwatta East (Bulathsinhala)	6	—	3	—	—	—	—	—	=	9
7	Warakagoda (Bulathsinhala)	12	1	—	2	—	—	—	—	=	15
8	Wellagampalatha (Bulathsinhala)	7	—	—	—	—	—	—	—	=	7
	Total in Types	42	4	4	8	—	4	3	2	=	67

Date : 1.10.83

Recorded by : [signature] (Aung Chean) . UNICEF - Horana

Progress of Drilled Wells in Horana Area for September 1983

A) Drilled Wells done by Tube Wells Ltd., Mt Lavinia

Well Code	Location	Pumps	Condition
401	Wallipillawa-Horana	WASP($\bar{c}$ screen)	Clean the well on 2.9.83 3.9.83 still hard to operate
402	Ingiriya Jr. School	Samall Pump	Good/casing pipe cover loose
403	Ilambe Model Village	WASP ($\bar{c}$ screen)	Hard to operate/clear water
404	Arunagama I	Sarvodaya L-4	Connecting rod repaired on 26.9.83/Sand blown out
405	-do- II	WASP ($\bar{c}$ screen)	Hard to operate, although clean the well on 1.9.83
406	Wagawatta Jr School	Small Pump	Good/Pump head covered

B) Drilled wells done by Lanka Enviro Co., Panadura

Well Code	Location	Pumps	Condition
407	Aramanagolla	WASP	Good/Clear water
408	Baddegoda-Polhena	Mark II	Good/Clear Water
409	Walgama Jr School	Mark II	Muddy water blown out, therefore cleaned again on 30.9.83
410	Kundelpitiya Junction	Mark II	Sand clogged in cylinders; Therefore cleaned again on 28.9.83
411	Algassalli High School	WASP	Good/Clear Water

AC:rw
SRI/P/W/3.0.0(b)
3.10.83

WORKING SCHEDULE FOR SHALLOW WELLS PROJECT - HORANA

5

OCTOBER - 1983

Assignments		1	2 S	3	4	5	6	7	8	9 S	10	11	12	13	14	15	16 S	17	18	19	20	21 P	22	23 S	24	25	26	27	28	29	30 S	31	Work Done
Excavating Wells (ACLG)		153	149	26	139		108		142	152		21		145		172	116		155		52		134	98		158		162		113	158		11 ?
Rings Installing Team (ACLG)	A								44			79		55		149			175		91					139		142		145			9
	B								43			26		159		54			17		90					52		108		21			9
	C								33			136		56		53			108		96					97		153		152			9 =27
Gravel Packing (ACLG)		101	50	51	141	20	45	146	46	47	33	43	44	132	167	171	114	118	169	136	79	26	53	64	55	56	159	149	104	160	168	59	
Platforms Constructing Team (NWSDB)	P	178			32		50		141			70		81		45			9		38		47			44		33		171			13
	Q	15			154		101		51			77		65		49			60		40		46			48		26		132			13
	R	Plastering																															=26
Pumps Installing Team (NWSDB)	Mark - II																		32	80													2
	Wasp			94	176	141	174	101			70	146	47	156				60			171		169							180		149	14
	USAID			144	76																57		3		51	26	80	136	77	114			10
	Sarvodaya																	Perk	43	44													3
	Slimco																								45	65	154	118				165	5 =34

13.9.83.

LIST OF COPIES OF FORM 2 - SITE INSPECTION REPORT

i) Identification Code: 32-K-WP

a) Combined = 2 sheets

b) 009 & 014 to 033 = 21 sheets

c) Form 3 for 011 = 1 sheet

ii) I D code 32 - K - IN

a) Combined = 1 sheet

b) 004 = 1 sheet

c) Form 3 for 001, 003 and 004 = 3 sheets

iii) I D Code 32 - K- UD

a) 001 & 002 = 2 sheets

iv) I D Code: 32 - K - MII -

a) 001 to 008 = 8 sheets

b) Form 3 for 002 to 005 = 4 sheets

FORM NO. 27 - OCR
(3/82)

INT/81/026

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PAGE 1 OF 3

OFFICIAL DEPT/DIV ABBREVIATION: 61785

MESSAGE NUMBER: 1708

TEST NUMBER (FOR CASHIER'S USE ONLY)

START HERE

MR. LEIF ROSENHALL, INTBAFRAD, BANGKOK. OUR REF. NO. 1550.

RE UNDP INT/81/026 HANDPUMPS PROJECT.

ALPHA. REYR MISC4140 VIA KULESSA

YR PARA AAA AFFIRMATIVE.

YR PARA BBB MY RECOLLECTION IS THAT WE BRAINSTORMED IN TAIYUAN ON 8/17 ON WHAT FOREIGN PUMPS MAY BE SUITABLE FOR TESTING, 12 PUMPS IN ALL INCLUDING THE PETRO WITH A QUESTIONMARK. NO AGREEMENT. WHEN WE LATER FINALIZED THE PUMP LIST WITH CAAMS IN BEIJING WE AGREED ON GETTING AN ADDITIONAL 2 PUMPS FOR LAB TESTING OF EACH TYPE THAT WILL BE FIELD TESTED, EXCEPT FOR THE TREADLE: MARK II, MALDEV, TARA, BLAIR, ROWER, CONSALLEN, KARDIA AND TURNI. WE ARE ORDERING PUMPS ACCORDINGLY. HOWEVER YOU MAY OF COURSE INCLUDE A FEW OTHERS OF SPECIAL INTEREST IN THE LAB TESTING, SUBJECT TO THE BUDGET CONSTRAINT.

YR PARA CCC THERE SEEMS LITTLE USE IN TESTING THE BLAIRS IN 2 LABS. CHANGSHA SHOULD BE ABLE TO GO UP TO 10-12 M SWL FOR THE MAXIMUM LIKELY DEPTH OF THE BLAIR.

YR PARA DDD THE RESERVATION EXPRESSED IN OUR 1419 WAS BECAUSE OF SUSPECTED PERFORMANCE PROBLEMS AND NOT FOR BUDGET REASONS. SINCE RECEIVING YOUR TLX EYE CHECKED WITH KEN MILLS AND GOT A

END OF TEXT

PINK AREA TO BE LEFT BLANK AT ALL TIMES

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START HERE

TENTATIVELY FAVOURABLE UNOFFICIAL VERDICT FROM HIM ON THE PREUSSAGS AND THE CONSALLEN. WE SHALL THEREFORE PROCEED WITH ORDERING THE 2 PREUSSAGS, THE CONSALLEN AND THE TREADLE. PLS FULLY EXPLAIN TO CAAMS AND UNDP OUR RESERVATIONS ABOUT THE PERFORMANCE OF THESE PUMPS, AND THE RISKS THEY TAKE. WE SHALL INCREASE THE CONSALLEN FOR SHANXI FROM 7 TO 10 AND ADD A CONDITION THAT CATR WILL INSPECT THE CONSALLENS IN U.K. BEFORE SHIPPING.

YR PARA EEE TWO PUMPS EACH FOR LAB TESTING AND TWO EACH AS SPARES IN PLACE OF ORDERING UNCOMMON REPLACEMENT PARTS. THE 2 SPARES COULD BE INSTALLED LATER IF NOT USED FOR SALVAGE. SEE OUR 1419 PARA EEE.

BETA REYR BAN1398. WATER MONITORS FROM CATR COST ABOUT POUNDS 40 FOR THE FIRST BATCH. CATR IS CURRENTLY NEGOTIATING A PRICE FOR MORE PRODUCTION WITH MANUFACTURER. WILL INFORM YOU WHEN AGREEMENT REACHED.

GAMMA. JUST RECEIVED YOUR MISC4195 VIA KULESSA. GLAD YOU HAD A SUCCESSFUL MISSION IN SPITE OF LONG TRAIN RIDES. WILL RESPOND ASAP

END OF TEXT

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CLASS OF SERVICE: TELEX | TELEX NO.: 788 82817 | DATE: DEC. 1, 1983

SUBJECT: INT/81/026

DRAFTED BY: GTschannerl:slj GT

EXTENSION: 61785

CLEARANCES AND COPY DISTRIBUTION:

cc: Ms. del Castillo (WUD)
Mr. Gross (WUD).

AUTHORIZED BY (Name and Signature): S. Arlosoroff S. Arl

DEPARTMENT: WUD

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PAGE 3 OF 3

OFFICIAL DEPT/DIV ABBREVIATION: 61785

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BUT MEANWHILE PLS RETRANSMIT PARAS BBB AND FFF. ALSO REPEAT PRICE AND CURRENCY OF TOYOTA CIF TIENJIN.

DELTA. PLS GIVE US KYAW NYUNT'S DATE OF ARRIVAL IN MANILA. WE HOPE ALL IS WELL WITH YOU AND YOUR FAMILY IN BANGKOK AND LOOK FORWARD TO SEEING YOU IN JANUARY.

REGARDS, TSCHANNERL/ARLOSOROFF, INTBAFRAD.

END OF TEXT

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SUBJECT:

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File Title	Barcode No.
UNDP/INT/81/026 - Rural Water Supply Handpumps Project - Fields, Trials and Technology Development Project - 1981 / 1983 Correspondence - Volume 17	30192462

Document Date	Document Type
December 1, 1983	Memorandum

Correspondents / Participants
To: Mr. Temesgien Gobena, PMD

Subject / Title
Contract with Cole and Company Ltd. UNDP Project INT/81/026

Exception(s)
Personal Information

Additional Comments

The item(s) identified above has/have been removed in accordance with The World Bank Policy on Access to Information. This Policy can be found on the World Bank Access to Information website.

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1	2	WUD/UNDP		

START HERE

WORLD WATER, LIVERPOOL 3, ENGLAND. ATTENTION APPLETON. OUR REF. NO. 1547. RE INT/81/026 HANDPUMPS PROJECT. FOLLOWING IS MY LETTER IN RESPONSE TO MR. S.S. WILSON'S ARTICLE ON HAND-OPERATED VS. FOOT-OPERATED PUMPS. SIR -- AAA MR. WILSON'S PREFERENCE FOR FOOT-OPERATED PUMPS IS UNDERSTANDABLE IF WE CONSIDER AN APPLICATION TOWARDS SUSTAINED PUMPING FOR IRRIGATION OR PUMPING BY ONE PERSON TO A STORAGE TANK. BBB HOWEVER HE FAILS TO APPRECIATE THE CON-VENIENCE OF THE SIMPLE HANDPUMP AND THE SIMPLICITY OF DESIGN IT ALLOWS. VILLAGE PEOPLE REQUIRE A QUANTITY OF WATER TO FILL A POT, RANGING FROM FOUR TO FIVE LITERS TO POSSIBLY FIFTEEN OR TWENTY. EACH PERSON OPERATES THE PUMP FOR A FEW MINUTES. THE STANDARD LEVER RECIPROCATING PUMP, MATCHED TO THE WATER TABLE IN MECHANICAL ADVANTAGE, REQUIRES A FEW STROKES TO WASH THE CONTAINER, WITH A FURTHER FORTY STROKES TO FILL THE CONTAINER. MR. WILSON IS SUG-GESTING THAT STANDING ON ONE LEG, MAINTAINING BALANCE, AND PUMPING WITH THE OTHER IS AN ADVANTAGE? OR TO COUPLE A BICYCLE TO THE PUMP WOULD BE AN ADVANTAGE? THE BICYCLE IS NOT REALLY DESIGNED FOR CONTINUAL OPERATION, NOT TO MENTION THE POINT THAT STANDARD PARTS WOULD BE SUBJECTED TO PILFERAGE IN A VILLAGE. I DO NOT THINK IT IS VERY REALISTIC TO SUGGEST THE ADJUSTMENT OF THE SEAT SO THAT THE VARIOUS USERS, FROM SMALL CHILDREN TO A 7-FOOT MASI COULD BE

END OF TEXT

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COMFORTABLE WHILE USING THE PUMP FOR ONE OR TWO MINUTES. CCC NO DOUBT AS MR. WILSON SUGGESTS, IN THE DEVELOPMENT OF MANUAL PUMPING THROUGH HISTORY, LEG POWER HAS BEEN UTILIZED WHERE SUSTAINED OPERATION AND MAXIMUM QUANTITY, USUALLY LOW LIFT, IS REQUIRED.
IN THE PERSONAL NEED FOR DRINKING WATER ONLY, THERE IS A PREFERENCE THROUGH HISTORY FOR THE HANDPUMP, SIMPLY BECAUSE OF ITS EASE OF OPERATION THROUGH A MECHANICAL ADVANTAGE. IT ALSO DELIVERS ENOUGH WATER IN ONE MINUTE TO MEET THE BASIC NEEDS FOR ONE DAY.
DDD WE KNOW HOW TO RAISE WATER AND WE CAN DO IT WITH AN ACCEPTABLE AMOUNT OF EFFORT. IF FOOT OPERATION CAN BE AN ADVANTAGE TOWARDS (1) SIMPLICITY IN MAINTENANCE, (2) DURABILITY, (3) EFFICIENCY, AND (4) COST, THEN IT SHOULD BE INVESTIGATED; HOWEVER, I FEEL THAT THE EASE OF OPERATION HAS GENERALLY BEEN ACHIEVED THROUGH HANDPUMP DEVELOPMENT. OUR PRIORITY IS SIMPLICITY AND DURABILITY OF THE UNDERGROUND EQUIPMENT, NOT IN THE DEVELOPMENT OF A DIFFERENT METHOD TO MAKE IT FUNCTION. REGARDS, SAUL ARLOSOROFF, CHIEF, APPLIED RESEARCH & TECHNOLOGY DIVISION, WATER SUPPLY & URBAN DEVE-LOPMENT DEPT, WORLD BANK (UNDP PROJECTS MANAGER, INT/81/026, GLO/80/004, INT/82/002)

END OF TEXT

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CLASS OF SERVICE: TELEX | TELEX NO.: 628761 | DATE: 11/30/83

SUBJECT: INT/81/026

DRAFTED BY: S. Arlosoroff:kb SA

EXTENSION: 61790

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PAGE 1 OF 2

OFFICIAL DEPT/DIV ABBREVIATION 61785

MESSAGE NUMBER

TEST NUMBER (FOR CASHIER'S USE ONLY)

START HERE

MR. KEN MILLS, CATR, ENGLAND. OUR REF. NO. 1541. RE INT/81/026 HANDPUMPS.

RECEIVED THE FOLLOWING TELEX FROM JOURNEY, FORWARDED HERE FOR YOUR INFORMATION QUOTE FOR ARLOSOROFF RE PROPOSED ODA/WB FINANCED CATR RESEARCH.AAA RE PLASTIC DOWN-WELL COMPONENTS, EYE ENDORSE IDEA, BUT BANGLADESH NOT APPROPRIATE FIELD TEST SITE, BECAUSE OF LOW LIFT HEADS. SUGGEST INDIA PROJECT, PERHAPS SRI LANKA, BUT NOT VERY DEEP THERE. FORTY TOO MANY IN ANY CASE. SUGGEST MAXIMUM 20. BBB. RE ACETAL AND OTHER POLYMER JOURNAL BEARINGS, WOULD LIKE TO INSTALL IN INDIA MK II TEST SAMPLE OF ABOUT 30 ON STANDARD PUMPS. KEN GRAY, KEN MCLEOD, MUDGAL CONCUR.

CCC. RE LIGHT WEIGHT PUMP RODS, PROPOSAL COMPLETELY MISSES POINT. DOUBLE ACTION IS PERIPHERAL CONCERN. FOR LOW LIFT PUMP APPLICATION ALL EYE NEED TO KNOW IS FATIGUE RESISTANCE. WAVIN WILL TAKE CARE OF THAT. MAJOR INTEREST IS FOR DEEP WELL PUMPS. ISSUES ARE EASE OF EXTRACTION, REDUCTION OF NET LIFTING FORCE PER CYCLE. BOTH HAVE MAINTENANCE IMPROVEMENT IMPLICATIONS, SHORT TERM AND LONG TERM RESPECTIVELY. HOWEVER, DYNAMICS NEED TO BE DESCRIBED, AFTER WHICH OPTIMAL GEOMETRY, MATERIALS AND WEIGHT CAN BE CHOSEN BASED ON EVIDENCE. EXPERIMENTS MAY BE CARRIED OUT ON TEST WELL,

END OF TEXT

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PAGE 2 OF 2 | OFFICIAL DEPT/DIV ABBREVIATION: 61785 | MESSAGE NUMBER: | TEST NUMBER (FOR CASHIER'S USE ONLY):

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NOT SIMULATED HEAD RIG. FORCE/DISPLACEMENT DIAGRAMS WILL INDICATE WHICH DESIGNS FAVORABLE. EQUIPMENT IN PLACE ALREADY, SO SHOULD BE INEXPENSIVE. PLS REFER MY PREVIOUS CORRESPONDENCE ON SUBJECT.

UNQUOTE.

REGARDS, TSCHANNERL/ARLOSOROFF, INTBAFRAD.

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CLASS OF SERVICE: TELEX | TELEX NO.: 826619 CALAB G | DATE: NOV. 29, 1983

SUBJECT: INT/81/026

DRAFTED BY: GTschannerl:slj GT

EXTENSION: 61785

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INT/81/026

November 29, 1983

Mr. I. Ahman
Global Promotion and Cooperation
for Water Supply & Sanitation
World Health Organization
1211 Geneva 27
Switzerland

Your Ref: W2/374/21

Dear Mr. Ahman:

Handpump Cost Analysis

Thank you very much indeed for your helpful letter and enclosures of November 4 to Mr. Burnett.

We greatly appreciate the efforts to which you have gone to unearth such data as do exist within WHO which could be helpful to the work our economists are carrying out. We are honored that you could take the time from your busy schedule as Decade Coordinator to provide this support to UNDP/World Bank Rural Water Supply Handpumps Project INT/81/026.

We are now beginning to prepare an interim report based on the necessarily incomplete data that we have managed to locate. This should be completed during the first half of 1984 and we will of course ensure that you receive a copy.

Thank you once again. I look forward to our continued cooperation.

Sincerely,

S. Arlosoroff
Applied Research and Technology Division, WUD
UNDP Projects Manager, INT/81/026, GLO/80/004, INT/82/002

Copies: Mr. W. Mashler (UNDP, NY)
Mr. B.M. Dieterich (WHO, Geneva)

SA/NB:slj

FORM NO. 27 - OCR (3/82)

INT/81/026

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F-338

(F)

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PAGE	OF	OFFICIAL DEPT/DIV ABBREVIATION	MESSAGE NUMBER	TEST NUMBER (FOR CASHIER'S USE ONLY)
		61785		

START HERE

BOOK OF FOUR

(1) MR. FENG, CAAMS
VIA MR. KULESSA
UNDP RES REP
716
BEIJING, PRC (TELEX NO. 22314 DPBJG CN)

(2) MR. KNIPSHIELD
BMZ, BONN
FEDERAL REPUBLIC OF GERMANY
841
(TELEX BMZ 886 9452)

(3) MR. KRESSE,GTZ
FRANKFURT
FEDERAL REPUBLIC OF GERMANY
841
(TELEX 415 230 GTZ)

(4) MR. ROSENHALL
VIA MR. KULESSA
UNDP RES REP
716
BEIJING, PRC (TELEX NO. 22314 DPBJG CN)

END OF TEXT

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OFFICIAL DEPT/DIV ABBREVIATION: 61785

MESSAGE NUMBER:

TEST NUMBER (FOR CASHIER'S USE ONLY):

MR. FENG, CAAMS, VIA KULESSA UNDEVPRO BEIJING, INFO KNIPSHIELD, BMZ; KRESSE GTZ; AND ROSENHALL VIA KULESSA, BEIJING. OUR REF. NO.1537. RE UNDP INT/81/026 HANDPUMPS PROJECT.

ALPHA. MANY THANKS FOR MR. YAO YUN'S LETTER OF NOVEMBER 1, AND ENCLOSED HANDPUMPS SURVEY REPORT. WE SHALL NOW FINALIZE THE ENGLISH VERSION AND DISTRIBUTE IT. IT IS AN INTERESTING REPORT.

BETA. FOLLOWING IS THE PROPOSED PROGRAM FOR THE HANDPUMPS WORKSHOP IN CHINA THAT WAS REQUESTED:

AAA. SEVERAL EXPERTS WHOM WE WOULD LIKE TO INVITE HAVE ASKED THAT THE WORKSHOP BE HELD SLIGHTLY LATER. WE NOW PROPOSE TO HOLD THE MEETINGS FROM AUGUST 13 TO AUGUST 30.

BBB. PROPOSED PROGRAM AS FOLLOWS, BASED ON OUR INITIAL OUTLINE IN THE LETTER TO YOU OF OCTOBER 24. SOME REVISIONS MAY BE NECESSARY ONCE THE PLACE FOR THE WORKSHOP HAS BEEN DECIDED.

AUGUST 10, 11, 12 ARRIVAL OF PARTICIPANTS AND SIGHTSEEING/CULTURAL VISITS IN BEIJING.

WORKSHOP TITLE: HANDPUMP APPLICATIONS FOR RURAL WATER SUPPLY (STATE OF THE ART AND PROGRESS)

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AUGUST 13: (1) OFFICIAL OPENING SESSION: SPEECHES BY AUTHORITIES FROM CHINA, FEDERAL REPUBLIC OF GERMANY AND UNDP.

(2) INTRODUCTION TO RURAL WATER SUPPLY AND HANDPUMPS IN CHINA (MINISTRY, CAAMS, CPHC).

AUGUST 14 - 17: PRESENTATIONS AND DISCUSSIONS ON THE GLOBAL SITUATION PRESENTED BY INT/81/026 REGIONAL PROJECT OFFICERS, ADVISORY PANEL MEMBERS AND OTHER EXPERTS, WHICH INCLUDES INVITED COUNTRY REPRESENTATIVES. EVENING OF CLOSING AUGUST 17: POSSIBLE CLOSING SESSION OF THE FIRST PART OF THE MEETING. ALTERNATE POSSIBILITY - CLOSING SESSION AFTER COMPLETION OF FIELD VISITS AND SITE DISCUSSIONS.

AUGUST 18 AND 19: CULTURAL VISITS.

AUGUST 20 AND 21: FIELD VISIT TO WELLS, HANDPUMPS AND SELECTED BRIGADES IN CHANGSHA AND WANGCHENG COUNTY AND TO PRESENT AND PROSPECTIVE HANDPUMP AND DRILLING RIG

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(3/82)

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	MANUFACTURERS IN THE NEIGHBOURHOOD.
AUGUST 22:	DEPARTURE OF MOST WORKSHOP PARTICIPANTS.

X

ADVISORY PANEL AND PROJECT MANAGEMENT MEETINGS.

AUGUST 22 AND 23:	ADVISORY PANEL MEETING (PROPOSED SITE - HANGZHOU OR SUZHOU) TO REVIEW THE GLOBAL PERFORMANCE AND THE FUTURE WORKPLAN OF THE UNDP HANDPUMPS PROJECT. PARTICIPANTS (ABOUT 18 PEOPLE) WILL BE THE ADVISORY PANEL MEMBERS AND SENIOR STAFF OF THE PROJECT. OBSERVERS FROM PRC ARE WELCOME TO ATTEND ON AUGUST 22, BUT AUGUST 23 WILL BE A CLOSED SESSION, AS IN ALL PAST SESSIONS OF THE PANEL.
AUGUST 24:	PROJECT MANAGEMENT MEETING, LIMITED TO SENIOR STAFF OF THE PROJECT.
AUGUST 25 AND 26:	CULTURAL VISITS IN HANGZHOU AND FOR WUXI AND SUZHOU.

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AUGUST 27 AND 28: SHANGHAI: VISITS TO INDUSTRIES AND OTHER SITES OF PROFESSIONAL INTEREST, INCLUDING HANDPUMP MANUFACTURERS, FOR PROJECT SENIOR STAFF AND INTERESTED MEMBERS OF THE ADVISORY PANEL.

AUGUST 29: DEPARTURE (FROM SHANGHAI).

CCC. MEETING PLACE:

(1) WORKSHOP OF AUGUST 13-17 EITHER IN BEIJING OR CHANGSHA. AIRCONDITIONED MEETING ROOM FOR 70-80 PARTICIPANTS REQUIRED, PERHAPS UP TO 100 ON OPENING DAY. LANGUAGES TO BE CHINESE AND ENGLISH WITH SIMULTANEOUS INTERPRETATION. SEATING ALONG U-SHAPE TABLES WITH 2ND ROW BEHIND IT ALONG WALLS OF ROOM.

(2) ADVISORY PANEL AND PROJECT MANAGEMENT MEETINGS AUGUST 22 - 24 IN HANGZHOU OR SUZHOU (OR WUXI OR SHANGHAI). AIR-CONDITIONED MEETING ROOM FOR 20 PARTI-CIPANTS PLUS ABOUT 10 OBSERVERS.

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THESE MEETINGS TO BE HELD ONLY IN ENGLISH. SEATING ARRANGEMENT TO BE A U-SHAPED OR SQUARE TABLE LAYOUT, WITH OBSERVERS SEATED ON AUGUST 22 ALONG THE WALLS AND AT THE BACK. NO NEED FOR SIMULTANEOUS TRANSLATION.

(3) NO SITE VISITS ARE SUGGESTED FOR JINCHENG COUNTY, BECAUSE OF LOGISTICS AND TIME.

(4) MEETING ROOMS TO HAVE AN OVERHEAD PROJECTOR AND A SLIDE PROJECTOR.

DDD. WE LOOK FORWARD TO YOUR REACTION AND SUGGESTIONS. SINCE MANY OF OUR ASSOCIATES ARE ALREADY NOW MAKING PLANS FOR THE SUMMER OF 1984, WE WOULD BE VERY GRATEFUL FOR YOU TO SEND US THE MINISTRY'S APPROVAL OF THE DATES BY TELEX AS SOON AS POSSIBLE. PROGRAM DETAILS CAN THEN BE WORKED OUT MUTUALLY IN DUE COURSE.

REGARDS, ARLOSOROFF, INTBAFRAD.

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TELEX NO.:

DATE: Nov. 28, 1983

SUBJECT: INT/81/026

DRAFTED BY: GTschannerl:slj GT

EXTENSION: 61785

CLEARANCES AND COPY DISTRIBUTION:

cc: Messrs. Potashnik (UNDP,NY)
Beyer (UNICEF, NY),
Cohen (WUD)

AUTHORIZED BY (Name and Signature): S. Arlosoroff S. Arlosoroff

DEPARTMENT: WUD

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WHEN REPLYING TO THIS MESSAGE REFER TO : TCP MC
MR. ARLOSOROFF AEADF

November 23, 1983

2231
22314 DPBJG CN

64145 WORLDBANK
WASHINGTONDC
MISC 4140 ARLOSOROFF FROM ROSENHALL REMYTEL 16 NOVEMBER AND MY
BOR PAGE 15-19.
AAA EYE ASSUME UNV SALARY WILL BE COVERED BY BUDGET POST
EXPATRIATE EXPERT USDLRS75,000.
BBB THE CHINESE ARE FOLLOWING AGREEMENT STRICTLY AND HAVE
PROPOSE12 PUMP MODELS TO BE TESTED IN LABORATORY. YOUR TELEX
1419 24 OCTOBER SUGGESTS FOUR PUMP MODELS OF FOREIGN ORIGIN TO
BE LABORATORY TESTED ALTHOUTH AGREEMENT STIPULATES 11 MODELS.
CAAMS NOT VERY HAPPY AND WANT AT LEAST TWO EACH OF CONSALLEN
PREUSSAG KARDIA, PREUSSAG TURNI TO BE TESTED IN BEIJING AND TWO
ROWER TO BE TESTED IN CHANGSHA.
CCC ONLY SUCTION PUMPS CAN BE LABORATORY TESTED IN CHANGSHA. TH
EREFORE 3 OUT OF 4 MODELS IN YOUR TELEX 1419 MUST BE TESTED
IN BEIJING. THE BLAIRS WILL BE TESTED IN BEIJING AND CHANGSHA.
DDD EYE UNDERSTAND YOUR REASONS TO KEEP DOWN TOTAL NUMBER
OF PUMPS BUT SINCE ALSO NUMBER OF MALDEV AND CONSALLEN TO B
E
FIELD TESTED IN SHANXI PROVINCE HAVE BEEN REDUCED IN YOUR
TELEX 1419 EYE RECOMMEND TO HAVE CONSALLEN, PREUSSAG AND ROWER
TESTED IN LABORATORY.
EEE ALSO SUGGEST WE TEST IN LABORATORY TWO EACH OF MARK
II,MALDEV, TARA AND NOT FOUR EACH AS SUGGESTED YOUR 1419
THEREBY ALLOWING BUDGETROOM FOR MORE PUMPS MODELS.
FFF CONSTRUCTION OF BEIJING LABORATORY WILL BE DELAYED AT
LEAST WITH THREE MONTHS SINCE NO CONSTRUCTION CREWS AVAILABLE
DURING WINTERTIME.
GGG EVERYTHING UNDER CONTROL HERE. LEAVING FOR JINCHENG
BY TRAIN TONIGHT. REGARDS.
(KULESSA UNDEVPRO BEIJING
COL 64145 4140 16 15-19 USDLR75,000 12 1419 24 11 3 4 1419
1419 1419

059214 0733 231183 05150057 0728
01890189 247

=11230855

NNNN

INT/81/026

November 28, 1983

Mr. Luis M. Gomez
DTCD
One United Nations Plaza
Room DC-11326
New York, New York 10017

Dear Mr. Gomez:

Re: UNDP INT/81/026 Handpumps Project

Following our telephone conversation last week I am sending you the draft of the summary on the Malawi groundwater experience. We are currently awaiting the comments and clearance from the Malawi Government. Your comments will be most welcome. The final version will contain full references and acknowledgements of the Malawi meeting.

Yours,

Gerhard Tschannerl
Senior Project Officer
Applied Research & Technology Div., WUD

Enc.

cc: Messrs. S. Arlosoroff (WUD),
D. Grey (WB/Nairobi)

INT/81/026

Gerhard Tschannerl, Senior Project Officer (WUD)

November 23, 1983

Saul Arlosoroff, Projects Manager (WUD) SAM

Terms of Reference - December 6-8, 1983

1. On or about December 6 you will visit GSW, a handpump manufacturer in Fergus, Ontario, to brief them on INT/81/026, assess their manufacturing capabilities, assess their likely responsiveness to improving their handpump designs, and to discuss with them the inclusion of their pumps in the laboratory and/or field trials.

2. On December 7 and 8 you will attend a review meeting at the offices of the national Film Board of Canada, in Montreal. The film sequences shot in Asia and some of those shot in Africa will be shown. You will be accompanied by other Bank staff and by two Cole and Company consultants. While in Montreal you will also visit the manufacturer of the PEK handpump.

3. You will submit to me a report on the meetings, including your impressions about the technical quality and the suitability of the sequences within two weeks of your return to Washington.

cc: Messrs. Cohen, Middleton, Freedman, Ramuglia, Burnett (WUD)
Ms. Obeng, del Castillo (WUD)

GT:slj

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OFFICIAL DEPT/DIV ABBREVIATION 61790

MESSAGE NUMBER 1713

TEST NUMBER (FOR CASHIER'S USE ONLY)

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LANGENEGGER, INTBAFRAD, ABIDJAN, IVORY COAST. OUR TELEX NO. 1533. YOU ARE AUTHORIZED TO PROCEED ON MISSION ON OR ABOUT NOVEMBER 28 TO UPPER VOLTA, ON OR ABOUT DECEMBER 3 TO MALI, ON OR ABOUT DECEMBER 7 BACK TO IVORY COAST. IF CANNOT BE ARRANGED OTHERWISE TO PROCEED TO ACCRA, GHANA ON OR ABOUT DECEMBER 12 FOR THREE TO FIVE DAYS. ARLOSOROFF, INTBAFRAD

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CLASS OF SERVICE: telex | TELEX NO.: 969-3533 | DATE: NOV.23,1983

SUBJECT: INT/81/026

DRAFTED BY: SARLOSOROFF:PHM

EXTENSION: 61790

CLEARANCES AND COPY DISTRIBUTION:

cc: Messrs. G. Tscahnnerl
K. Bryan
Ms. C. del Castillo

AUTHORIZED BY (Name and Signature): S.ARLOSOROFF S.A.

DEPARTMENT: WUD

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TO MR. L. ROSENHALL, VIA MR. KULESSA, UNDEVPRO, BEIJING.

OUR REF. NO. 1519. RE UNDP INT/81/026 HANDPUMPS PROJECT.

AAA. RECEIVED THE FOLLOWING TWO TELEXES FROM WHITE, UNV GENEVA QUOTE GEN11326 KULESSA NFO EN11327 TSCHANNERL/ARLOSOROFF INT/81/026 KYAW MYINT RECONFIRMED AVAILABILITY INT/CPR/V/061 BUT REQUIRES MINIMUM SIX TO EIGHT WEEKS PROCESS DEPARTURE FORMALITIES. AWAITING FINALIZED BLUE SHEET. UNQUOTE.

BBB. SECOND TELEX FROM WHITE QUOTE GEN11356 TSCHANNERL/ARLOSOROFF INFO GEN11357 MCGRATH INFO GEN11358 KULESSA INFO GEN11359 PRATTLEY FOR KUN CHETPAN C/O HEALTH DEPT VIA SMITH INT/81/026 YRCAB 16 NOV CROSSED WITH OUR GEN 11327 BRIEFING EARLY WEEK DEC BANGKOK NOT FEASIBLE. GRATEFUL REARRANGE SCHEDULE AFTER WE ADVISE YOU KYAW MYINT DEPARTURE FORMALITIES COMPLETED. FOR DESSAU YT OT912 PLEASE NOTE IBRD REQUESTING KYAW MYINT UNDERGO ONE WEEK FIELD ORIENTED TRAINING THAILAND FAMILIARISE HIMSELF TECHNOLOGY, UTILIZATION TESTING HANDPUMPS (ESPECIALLY DEEPSET HANDPUMPS AND UTILIZATION PLASTIC COMPONENTS WHICH NO GENERALLY KNOWN IN CHINA) EN ROUTE CHINA. WILL REVERT WITH INSTRUCTIONS ARRANGE A BRIEFING.UNQUOTE.

CCC. THE SECOND TELEX IS PRESUMABLY IN RESPONSE TO OUR NO. 1500 TO CHETPAN OF 11/16 COPIED TO YOU VIA KULESSA. NO RESPONSE FROM

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BANGKOK AS YET.

DDD. REYR MISC4077 VIA KULESSA. BANGLADESH IS EXCLUDED BECAUSE BURMESE PASSPORTS ARE NOT ENDORSED FOR BANGLADESH. NOT MUCH TO SEE FOR MYINT YET IN INDIA AND PHILIPPINES, AND WE WOULD HAVE LOGISTICAL PROBLEMS FOR HIM THERE. THIS LEAVES THAILAND. HIS SALARY IS INCLUDED IN THE BUDGET ITEM B4I AND II. WAS ORIGINALLY FOR AN EXPATRIATE EXPERT AND THAN CHANGED TO A UNV AS CHINA AGREED TO TAKE A UNV FOR MONITORING. ALL COSTS FOR THE UNV SHOULD BE PAID OUT OF THESE TWO ITEMS.

EEE. EYE AM POUCHING TO KULESSA DRAFT OF THE BLUE SHEET FOR MYINT.

REGARDS, TSCHANNERL/ARLOSOROFF, INTBAFRAD.

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SUBJECT: INT/81/026

DRAFTED BY: GTschannerl:slj GT

EXTENSION: 61785

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cc: Ms. Del Castillo (WUD)

AUTHORIZED BY (Name and Signature): S. Arlosoroff S. Arlt

DEPARTMENT: WUD

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MESSAGE NUMBER: 1673

TEST NUMBER (FOR CASHIER'S USE ONLY):

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ROSENHALL, INTBAFRAD, BANGKOK, THAILAND. OUR TELEX NO. 1528.
RE INT/81/026 YOUR LETTER WUD/060/83 OF OCTOBER 28. AAA THANKS FOR YOUR DRAFT BUDGET PLAN. BBB PLEASE REVISE AND BRING CHINA BUDGET WITH YOU WHEN YOU COME TO WASHINGTON. CCC WE HAVE THE DETAILS OF THE ADMINISTRATIVE COSTS IN BANGKOK. THERE IS NO NEED TO SEND THEM UNLESS WE ASK YOU FOR MISSING DETAILS. DDD WE NEED TO KNOW FOR THE THREE COUNTRIES AND FOR PNG TRAVEL COSTS ETC. FOR THE UNV AND COUNTRY MONITORING THAT ARE NOT COVERED BY THE REGULAR UNV AGREEMENT (EQUIPMENT AND INTERNAL TRAVEL). EEE WE SHALL INFORM YOU RE PUMP COSTS AS WE GET THEM FROM THE MANUFACTURERS TO INCLUDE INSURANCE AND SHIPMENT UP TO THE PORT IN EACH COUNTRY. THE EXECUTING AGENCY AND OR UNDP WILL HAVE TO DEAL WITH THE CUSTOMS RELEASE AND TRANSPORT TO THE STORAGE SITE OF THE PROJECT. FFF COULD YOU PLEASE CLARIFY A FEW POINTS. ALPHA WE FEEL YOUR FIGURES ARE INFLATED. (THIS MAY BE STILL AN INERTIA FROM SIDA AND UNICEF.) FOR EXAMPLE FOUR MAN WEEKS OF CONSULTANCY IN THAILAND - 18,000 US DOLLARS? THE SAME IN CHINA, PHILIPPINES AND PNG. WE SHALL TRY TO USE ONE MISSION FOR MORE THAN ONE COUNTRY TO SAVE ON TRAVEL AND TIME COSTS. BETA CHINA CONSULTANTS. THIS WILL BE PART OF OUR REVISION IN WASHINGTON. THE U.K. PLUS FRG COSTS ARE HIGHER THAN EXPECTED. IT WILL HAVE TO BE REDUCED

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FROM OTHER BUDGET LINES. AUGUST MEETING WILL COST MORE THAN EXPECTED. AGAIN WE SHALL HAVE TO DEDUCT FROM BUDGET LINE 50 AND OTHERS. GAMMA RPO TRAVEL. FOR YOUR INFORMATION OUR TOTAL ANNUAL BUDGET FOR TRAVEL FOR THE WHOLE TEAM - RPO'S, GERHARD, TONY, NICK AND MYSELF FOR 1983 WAS 80,000 DOLLARS AND FOR 1984 WILL BE 100,000 DOLLARS. MALAYSIA, SINGAPORE AND KOREA MAY HAVE TO BE TAKEN OUT. CHINA, PHILIPPINES, PNG CONFIRMED. DELTA EQUIPMENT (BUDGET LINE 40). 111 I DOUBT IF PUMPS WILL BE PAID IN 1983. PROCEDURE IS TOO COMPLEX TO BE COMPLETED IN 1983. ADDITIONAL PUMPS (?) MAY NOT BE NEEDED. COMPUTER - GERHARD ALREADY TELEXED YOU. NOTHING SHOULD BE BOUGHT AT TOKYO AIRPORT. PROCUREMENT MUST BE DONE IN AN ORDERLY MANNER THROUGH PROCUREMENT IN RESIDENT MISSION OR WASHINGTON AND NOT USING TRAVEL FUNDS. I BELIEVE THE EXPECTED EXPENDITURE ON THIS BUDGET LINE WILL BE 5,000 TO 7,0000 DOLLARS EXCLUDING PUMPS. EPSILLON. MISCELLANEOUS (BUDGET LINE 50). MOST OF THE ITEMS YOU INDICATE SHOULD BE CHARGED TO TRAVEL AND OFFICE EXPENSES. THE REST CONFIRMED. I DON'T WANT TO SOUND PETTY HOWEVER. I DON'T THINK BUYING A CAMERA FROM PROJECT FUNDS IS GOOD PRACTICE. CAMERAS HAVE A STRANGE TENDENCY TO GET LOST. THIS IS FOR YOUR DECISION. PROCUREMENT IS CONFIRMED OF REGULAR, SIMPLE CAMERA

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PAGE 3 OF 3 | OFFICIAL DEPT/DIV ABBREVIATION 61790 | MESSAGE NUMBER | TEST NUMBER (FOR CASHIER'S USE ONLY)

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(50 TO 60 DOLLARS IN NEW YORK FOR EXAMPLE). GGG THANKS FOR DRAFT BUDGET FOR FY 85 (JULY 1, 1984 TO JUNE 30, 1985). AS YOU REALIZE FROM OUR ATTITUDE TO YOUR PROPOSED BUDGET FOR JANUARY 1, 1984 TO JUNE 30, 1984, YOUR REQUESTS ARE REASONABLE BUT IMPOSSIBLE TO MEET. INITIALLY PLEASE PLAN OPERATIONS SO AS: LINE 11.04 - APPROXIMATELY 20 - 25,000 DOLLARS, LINE 15.0 DOLLARS 15 TO 18,000 - MISSIONS TO BE COMBINED. PERIODS TO BE SHORTENED. LINE 40.0 - SEEMS O.K. LINE 50 MOST OF CHARGES ARE NOT TO BE CHARGED HERE. TOTAL - I WOULD ESTIMATE OUR AVAILABILITY AT APPROXIMATELY 60,000 DOLLARS. WE SHALL MONITOR THE SITUATION TOGETHER WITH THE RPOS AND DECIDE. F.Y.I. - TOTAL BUDGET FOR THREE OTHER RPOS FOR BUDGET LINES 11.04, 15.0, 40.0 AND 50.0 IN 1983 IS APPROXIMATELY 90,000 DOLLARS. LOOKING FORWARD TO MEETING YOU IN JANUARY. I SHALL LEAVE ON MISSION ON DECEMBER 5 TILL DECEMBER 28. GERHARD IS WELL AND WILL BE HERE. ARLOSOROFF, INTBAFRAD

END OF TEXT

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CLASS OF SERVICE: TELEX | TELEX NO.: 788 82817 | DATE: NOV.22,1983

SUBJECT:

DRAFTED BY: SARLOSOROFF:PHM SA | EXTENSION: 61790

CLEARANCES AND COPY DISTRIBUTION:

cc: Messrs.G.Tschannerl,
Ms.C. del Castillo

AUTHORIZED BY (Name and Signature): S.ARLOSOROFF S.A

DEPARTMENT: WUD

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The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street, N.W.
Washington, D.C. 20433
U.S.A.

(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

November 22, 1983

Mr. Anders Roejkjaer
Resident Representative
United Nations Development Programme
P.O. Box 2075
Lagos, Nigeria

Dear Mr. Roejkjaer:

Re: UNDP/World Bank INT/81/026
Rural Water Supply Handpumps Project

We received your letter of October 19, 1983, and appreciate your initiative to which Mr. Mashler partially replied in his telex of October 31, 1983. We have already sent you extra copies of our Rural Water Supply Handpumps Project Reports One and Two and other related materials.

Following the letter of Mr. A.D. Kolawole, we will, of course, be at your disposal to give you assistance during the decision-making process as to what pumps to manufacture in Nigeria; we will also provide technical assistance to the manufacturers. We strongly recommend, however, not beginning any direct actions on selecting the type of pump, as it will take us another 9 - 12 months to reach a conslusion based on the ongoing R&D work on VLOM pumps (Village-Level Operated and Maintained Handpumps) for local production and for settings of between 15 and 60 - 70 meters depth. Appropriate pumps can then be selected.

As you well know, the International Finance Corporation, an affiliate of the World Bank, is promoting the establishment of local industries, especially when private enterprises may be involved in the venture, as was indicated in Dr. Kolawole's letter. We would appreciate receiving more information, as was detailed in Mr. Mashler's telex.

With my warm regards,

S. Arlosoroff

S. Arlosoroff, Chief
Applied Research & Technology Division, WUD
(UNDP Projects Manager, INT/81/026, GLO/80/004, INT/82/002)

Copy: Mr. Mashler, UNDP, New York

cc: Messrs. Cohen, Middleton, Beier, Tschannerl, Langenegger (WUD);
Cohn (IFC-CA2)

SA/rkb

INT/81/026

Mr. A. Amir Al-Khafaji, Chief, WAPWS

November 21, 1983

AA

Saul Arlosoroff, Chief, Applied Research & Technology Div., WUD

CILSS Regional Meeting on Village Hydraulics, Ouagadougou, Oct.3-5,1983

1. Mr. Nicholas Burnett, Economist, attended this meeting on behalf of INT/81/026, as did Mr. Otto Langenegger, our Regional Project Officer for West Africa. (They also attended the CATEES/CIEH meeting that immediately followed on October 6-7 with almost identical participation).

2. I attach a copy -na of the final report of the meeting. Recommendation 4 is concerned with handpumps, calling for the standardization of pump bases, a study on the establishment of a regional handpump manufacturing factory, and the exchange of information with both CIEH and CILSS.

3. The perception that INT/81/026 does not share information and cooperate with CIEH was mentioned by a number of participants, formally and informally, and undoubtedly contributed to the final part of the recommendation. This is a direct result of the fact that until now we did not receive a reply from FAC in Paris re our request for their financial contribution to our activities in the francophone West African countries.

4. There were a number of remarks that the Bank as such was not officially represented at the CIEH meetings. Regardless of what may have actually occurred, conference officials claimed that no replies had ever been received to the various invitations that were sent to WAP and WUD, aside from INT/81/026. Messrs. Langenegger and Burnett indicated that they were also representing the Bank.

5. Mr. Burnett (ext. 61776) has a complete set of the rest of the documentation provided at the conference which we will be happy to have copied if you do not already possess it. The principal documents consist of seven country reports on Village Hydraulics, prepared by BURGEAP and BRGM in September 1982, for Cape Verde, Gambia, Mali, Mauritania, Niger, Senegal and Upper Volta (all in French); a CIEH report of January 1983 on "Conditions d'utilisation et d'entretien des moyens d'exhaure" (French); and a synthesis document on "Le developpement de l'hydraulique villageoise dans le Sahel: bilan et perspectives" (French and English).

cc: Messrs. Cohen, Beier, Middleton, Freedman, Tschannerl, Ramuglia, Burnett (WUD), Langenegger (WB/Abidjan).

NB/SA:slj

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PAGE OF

OFFICIAL DEPT/DIV ABBREVIATION 61785

MESSAGE NUMBER

TEST NUMBER (FOR CASHIER'S USE ONLY)

START HERE

BOOK OF THREE

(1) MR. KUN CHETPAN, DEPARTMENT OF HEALTH

VIA MR. SMITH, UNDEVPRO, BANGKOK

788-

TELEX TH82392

(2) MR. WHITE, UNITED NATIONS VOLUNTEER

UNDEVPRO, GENEVA, SWITZERLAND

845-

TELEX UNDP 289620

(3) MR. KULESSA, UNDEVPRO, BEIJING, PEOPLE'S REPUBLIC OF CHINA

716-

TELEX 22314 DPBJG CN

END OF TEXT

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PAGE 1 OF 2

OFFICIAL DEPT/DIV ABBREVIATION: 61785

MESSAGE NUMBER:

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KUN CHETPAN, DEPARTMENT OF HEALTH, VIA SMITH, UNDEVPRO, BANGKOK.
INFO WHITE, UNV GENEVA. KULESSA, UNDEVPRO, BEIJING (FOR YOUR INFO AND FOR ROSENHALL). OUR REF. NO. 1500. UNDP INT/81/026 HANDPUMPS PROJECT.

AAA. CHINA HAS OFFICIALLY ACCEPTED MR. KYAW MYINT FROM BURMA AS THE UNV FOR THE HANDPUMPS PROJECT. WE WOULD LIKE HIM TO GET A BRIEF INTRODUCTION TO THE TECHNOLOGY, UTILIZATION AND TESTING OF HANDPUMPS BEFORE HE ARRIVES IN CHINA TO TAKE UP HIS POST, AND WOULD BE GRATEFUL IF YOU CAN PROVIDE THIS INTRODUCTION FOR HIM OUT OF YOUR RICH EXPERIENCE IN THIS FIELD. DEEPSET HANDPUMPS AS WELL AS THE UTILIZATION OF PLASTIC COMPONENTS ARE NOT GENERALLY KNOWN IN CHINA AND THE VOLUNTEER MUST FAMILIARIZE HIMSELF WITH THESE IN ADVANCE.

BBB. WE SHALL PAY FOR ALL EXPENSES IN THIS CONNECTION THROUGH MR. ROSENHALL. SINCE ROSENHALL MAY NOT HAVE RETURNED TO BANGKOK WHEN KYAW MYINT ARRIVES IN THE BEGINNING OF DECEMBER, WE ARE ASKING YOU TO KINDLY MAKE THE ARRANGEMENTS. ONE WEEK IN BANGKOK SHOULD BE SUFFICIENT, MOST OF WHICH HE SHOULD SPEND IN THE FIELD WITH MR. KHIN MAUNG THAN. WE SHALL TRY TO TIME HIS ARRIVAL IN BANGKOK SO THAT HE CAN SPEND THE LAST 2-3 DAYS WITH MR. ROSENHALL.

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CCC. YOU MAY BE INTERESTED TO KNOW THAT WE ARE PLANNING TO HOLD A MEETING IN CHINA NEXT AUGUST, SIMILARLY TO THE ONE IN MALAWI. YOU WILL BE INFORMED AS SOON AS IT IS FINALIZED.

REGARDS, TSCHANNERL/ARLOSOROFF, INTBAFRAD.

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DATE Nov. 16, 1983

SUBJECT: INT/81/026

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TO:

BOOK OF FIVE

F 1. LANGENEGGER, INTBAFRAD, ABIDJAN, IVORY COAST (TLX 969-3533)
#1683

F 2. ROSENHALL, INTBAFRAD, BANGKOK, THAILAND (TLX 788-82817)
#1654

F 3. JOURNEY, INTBAFRAD, DHAKA, BANGLADESH (TLX 642302 IDA BJ)
#2924

4. GREY, INTBAFRAD, NAIROBI, KENYA, (TLX 963-22022)
#4211

FR/ITT 5. MCLEOD, 10 PARK STREET, PORT DOUGLAS, QUEENSLAND 4871, AUSTRALIA (CABLE: FULL RATE)

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ATTENTION LANGENEGGER, INTBAFRAD, ABIDJAN, ROSENHALL, INTBAFRAD, BANGKOK, JOURNEY, INTBAFRAD, DHAKA, GREY, INTBAFRAD, NAIROBI, MCLEOD, AUSTRALIA. OUR TELEX NUMBER 1507. FOLLOWING TELEX RECEIVED FROM KEN MILLS AND SENT TO YOU FOR INFORMATION. QUOTE THANKS FOR YOUR TLX 1480 10 11 83.

AAA MONITORS FOR W. AFRICA PACKS SENT TO 3 ADDRESSES IN OTTO'S REGION EACH CONTAINED 1 SET OF TOOLS (ONE C SPANNER AND ONE HEXAGON HEADED SCREW DRIVER) AND FULL INSTALLATION INSTRUCTIONS. WE HAVE NEVER ENVISAGED SENDING ANY OTHER TOOLS, PRESUMING THAT TOOLS TO DRILL AND TAP HOLES WOULD BE AVAILABLE LOCALLY. IF EXTRA SETS OF OUR TOOLS ARE NEEDED PLEASE LET ME KNOW. LEIF ASKED FOR SOME MORE WHICH WE SENT A MONTH AGO. PRESUMABLY I CAN BOOK COSTS TO THIS PROJECT.

BBB PRODUCTION OF MONITORS. YOU WILL RECALL YOU ASKED FOR 100 PER CENT CHECK ON THESE SO WE TESTED EVERY ONE ELECTRONICALLY AND 397 WORKED PERFECTLY. SOME OLD UNITS SENT OUT FOR INITIAL FIELD TEST SHOWED LEAKS AROUND ELECTRODES SO TO BE SAFE WE HAD ALL NEW MONITORS X-RAYED. WE WERE ALARMED TO DISCOVER ABOUT HALF THE MOULDINGS HAD INTERNAL VOIDS NEAR THE ELECTRODES SO WE REJECTED THEM BECAUSE THEY WOULD POTENTIALLY PRODUCE LEAKS INTO ELECTRONICS. THE MANUFACTURER WHOM WE HAD USED BEFORE SUCCESSFULLY

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BECAME EXTREMELY DIFFICULT REFUSING TO PAY FOR REMOVAL OF COLLAR, ELECTRODES AND ELECTRONICS FROM THE POOR MOULDINGS AND RE MOULDING THEM PROPERLY, UNTIL WE PAID THE FULL COSTS OF MOULD TOOL. SINCE THIS WAS OUR ONLY LEVER WE REFUSED TO PAY AND ONLY RECENTLY HAVE WE MANAGED TO ARRIVE AT A LEGALLY ACCEPTABLE COMPROMISE. THIS HAS COST US MORE MONEY AND INCONVENIENCED YOU, UNFORTUNATELY. FULL DETAILS IN LETTER.

CCC JOINT PROJECTS WITH ODA. NEVILLE PHONED ME TO SAY HE HAD AGREED WITH YOU ON FUNIDNG PROJECTS MENTIONED IN MY LETTER TO HIM OF 14TH OCTOBER. I BELIEVE I SENT YOU A COPY. MANY THANKS FOR THAT. PLEASE NOTE THOSE COSTS WERE ONLY ESTIMATES AND DID NOT FOR INSTANCE CONTAIN TRAVEL COSTS NECESSARY FOR VISIT TO DEV COUNTRY OR WASHINGTON. NO CONTINGENCY WAS INCLUDED AND SINCE RPO'S MAY WISH TO HAVE CHANGES TO PROJECT OUTLINES I TRUST YOU HAVE A DEGREE OF FLEXIBILITY IN YOUR BUDGET. I ALSO WISH TO AVOID HAVING TO ASK FOR MORE MONEY HEAR THE END OF A PROJECT BECAUSE WE ORIGINALLY TRIED TO COST TOO TIGHTLY AS HAPPENED ON PLASTICS PROJECT, WATER MONITORS AND ACETAL BEARINGS. I ALSO REALISE I MUST CONTROL THE ENTHUSIASM OF OUR ENGINEERS WHO ARE MORE INTERESTED IN DOING A THOROUGH JOB THAN STAYING WITHIN THE RIGID CONSTRAINTS OF A NON-PROFIT FIXED PRICE CONTRACT.

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OFFICIAL DEPT/DIV ABBREVIATION: WUD/ART

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DDD THANKS FOR COPY LETTER TO MASHLER AND DAVID'S REPORTS. VERY HELPFUL TO FIND FIELD FAILURE OF NIRA IN LINE WITH OUR LABORATORY REPORT. UNQUOTE, ARLOSOROFF, INTBAFRAD

END OF TEXT

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CLASS OF SERVICE: TELEX	TELEX NO.: Book of Five	DATE: 1 1/16/83
SUBJECT:	DRAFTED BY: SARLOSOROFF:dnl SA	EXTENSION: 61790
CLEARANCES AND COPY DISTRIBUTION:	AUTHORIZED BY (Name and Signature): S. Arlosoroff S. Arlosoroff	
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1 OF 3	61788	WUD-UNDP	1676	

START HERE

OTTO LANGENEGGER, ABIDJAN IVORY COAST OUR TELEX REFERENCE NUMBER 1495 RE YR ABI 1061

AAA WE MET WITH LEGAULT AND SOMMELET OF GEOMINES ON NOV. 10 TO BRIEF THEM ON THE OUTLINES OF THE TERMS OF REFERENCE. WE SHALL SEND YOU OUR PROPOSED TOR FOR THEIR WORK FOR CLEARANCE WITH DCH. THESE ARE IN ACCORDANCE WITH YOUR AND ARLOSOROFF'S JOINT DISCUSSIONS WITH DCH. AFTER CLEARANCE CONSULTANT WILL BE SENT TOR AND INVITED TO SUBMIT PROPOSAL ON HOW AND WITH WHAT PERSONNEL THEY INTEND TO UNDERTAKE THE WORK. IF PROPOSAL IS ACCEPTABLE THEY WILL THEN BE INVITED TO NEGOTIATE A CONTRACT FOR WORK AS DETAILED IN TOR BECAUSE THEY ARE A SOLE-CONTRACTOR.

BBB ALL HARDWARE PROCUREMENT AND INSTALLATION E.G. PUMPS WILL BE COVERED BY US, USING RAMI SELA IF POSSIBLE. DCH IS EXPECTED TO DESIGNATE ONE PERSON IN EACH REGION TO PARTICIPATE FULL-TIME IN THE VILLAGE-LEVEL WORK AND TRAINING ONE PERSON WHO WILL ALSO SUPERVISE THE OPERATIONS PART-TIME WORKING WITH YOU. THIS HAS TO BE NEGOTIATED WITH DCH. LOGISTICAL SUPPORT AND EXTRA COSTS SUCH AS PER DIEM WILL BE PAID BY CONSULTANTS, AS PART OF THEIR CONTRACT.

CCC TASKS OF CONSULTANTS.

111 IDENTIFY VILLAGES IN 2-3 REGIONS AND SELECT TRAINEES WHO WILL LATER TRAIN OTHERS.

END OF TEXT

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OFFICIAL DEPT/DIV ABBREVIATION: 61788

MESSAGE NUMBER

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No. 1495

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222 CONDUCT ONE TRAINING COURSE PER REGION FOR VILLAGE PUMP ATTENDANTS.

333 OBSERVE RESULTS IN VILLAGES AND IDENTIFY NEEDED SUPPORT

444 IDENTIFY AN APPROPRIATE SPAREPARTS SUPPLY SYSTEM.

555 OBSERVE AND RECOMMEND VILLAGE FINANCING ARRANGEMENTS AND TRANSITION TO VLOM.

666 IDENTIFY EXTENT AND MEANS OF OUTSIDE SUPPORT REQUIRED FOR MAINTENANCE.

777 PROVIDE SOME BASIC VILLAGE HEALTH TRAINING AT THE END STAGE (LAST 6 MONTHS OF 24 MONTHS OPERATION).

DDD THE SUM AVAILABLE TO CONSULTANTS IS AROUND US$200,000 OVER 24 MONTHS STARTING ABOUT FEBRUARY 1983. PLEASE GIVE US YOUR REACTION TO THE WHOLE CONCEPT ASAP.

EEE BROKEN DOWN CIDA BUDGETS FOR IC AND GHANA ARE READY AND WILL BE TELEXED TO YOU ASAP. WE WANT YOU TO BRING A REVISED WORK-PLAN FOR THE TWO COUNTRIES IN JANUARY, BASED ON THESE BUDGETS.

FFF WE PROPOSE TO PAY FOR VOLANTA AND MALDEV IN GHANA AS DISCUSSED WITH YOU EARLIER, AND FOR MOYNO IN IVORY COAST. MONARCH AND GSW TO BE TESTED AT CATR FIRST, BUT MODIFIED MONARCHS WILL BE INCLUDED IN GHANA VIA SCHATZ. PLEASE COMMENT. HANDPUMPS WILL BE ORDERED SHORTLY VIA UNICEF.

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No. 1495

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GGG M. SOMMELET WILL TRAVEL TO IC ON NOVEMBER 16 FOR DISCUSSIONS WITH YOU AND DCH. PLEASE GIVE TOP PRIORITY FOR THESE MEETINGS. REGARDS, TSCHANNERL/ARLOSOROFF.

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CLASS OF SERVICE: TELEX
TELEX NO.: 969-3533
DATE: Nov. 15, 1983

SUBJECT:

DRAFTED BY: G. Tschannerl

EXTENSION: 61785

CLEARANCES AND COPY DISTRIBUTION:
cc. Messrs. Ramuglia, Burnett

SA/dnl-aga

AUTHORIZED BY (Name and Signature): S. Arlosoroff SA/M.

DEPARTMENT: Water Supply and Urban Development

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File Title	Barcode No.
UNDP/INT/81/026 - Rural Water Supply Handpumps Project - Fields, Trials and Technology Development Project - 1981 / 1983 Correspondence - Volume 17	30192462

Document Date	Document Type
November 15, 1983	Memorandum

Correspondents / Participants

To: Mr. Jacques de Groote, ED for Belgium

From: S. Arlosoroff, Chief, Applied Research & Technology Division (WUD) and UNDP Projects Manager

Subject / Title

UNDP/WB executed (INT/81/026) Rural Water Supply Handpump Programs

Exception(s)

Additional Comments

Declassification review of this record may be initiated upon request.

The item(s) identified above has/have been removed in accordance with The World Bank Policy on Access to Information. This Policy can be found on the World Bank Access to Information website.

Withdrawn by	Date
Ann May	19-May-16

INT/81/026

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE November 14, 1983

TO Those Listed Below

S. Arl

FROM S. Arlosoroff

EXTENSION 61790

SUBJECT The Expanding Role of the Hydrogeologists in the provision of Rural Water Supplies

Re: UNDP/WB - Rural Water Supply - Handpumps Program

docs. (INT/81/026)

I wish to bring to your attention a paper written by our Regional Project Officer to East Africa, David Grey, and co-authored by John Chilton and Amanda Smith-Carington of the groundwater project, DLVW, Malawi, and Edmund Wright, UDA, United Kingdom. The four collaborated for a few years in ground water development and handpumps applications in Malawi and in other African countries.

The paper has just been presented in a meeting of the Geological Society of London. It presents a most valuable experience in ground water development in Africa.

Hydrogeologists and water planners are the target groups of this paper, which aims at stimulating their broad-range involvement in rural and urban-fringe water supply programs.

For ground water development, in the specific conditions we are dealing with, a hydrogeologist is a geologist or an engineer with either post-graduate training or considerable experience in ground water development.

We strongly believe that far greater efforts should be invested in ground water supply options than before, as we have only touched the surface of this "huge waterberg".

cc: Messrs. Mashler, Potashnik, Beyer, Cohen, Middleton, Beier, Tschannerl, Costa, Pettigrew, Thys, Al Khafaji, Buky, Freedman, Sandstrom, Sud, Yepez, Grey, Langenegger, Journey, Rosenhall, McLeod, Sternberg, Taylor, Beyer, McJunkin, Mills, Sharp, Ms. Jorgensen, Katsu, Locussol, Calegari, Des Bouvrie, Ringskog, Rietveld, Motte, Pruntel, Kleiner, Ramadan, Lehr (NWWA) and Chilton (Malawi).

SA:dnl

INT/81/026

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November 14, 1983

Ms. Linda Mc Donald
Bilateral Programmes Analysis Group
Canadian International Development Agency
200 Promenade du Portage
Hull, Quebec, K1A 0G4
Canada

Dear Ms. Mc Donald:

We acknowledge receipt of your letter dated October 11, 1983 and are sending you our response to the points you raised.

Budget Profile

Following the delay in the signature of the agreement, the anticipated disbusements in FY83/84 to FY85/86 will be delayed somewhat over the original disbursement schedule attached as Annex A to the CIDA letter September 19, 1983 addressed to UNDP. Enclosed as Annex I is our presently revised disbursement schedule. Please note that the country totals are the same as in Annex A to the CIDA letter of September 19, 1983 and include C$20,000 per country for training recipient country representatives in the Univeristy of Ottawa Water Resources Seminars/Courses.

A further breakdown of the revised disbursements by expenditure component contained in Annex II. The period in which recurrent expenses will be incurred was moved forward by about four months, causing a displacment of the anticipated expenditure for these items away from FY83/84 and into FY85/86. The expenditure profile under subcontracts was similarly revised, the entries for Bangladesh reflecting the agreed payment schedule (Appendix C-2 of our contract agreement with ICDDR,B). A portion of the equipment component was shifted from FY83/84 to FY84/85 to take into account the delay in the procurement and payments of some of the equipment.

The proposed timing for the mid-term review, subject to your approval and comment, should be approximately 18 months after October 1, 1983 - some time in February or March 1985. By the time the CIDA - supported activities in each of the four recipient countries would have been underway for at least 12 months, providing us with initial results. The timing would also be early enough for reommendations of the review committee to have significiant impact on the remaining portion of the work program. We propose the mid-term review to take place in Dhaka and to include site visits in the testing area and ICDDR,B and /or Abidjan to include site visits as well. We would appreciate having your views.

The final project evaluation could take place toward the completion of the years budget sometime in the fall of 1986. The overall results of the CIDA-sponsored activities could at that time be reviewed and the scope of the final report discussed.

Financial Reporting Procedures

As explored in much detail, we will provide CIDA semi-annual financial reports. If necessary more often when the advance of $250,000 (Cdn) per country has been utilized. These reports would include the following data by country and expense element:

- Project disbursements to date (as related to CIDA activities;
- Planned disbursements for period which reporting is being done;
- Actual disbursements for period (Commitment to disburse)
- Estimate of disbursement for next period;
- Review of overall project disbursement status.

Attached are blank financial and progress report formats for your review (Annexes 3 and 4). The report will normallyl be stated in USDollars as our financial reporting and accounting is only done in USDollars.

We are in the process of computerizing our operations as of January 1984 and we will send the updated version of our computerized report as soon as it is finalized. (Samples attached are marked Annex 5.) As you requested, our division's project accounts on the four CIDA-related countries; Bangladesh, Ghana, Ivory Coast and Sri Lanka will be open to CIDA's inspection.

Involvement of Canadian Headpumps Manufactures

This list you enclosed as Annex III to your letter is complete according to our knowledge. After detailed technical consultations with our Regional Project Officers, with K. Mills of CATR (U.K.) and other hand pumps experts, we feel that these pumps have a potential for application in developing countries. In order to test their performance we plan to subject the Monarch and GSW to accelerated laboratory tests at CATR in the United Kingdom.

Both manufacturers made design changes in response to earlier criticism, and once positive results from the laboratory tests are obtained, buyers will be able to evaluate their needs on the basis of the Report. The Moyno is a relatively robust pupmp that has performed well in a previous endurance test at CATR. It was therefore concluded to test it in the field with a reduced risk of significant failures. The PEK pump is a novel design promise as a VLOM pump, and should therefore be demonstrated and tested in the field, on the basis of our promotion policy to VLOM pumps.

Regarding the CIDA-supported deployment of PEK pumps in West Africa, we are keen to cooperate with anyone willing to carry out the monitoring. We shall shortly contact Mr. Alves and provide him with all the assistance he needs, including the advice and cooperation of Mr. Langenegger, our Regional Project Officer stationed in Abidjan.

We hope this clarifies the outstanding issues mentioned in your letter. Should you need further details, we shall be glad to provide them.

We would like to take this occasion and express our appreciation to CIDA to its generous contribution toward the Decade goals and to your department for the efficient handling of the complex negotiations.

On our part we are keen to continue the active exchange of views which has characterized our relationship during the preparatory phase of our cooperation. You will be kept informed and consulted on issues and on the progress of implementing the agreed program. We are very grateful for CIDA's confidence in our work and for your financial assistance.

Sincerely yours,

S. Arlosoroff
Applied Research & Technology Division, WUD
(UNDP, Projects Manager, INT/81/026, GLO/80/004, INT/82/002)

Enc.

Copy: Mr. Mashler (UNDP, NY)

cc: EDS office for Canada
Messrs. Cohen, Tschannerl, Middleton, Beier (WUD).
Rapheli (PAS), Journy (WB/Dhaka), Langenegger WB/Abidjan).

INT/81/026
F338

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DIST
WHEN REPLYING TO THIS MESSAGE REFER TO : TCP FCA
MR ARLOSOROFF AEADB

Mr Arlosoroff N1021

1) NS NC
2) RD

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ZCZC BAN1396
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NOVEMBER 11, 1983
FOR BROWN UNDP MANILA COPY ARLOSOROFF WASHINGTON
EYE UNDERSTAND FROM INFO RECEIVED FROM OUR UNV MR. KYAW NYUNT THAT HE IS NOT RECEIVING ADEQUATE TRANSPORTATION FACILITIES AND EQUIPMENT FROM THE MPWH TO CARRY OUT MONITORING WORK ALTHOUGH THIS IS STIPULATED IN THE PROJECT AGREEMENT. YOUR HELP AND ASSISTANCE TO SOLVE THIS PROBLEM WILL BE MOST APPRECIATED.
REGARDING HIS LOCAL TRAVEL CLAIM ENTITLEMENT EYE HAVE ASKED UNV IN GENEVA TO TELEX YOU INSTRUCTIONS. IN THE MEANTIME EYE SUGGEST YOU PAY HIM USING THE RULES FOR UNV IN THAILAND I.E. TWO THIRDS OF THE REGULAR UN PER DIEM IF NIGHT OUT AND 40 PERCENT OF THE TWO-THIRDS IF MORE THAN 10 HOURS TRAVEL BUT NO NIGHT OUT. IF LESS THAN 10 HOURS NO PER DIEM STOP REGARDS AND THANK YOU FOR YOUR HELP

ROSENHALL

=11110535

NNNN

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

INT/81/026

DATE November 11, 1983

TO Messrs. O. Langenegger, D. Grey, T. Journey, L. Rosenhall, K. Mills

FROM S. Arlosoroff S.A.

EXTENSION 61790

SUBJECT Further Research Into Handpump Components

I would like to bring to your attention a memorandum expressing R. Middleton's views on dry bearings regarding our work on the acetal. The Report RES 13 is well known to Tim Journey, McLeod and myself as it was one of the background papers we had when we initiated our program. Our conclusions was that as we were promoting designs for mass production we should avoid handling in our R&D indigenous materials even though they may play an important role in a number of regions or countries.

Following is the quotations from R. Middleton's memorandum and we also enclose the documents for those of you who do not have it in your offices:

"I notice that the CATR proposal which you copied to me recently includes research on the use of plastics to form dry bearings in pumpheads, starting with laboratory trials and proceeding to field evaluation. You may not be aware that when we started research into VLOMs (with the work with Tim Journey in 1976), we tried out oil-impregnated hardwoods running on ordinary 1/2 inch diameter galvanized iron pipe. These systems, operating under load at Yaron Sternberg's University of Maryland rig, showed very little wear after 2 million cycles. They are obviously very suitable for VLOMs, as they can be made from any local wood soaked in cooking oil. The whole exercise was written up in Public Utilities report RES 13.

What was rather interesting was that wear occurred, to a very limited extent, during the first million cycles, during which the rough surfaces of the galvanizing wore off and became embedded in the wood bearing; after that, the wooden bearing seemed to be much tougher, and the polished pipe ran in it without additional wear. Obviously the issue of readily replaceable bearings is central to VLOMs, but I hope you can include wood in your next round of studies as well as more recent man-made materials."

Enclosure

SArlosoroff:rkb

cc: Messrs. M. Cohen, R. Middleton, G. Tschannerl, K. McLeod, Y. Sternberg

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION
OFFICE MEMORANDUM

INT/81/026

DATE November 11, 1983

TO Mr. S. Arlosoroff, Projects Manager (WUD)

FROM Nicholas Burnett, Economist (WUD) N.R. Burnett

EXTENSION 61776

SUBJECT IVORY COAST - Abi Industries Maintenance Proposal

1. In view of our discussions yesterday with Geomines, I want to immediately bring to your attention a proposal I believe Abi recently made to DCH. I was going to include this in my BOR but it seems more urgent.

2. On October 21, Mr. Langenegger and I visited Abi Industries in Abidjan and met with Messrs. Piquemal-Baron (Directeur General) and Isidore Trabucco (Directeur General Adjoint). They told us that they had arranged a meeting with DCH for October 25 at which they would suggest a new system of pump maintenance/ guarantees. I presume the meeting took place. As yet, Abi had no written proposal but intended to have a general discussion with DCH.

3. Abi propose that DCH pay CFAF 800,000 for a pump, for which Abi will guarantee it for 10 years. (CFAF 300,000 to be paid initially and the rest over time with interest). Abi teams would visit each pump at least twice a year for preventive maintenance, taking out and replacing defective pumps. There would be no repairs in the field. All pumps would be reconditioned in the Abi factory.

4. Abi reckon they would need 30 vehicles for Ivory Coast's 12000 pumps, each staffed by 2 mechanics who would sleep in the bush but be in radio contact with Headquarters. They assume 2-2 1/2 hours are necessary to take out and replace an Abi pump and 1 hour for an Abi-Vergnet. (Abi believe a trial area of at least 1000 pumps should be selected).

5. The proposal would put the manufacturer into direct contact with the villagers which would presumably be good for training, education, etc.

6. At present both Abi and Abi-Vergnet pumps cost about CFAF 275,000 with a 1 year guarantee. DCH has a contract with SODECI for 6 months for maintenance for CFAF 150,000,000. (Abi point out that for this they could provide 1000 new pumps each guaranteed for a year!). Villagers pay (at least in theory) CFAF 60,000 a year for maintenance, of which approximately CFAF 8,000 is used for spare parts (Abi claim that the remaining CFAF 52,000 are much, much more than is necessary for labor, fuel, depreciation, etc).

7. Abi are keen to have the Bank, UNDP, CCCE, the FED or someone endorse their proposal. We carefully avoided doing so.

cc: Messrs. Ramuglia, Tschannerl, Langenegger

NB:slj

FORM NO. 27 - OCR (3/82)

INT/81/026 -F 338-

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1 OF 1	61790	1653	

START HERE

ATTENTION LANGENEGGER, INTBAFRAD, ABIDJAN. INFORMATION MILLS, CATR, ENGLAND. OUR TELEX NO. 1483. RE YOURS AAA CHEMICAL MONITORS. HALF WERE SENT TO ALL RPOS FOR DEBUGGING PURPOSES. SUBJECT WAS DISCUSSED AND CONCLUDED WITH ALL OF YOU IN DHAKA. BBB TOOLS WERE SENT WITH ALL SHIPMENTS OF METERS AND RECEIVED BY ALL. MIGHT HAVE VANISHED IN WEST AFRICA. NEW SETS ARE BEING SHIPPED TO YOU. ARLOSOROFF, INTBAFRAD

END OF TEXT

PINK AREA TO BE LEFT BLANK AT ALL TIMES

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SUBJECT: INT/81/026

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INT/81/026

THE WORLD BANK / INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE November 10, 1983

TO Those Listed Below

FROM S. Arlosoroff

EXTENSION 61790

SUBJECT Tanzania: TOR - The Recruitment of a National Rural Water Supply Handpumps Engineer

I attach herewith the Terms of Reference prepared by David Grey, our Regional Project Officer to East Africa, for a national Rural Water Supply Handpumps Engineer in Tanzania. The position is proposed to be funded by a donor agency.

The major function of the engineer will be to assist in the formulation of national policy in rural water supply - groundwater based for handpump applicatons. The policy should lead to the government decision on the standardization of pumps in the three subregions (shallow aquifers, intermediate and deep), and to assist in the establishment and quality control of local manufacturing of VLOM-type handpumps, that will be decided upon.

We are bringing this to your attention in order to promote the establishment of similar positions in other countries where handpumps are or will play a dominant role in rural water supply coverage.

Attachment

To: Messrs. M. Cohen, R. Middleton, G. Beier, G. Tschannerl, A. Ramuglia,
N. Burnett, C. Gunnerson, R. Costa, J. Freedman, J. Pettigrew,
J. Buky, D. Dunn, O. Langenegger, D. Grey, T. Journey,
L. Rosenhall, K. McLeod
Ms. L. Obeng, K. Jorgensen

cc: Messrs. W. Mashler, M. Beyer

SARLOSOROFF:dnl

HEREWITH DRAFT JOB DESCRIPTION FOR NATIONAL RURAL WATER SUPPLY HANDPUMPS ENGINEER.

QUALIFICATIONS:

DIPLOMA OR DEGREE IN MECHANICAL OR CIVIL ENGINEERING.

EXPERIENCE:

SOME PREVIOUS EXPERIENCE IN RURAL WATER SUPPLY CONSTRUCTION AND MAINTENANCE WOULD BE AN ADVANTAGE, BUT NOT ESSENTIAL. CONSIDERABLE INTEREST IN RURAL WATER SUPPLIES AND SOUND MECHANICAL ABILITY ESSENTIAL.

TERMS OF REFERENCE:

ACT AS GOVERNMENT'S REPRESENTATIVE IN NATIONAL HANDPUMP TESTING AND DEVELOPMENT PROGRAMME WHOSE AIM IS THE SELECTION OF HANDPUMP UNITS WHICH CAN BE MAINTAINED AT VILLAGE LEVEL, BE MANUFACTURED IN TANZANIA AND BE INTRODUCED AS STANDARD UNITS THROUGHOUT THE COUNTRY.

TOGETHER WITH UNDP/WB COUNTRY MONITORING ENGINEER SPECIFIC TASKS WILL INCLUDE:

A) INSTALLATION, MAINTENANCE AND MONITORING (OF PERFORMANCE, UTILISATION, COSTS) OF TEST HANDPUMPS IN MTWARA AND LINDI REGIONS.

B) COORDINATION OF HANDPUMP TESTING IN OTHER REGIONS.

C) COOPERATION WITH HANDPUMP DESIGN AND DEVELOPMENT WORK IN DSM UNIVERSITY, MOROGORO, MTWARA AS WELL AS WITH UNDP/WB HANDPUMP ACTIVITIES ALL OVER THE WORLD.

D) STUDY OF HANDPUMP MAINTENANCE, DEVELOPMENT OF MAINTENANCE TOOLS AND TRAINING MATERIALS AND ASSISTANCE WITH TRAINING OF MAINTENANCE CREWS AND VILLAGE CARETAKERS.

DURING THE COURSE OF THE PROGRAMME THE OFFICER'S JOB DESCRIPTION COULD BE EXPANDED TO INCLUDE:

E) PARTICIPATION IN DEVELOPMENT OF NATIONAL STANDARD DESIGN PRINCIPLES FOR RURAL WATER SUPPLY HANDPUMP PROJECT PLANNING, IMPLEMENTATION AND MAINTENANCE.

F) ORGANISATION OF HANDPUMP MANUFACTURE AND ESTABLISHMENT OF QUALITY CONTROL.

SOME SUPPORT WILL BE GIVEN BY MYSELF IN ALL ASPECTS AND THE ADDITIONAL SUPPORT OF CONSULTANTS IN (E) AND (F) ABOVE CAN PROBABLY BE ARRANGED.

INT/81/026

11-10-83

Back to office report

INTERNATIONAL DEVELOPMENT ASSOCIATION | INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT | INTERNATIONAL FINANCE CORPORATION

SA

OFFICE MEMORANDUM

WUD/082/83

TO: S. Arlosoroff, Div. Chief, WUD

DATE: November 10, 1983

FROM: L. Rosenhall, Regional Project Officer

SUBJECT: Trip Notes from a Visit to Khon Kaen

Date : November 8-9, 1983

Place : Khon Kaen, North-eastern Thailand

Present: Mr. Mongkon Chunwarat, NESDB Officer
Centre for Integration Plan of Operation (CIPO)
Mr. Linsay Falvey, Director, MPW (Australian Consultancy Firm)
Mr. F. J. Murray, Director , MPW (Australian Consultancy Firm)
Mr. Ronald McMahon, Project Manager (MPW)
Mr. Peter Lardi, Engineer (MPW)
Mr. Seamus Hanniffy, Water Resources Techn. (MPW)
Mr. Cecil Showman, Sanitary Expert (MPW)
Mr. James Johnson, Consulting Hydrogeologist
Mr. Peter Cox, (Part of the team as a sociaologist but not present at the meeting)

Purpose of Visit:

I was invited by MPW to visit the Thai-Australia Village Water Supply Project based in Khon Kaen. MPW is working in Thailand on behalf of the Australian Government.

Observations:

The overall aim of the project is to improve the implementation and maintenance, central planning (by testing the decade master water plan prepared by AIT) and provincial planning by supporting ongoing activities implemented by NESDB, CDD, KKU, ARD, DMR.

The input provided by the Australian Government is approximately Austr. $ 2¼ million and the Thai Government counterpart fund is approximately twice the amount provided by Australia.

The project is phased over the period 1983-1986 and operates in two provinces in the Northeastern Thailand.

The direct activities of the joint Thai-Australian project are:

1. Water quality
2. Water need survey
3. Case study survey
4. Well maintenance
5. Tube well program
6. Shallow well program
7. Jar construction
8. Rain water tank
9. Pond program
10. Deep well program

I made field visits to observe the jar construction program. The project has provided molds (Steelbars) costing Baht 1,500.00 per mold. Each mold can be used for many years with several jars constructed weekly. Thus, the cost per jar is less than 5 baht or neglectible.

The project is also training 10 villagers to construct jars. These villages will then be able to help other villagers to construct their own jars. This initial labour cost is estimated to Baht 50/jar.

Each jar, with a volume of approximately 1.4 m^3, use the following materials:

1.	Cement	150	kgs.	฿ 210
2.	Sand	450	Kgs.	93
3.	Wire	1	kgs.	16
4.	Red dye	0.2	kgs.	9
				฿ 328

The total cost for one jar will be (328 + 50 + 5) 383 baht, while commercial jars are available for 500-700 baht.

In the long run, the labour cost will be excluded altogether thus bringing down the cost to 333 baht.

Simultaneously to this project, the Population and Community Development Association (PDA) is constructing water collection tanks on the same self-help principle in the same area. These tanks are 11.2 m^3 in volume, takes six days to construct including the foundation and cost 4,200 baht in material only. 22 Workers are engaged voluntarily from the village. 1,600 Such tanks have been constructed over the past two years in this area. PDA gives three years maintenance guarantee and 15 years cracking guarantee (five percent cracking rate). Commercially constructed tanks of similar design will cost 13,400 baht.

The PDA tank, therefore, seems very attractive with the exception that the tank owner will have to pay 200 baht per month to PDA. This will amount to 2,400 baht per year. The average net income available in the area is approximately 3,500 baht annually. Therefore, only the better-off villagers can afford the PDA constructed tank.

A visit was also paid to a Department of Health constructed "wateryard". The system was constructed approximately 18 months ago and consists of a deep borehole, electric submersible pump, water tank and gravity fed supply to 276 nearby households with stand pipes outside their houses. The system is potentially large enough for 500 households. The construction cost is approximately 700,000 baht. The capital cost per head will be US$19.00 and potentially US$ 10.00. The consumers pay three baht per consumed m^3 and the revenues covers maintenance and operation cost with a small profit, to entertain World Bank missions among other things.

Three stand pipes were visited with following reading:

1. 45 m^3
2. 46 m^3
3. 53 m^3

143 m^3 Average = 48 m^3

The daily consumption will be 15 litres per person. The problem is that consumers have a very distinct taste preference for either the water from shallow sources or rainwater. The safe and healthy groundwater from the pipe is exclusively used for washing and other domestic purposes. Hopefully, the pressure of the Thai-Australian project can do something to promote increased consumption of the safe water provided by the Department of Health at a very attractive investment and running cost.

I am impressed by the terms-of-reference of the Thai-Australian Project and wish them good luck with their work.

Regards.

LR/la

cc Mr. Mongkon Chunwarat, NESDB, Khon Kaen
Mr. McMahon, MPW, Khon Kaen
Mr. Falvey, MPW, Australia
Mr. Khin Maung Than, UNV, Saraburi
Mr. Chetpan Karnkaew, Director, Division of Rural Water Supply
Mr. Adi Davar, Chief of Mission, World Bank

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BOOK OF THREE

1. LANGENEGGER, INTBAFRAD, ABIDJAN, IVORY COAST (TELEX 969-3533)
#1649

2. ROSENHALL, INTBAFRAD, BANGKOK, THAILAND (TELEX 788-82817)
#1626

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3. JOURNEY, INTBAFRAD, DHAKA, BANGLADESH (TELEX 642302 IDA BJ)
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1 OF 2	61790		

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ATTENTION LANGENEGGER, INTBAFRAD, ABIDJAN, ROSENHALL, INTBAFRAD, BANGKOK AND JOURNEY, INTBAFRAD, DHAKA. OUR TELEX NO. 1481. FOLLOWING TELEX RECEIVED FROM KEN MILLS AND SENT TO YOU FOR INFORMATION. QUOTE TO GREY, NAIROBI AND CC ARLOSOROFF. REGRET COMMUNICATION BREAKDOWN. WE WERE VICTIMS OF POST OFFICE ENGINEERS STRIKE PREVENTING OUR TELEX MACHINE FROM BEING REPAIRED. AAA I HOPE YOU HAVE NOW RECEIVED ACETAL BEARINGS ETC. SAFELY. WE ASKED OUR EXPORT PAKER TO TELEX AIRWAY BILL NOS ETC. FOR OUR FINAL DETAIL DESIGN WORK WE NEED TG KNOW WHETHER IMPERIAL OR METRIC SIZE BRIGHT DRAWN MILD STEEL TUBE IS AVAILABLE IN AFRICA. WE NEED EITHER 2 INCH OD BY 6 SWG OR 50 MM OD BY 5 MM WALL. IF NOT AVAILABLE WHAT IS? ALSO INTERESTED IN BRIGHT MILD STEEL ROUND SOLID BAR OR HOLLOW TUBE 30 MM OR 1 AND 3/16 INCHES FOR INNER JOURNAL. PLEASE LET US KNOW AVAILABILITY. BBB RE CONSALLEN PUMPS. I UNDERSTAND 5 FREE SAMPLES FOR MALAWI HAVE NOT YET LEFT UK. I WILL LET YOU KNOW WHEN I HAVE NEWS. I WOULD WELCOME A COPY OF BREAKDOWN REPORT TO CHECK OUR TEST SAMPLE HAS ALL RECOMMENDED CHANGES TO COPE WITH FIELD FAILURES. CCC ODA/WB PROJECTS. I HOPE TO BE DISCUSSING THESE, INCLUDING NEXT STAGE IN PLASTIC BELOW GROUND COMPONENTS PROJECT TOMORROW WITH NEVILLE BULMAN.

END OF TEXT

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PAGE 2 OF 2

OFFICIAL DEPT/DIV ABBREVIATION: 61790

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DDD JUST RECEIVED YOUR TELEX RE WATER MONITORS AND NEED FOR EXTRA SENSORS. WE ARE DISCUSSING WITH OUTSIDE CONTRACTOR THE POSSIBILITY OF TAKING ON MANUFACTURING AND SPARES SUPPLY. IT IS NOT OUR FIELD. DELIGHTED TO HEAR THEY ARE WORKING EVEN IF THEY HAVE ALREADY GONE FULL SCALE. IN THAT AREA WITH SUCH HIGH PUMP USAGE YOU REALLY NEED THE WATCH MODULE. I WILL GET COSTS OF REPLACEMENT 1000 HOUR SENSORS AND TELEX YOU ASAP. 10,000 HOUR ONES ARE AVAILABLE BUT CIRCUIT MODIFICATION NEEDED. CANT BE DONE IN FIELD. LOOK FORWARD TO SEEING YOU ON JANUARY 5/6TH

UNQUOTE ARLOSOROFF, INTBAFRAD

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INT/81/026

Mr. Saul Arlosoroff

November 10 1983

Richard N. Middleton

Further research into handpump components.

I notice that the CATR proposal which you copied to me recently includes research on the use of plastics to form dry bearings in pumpheads, starting with laboratory trials and proceeding to field evaluation. You may not be aware that when we started research into VLOMs (with the work with Tim Journey in 1976), we tried out oil-impregnated hardwoods running on ordinary 1/2 inch diameter galvanized iron pipe. These systems, operating under load at Yaron Sternberg's University of Maryland rig, showed very little wear after 2 million cycles. They are obviously very suitable for VLOMs, as they can be made from any local wood soaked in cooking oil. The whole exercise was written up in Public Untilities report RES 13.

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RNMiddleton/bsw.

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1	1	61790	1648	

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LANGENEGGER, INTBAFRAD, ABIDJAN, IVORY COAST. OUR TELEX NO. 1477. RE YOUR BUDGET JULY 1, 1983 TO JUNE 30, 1984 (YOUR LETTER OF SEPTEMBER 16, 1983). AAA TWO VEHICLES ONE FOR RPO FOR MOVEMENT MAINLY IN IVORY COAST AND GHANA AND SECOND ONE FOR COUNTRY MONITOR IN UPPER REGION GHANA ARE CONFIRMED. WE HAVE A DEFINITE REPLY FROM TOYOTA NO REPLY AS YET FROM PEUGEOT. YOU WILL HEAR FROM US ASAP. BBB VEHICLES WILL BE ORDERED WITH A FULL SET OF SPARES AND EQUIPPED FOR RUGGED TRAVEL IN AFRICA. CCC PARA 2.1 IS THEREFORE APPROVED INCLUDING YOUR TRAVEL WITHIN THE REGION. DDD ALL EXPENDITURES RELATED TO CIDA PROJECTS INCLUDING YOUR TRAVEL, ETC. MUST BE RECORDED ACCORDING TO ITS BUDGET LINE AND A SEPARATE PARALLEL LEDGER FOR EACH COUNTRY. CID/026/03 FOR IVORY COAST AND CID/026/02 FOR GHANA. EEE PARA 2.2 CONFIRMED FIVE THOUSAND DOLLARS. THE THREE THOUSAND DOLLARS FOR DATA PROCESSING EQUIPMENT TO BE DELAYED AS WE MAY HAVE EXTRA EQUIPMENT HERE IN WASHINGTON TO BE SHIPPED OR TAKEN BY YOUR IN JANUARY. FFF PARA 2.4 CONFIRMED EXCLUDING THE FIVE THOUSAND DOLLARS FOR PUMP TESTING SIMULATOR TO BE DISCUSSED IN JANUARY IN WASHINGTON. GGG PARA 2.3. A, B, E, AND F CONFIRMED FOR FOURTHOUSAND NINE HUNDRED DOLLARS. C AND D TO BE DISCUSSED IN JANUARY. ARLOSOROFF, INTBAFRAD

END OF TEXT

PINK AREA TO BE LEFT BLANK AT ALL TIMES

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CLASS OF SERVICE: TELEX | TELEX NO.: 969-3533 | DATE: NOV.9,1983

SUBJECT:

DRAFTED BY: SARLOSOROFF:PHM SA | EXTENSION: 61790

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cc: Messrs. M.Cohen, G.Tscahnnerl, B.Gross, Ms. C.del Castillo L. McDonald

AUTHORIZED BY (Name and Signature): S.ARLOSOROFF S Arl

DEPARTMENT: WUD

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THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

INT/81/026

DATE November 9, 1983

TO Messrs. O. Langenegger, D. Grey, T. Journey, L. Rosenhall, K. McLeod, G. Tschannerl and Y. Sternberg

FROM S. Arlosoroff

EXTENSION 61790

SUBJECT Canadian Plastic Handpump

A Canadian plastic handpump has been installed via CIDA in West Africa and Latin America. We propose to include it in our joint CIDA activities - Latin America, West Africa and South Asia.

SARLOSOROFF:dnl

INT/81/026

November 8, 1983

Mr. William T. Mashler
Senior Director
Global and Interregional Programmmes
United Nations Development Programmes
One United Nations Plaza
New York, New York 10017

Dear Mr. Mashler:

Re: Mr. I. Head's Letter of October 4, 1983, to the UNDP Administrator on the IDRC Handpump Research Programme

I was asked to refer to Mr. Head's letter of October 4, 1983. Following are my brief comments; I have tried to avoid unnecessary reactions.

1. It was annoying to read that Mr. Head met with me earlier this year and had "expressed with some vigour his astonishment at the apparent unwillingness of the UNDP/World Bank leadership to acknowledge contributions of other organizations", etc. As far as I can recall, I have not met with Mr. Head, nor have I heard him express any views on this matter. His accusation is intolerable.

2. I did initiate, however, a meeting with IDRC officials to discuss their collaboration with the handpumps programme. The meeting was held on March 18, 1982, at Dr. Gil's office. Mr. D. Sharp and Ms. Ahluwalia also participated.

During the meeting, I described the objectives of our programme, including the facts that we have an IDRC expert on our Advisory Panel and that we wanted to try to implement the IDRC research programme on plastic handpumps towards manufacturing in the developing countries. Dr. Gil was negative; he stated that IDRC was not interested, as the project is considered by him to be a failure. He added that they should not have been carrying it out the way they did, and that in his mind it was "a waste of time and money and no implementable results can be expected." I told him that we do not share his views. We feel that the subject of handpumps is extremely important and that any coordinated effort is another brick needed to complete the wall.

3. Although Dr. Gil's reaction to the programme was negative, we initiated a meeting at the AIT campus with all IDRC managers of projects funded by us. The meeting was attended by D. Sharp; the professionals from Sri Lanka, Thailand, Malaysia, and Ethiopia; and two of our senior professionals. (The project officer from Malawi could not come at the last minute as he was an expatriate; McLeod expressed his views.)

The purpose of the meeting was to ascertain potential benefits from the IDRC research work and to disseminate a special report of the meeting to persons on our large mailing list. The IDRC representative prohibited dissemination, as they were going to hold a meeting in Singapore and did not want any information released before it. I agreed to their request for the sake of good relations, although the IDRC pump is really a World Bank product. The research programme was initiated by J. Kalbermatten before W.K. Journey joined IDRC and later returned to work for us as our Regional Project Officer in Bangladesh.

Our consensus of the meeting was as follows:

A. There is not one proven IDRC pump. Different versions have been developed, and none have proven effective below 13 - 15 meters.

B. The pump needs further R&D, as most of the crucial questions have not been resolved.

C. The pump cannot be considered for intermediate and deep applications, which is the focus of our project.

D. The Prodorite-Zimbabwe pump (a plastic pump using a different design) has already proven itself to be a potential shallow-well plastic pump; its development and replication promises much more than the Waterloo design.

E. We shall have to abandon the IDRC design in our work on the Bangladesh-Tara pumps.

4. When we tested the Ethiopian plastic pump, we called it the IDRC pump from Ethipia. We were instructed by the manufacturers not to do so, as it was not an IDRC pump. We followed the same procedure with the USAID "Battle Pump" when we were instructed to use the manufacturer's name.

I could still write quite a bit on our testing of the improved version of the IDRC pump in Sri Lanka which has proven to be very unsuccessful; in this case, we deliberately avoided stressing the link to IDRC, as well as avoiding our group's views on the costs/benefits of the programme.

5. I would like to stress the following conclusions:

A. Mr. Head must judge if the programme is to be a success or a failure. The views of Dr. Gil were clear on that issue.

B. We mention in our reports the names of pumps which manufacturers are instructing us to use.

C. In our R&D work at CATR (with Dunlop and others), we cannot use any data from the IDRC research programme, as we do not deal with shallow pumps.

D. In our R&D work with UNICEF and MWATS in Bangladesh, on the "Tara pumps" with a 5 - 18 meter intermediate depth, we started completely new designs, although W.K. Journey was a key figure in the design of the IDRC pump and naturally wanted to base his present work on his past contribution to the World Bank and IDRC.

E. In our R&D work in India with Richardson & Cruddas, Wavin and INALSA, we are concentrating on intermediate and deep pumps and therefore cannot use any of IDRC's work.

F. Mr. Tschannerl and I have offered to collaborate with D. Sharp of IDRC throughout the project cycle. He was invited to all of our Advisory Panel meetings where major policy decisions are made. We have distributed IDRC publications to our staff members and consultants.

I enclose a telex that I sent to Mr. Head six months ago just as an indication of our good will. Until we received this unfair letter, we never heard any complaint or request which we refused.

G. We will mention in our field trial reports the names of organizations behind important contributions, e.g. UNICEF, USAID, the French Government, IDRC, the Indian Government, the Malawi Government, the Blair Institute, and others. We do not take any credit ourselves if we do not deserve it.

I have serious doubts if this is the correct way to go about collaborating with UNDP and the World Bank.

Sincerely yours,

S. Arlosoroff, Chief
Applied Research & Technology Division, WUD
(UNDP Projects Manager, INT/81/026, GLO/80/004, INT/82/002)

Enclosure

SA:kb

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

GLO/80/004

OFFICE MEMORANDUM

TO: Mr. C. G. Gunnerson

DATE: November 8, 1983

FROM: S. Arlosoroff

SUBJECT: Resource Recovery Project UNDP GLO/80/004

The attached telex should have the following changes:

1. It should be addressed to Kulessa, and via him to the Ministry of Foreign Relations and Trade, Info: Dr. Wu King, etc. If you want GTZ and CIDA support, copies for information should also go to Knipschild and Kresse, and McMaster.

2. There should be a separate first page to Kulessa, saying as follows:

Re GLO/80/004 -- Proposed activities.

(i) It was unfortunate that Gunnerson could not meet you during his short stay in Beiging. For your information we include a short description of GLO/80/004's past and proposed future activities in PRC;... (please do not forget Shanghai's commitment to produce the report.)

(ii) As you realize the proposed workshop is directly connected to Activity No. ( ), and is intended to use the availability of the international recycling experts coming to PRC to assist Shanghai Corporation for Recycling in its recycling programmes.

3. We are asking for your assistance in getting the early response from the Ministry as we wish to have both activities in April, 1984, dates which were recognized as possible by the Shanghai... The timetable calls for an early decision by the Ministry. We need 3-4 months to arrange all that is necessary in identifying visiting experts, the writing, translations, and submission of papers.

In parallel, we have to approach the Donors for financial aid as the present phase funds, for GLO/80/004 have not budgetted for this activity and are all committed until the project extension is approved.

4. If the timetable cannot be met, the workshop and the visit of the experts will have to be delayed, and/or only the workshop.

5. We and UNDP/DG&P shall be grateful if you could assist in allocating IDF and other funding resources for this proposed workshop.

__________________up to here Kulessa's part.

6. Then you start the telex separately so that it can be sent as it is with a covering letter from the Resident Representative to the Ministry.

7. It should stress a much stronger Shanghai commitment to produce the Recycling Report and parts of it as a pre-requisite to the experts' mission. We need a clear timetable on this issue.

8. April dates should be taken out from the document. You could stress that the dates that were discussed were April.....; however, if it cannot be met, as we need to discuss the funding of the workshop with external organizations, after we get the clearance from the Ministry. We need some 3-4 months for the arrangements.

It must be clear to them that we do not have the money and we have to pursue the issue after initial clearance from them.

If this timetable cannot be met, we shall have to delay the workshop. I hope we don't have to delay the whole project because of that.

9. It should start after

AAA with the experts' visit and utilizing their visit for the workshop.

BBB delete all dates. Write Day One, Day Two, etc.

10. III V, page 4 -- communes, etc.

11. We do not mention names in the Document, Chinese or ours. This is not a private affair between McGarry-Gunnerson- and Prof. Chieng. This is not done in PRC, as they object and are sensitive to personal contacts with foreigners (we had this lesson in the Handpumps).

So McGarry and your name are to be excluded. Instead of McGarry, you can say: an expert-consultant employed by the Management of GLO/80/004 whenever your name appears professional staff of GLO/80/004.

12. III VIII, page 5 -- Invitation to Chinese participants (approx. 10-15 etc.). We do not press such issues that lead them to the feeling that we run their show. When we mention Municipalities -- we have considered, or propose the following municipalities.....

13. Para. 3, page 5 -- The RR project will aim at providing travel, subject to the availability of funds.

page 6. Exclude dates.

14. Para. DDD, page 7 --- Delete April dates (as everywhere).

Expert Consultants - Except those we have assured funds do not mention any countries.

If funds will come only from CIDA, or CIDA + GTZ, or CIDA + GTZ + UNDP -- each combination may dictate a different mix of countries. PRC should express their wishes for names of specific experts they would like us to invite.

15. Page 9. McGarry, Gunnerson not to mention names. After confirmation names will be mentioned.

16. Page 9. Note. Total number of Foreigners not to be mentioned. I am not going to lead them to believe we have the money, etc. When we say 27, it is implicit that we already know the budget and its resources.

17. To conclude -- After reading the telex I am sure April cannot be met and that we shall not take it on ourselves unless all the administration is done by consultants -- fully paid by a donor. Even though it will take quite a bit of additional time for you and me.

In that case if we are already torn to pieces why should we go into this adventure. It may be too late to back out; however, I shall not press on dates. I would not mind that.

(i) Until April - July 1985 Shanghai will write their report.

(ii) End of 1984 or early 1985 -- experts go.

(iii) End of 1985 or early 1986 -- workshop. Shanghai Report to be thoroughly discussed and later disseminated by us. Meanwhile, the workshop will be a concluding of phase and early evaluation of the large investment programme if it will find its funds and support from the Donors.

I am not negative but realistic. Priorities for our time is essential until we complete the present phase of GLO/80/004.

SA/aga

INT/81/026

GT

INTERNATIONAL DEVELOPMENT ASSOCIATION | INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT | INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

WUD/077/83

TO: S. Arlosoroff, Div. Chief, WUD

DATE: November 8, 1983

FROM: L. Rosenhall, Regional Project Officer

SUBJECT: Monthly Progress Report for the Month of October from our UNV in Thailand

Please find enclosed for your information a monthly Progress Report from Mr. Khin Maung Than "Johnie". With reference to his second last paragraph, the Division of Rural Water supply has made good progress in preparing caretakers manuals for the Korat Modified version and PVC Shallow Pump. The Training Program as such will be prepared by the Division of Rural Water Supply with my assistance in close cooperation with the Population and Community Development Association of Thailand (PDA). See my separate memo on the PDA issue.

Mr. Khin Maung Than has developed a form for the reading of the water monitors. It will be further developed to include flowrates of the various pump as well as amount of water produced by each pump.

One clear observation from the reading of the digital monitors is that the pump are hardly used during the wet season. This also corresponds with my own observation that rainwater catchment from roofs is very common in Saraburi Region. Looking at a Korat Conventional installed in Saraburi earlier this year equipped with a digital flow meter on October 13 gives the following conclusion: The pump was in operation for 104 minutes between October 13 to November 3 or say five minutes per day. The flowrate of the Korat Conventional is not yet established but let us assume 30 litres/minute. Thus, this very pump is currently producing 150 litres of water daily. Most of the pumps in Thailand (our project area) will have approximately the same utilization. This raises one important question on how relevant is our testing program during the wet season. I am really looking forward to the readings from the beginning of next year when the villagers have finished their rainwater collected by roof catchment. Perhaps I should mention that I am confident that the water monitor is working well. The second document prepared by Mr. Khin Maung Than is the caretakers logbook (Form No. 4). This will be translated into Thai next week and introduced to the caretakers without delay. Finally, Mr. Khin Maung Than has prepared a list of duties of the caretakers.

Your comments to the above will be much appreciated.

Regards.

LR/la

Enc.

cc Mr. Khin Maung Than
Mr. Chetpan Karnkaew, Director, DRWS
Mr. Wiroj Wiwathanachaisang, DRWS, Saraburi

INT/81/026

Letter No. INT/THA/V/031/09

Mr. Leif Rosenhall
Regional Project Officer
The World Bank
Udom Vidhya Building (5th Floor)
956 Rama 4 Road, Saladaeng
Bangkok 10500

1 November 1983

Dear Mr. Rosenhall,

Dempster pumps are under installation starting from 24 October as soon as site selection visits have been made in Saraburi and Lopburi Provinces. For the time being, 14 pumps (10 in Saraburi Province and 4 in Lopburi Province) have already been installed. Normally, 2 pumps can be completed to be installed a day and all of the Dempster pumps are expected to be completed within the first week of November.

Since we have had no more chance to select any other more suitable pump sites in Saraburi Province, some sites in Lopburi Province were added to the list of the sites of the installation of Dempster pumps. Most of the existing pumps were found far, over 80 Km, from the RWS Regional Office, Saraburi; and therefore these sites are not suitable for site inspection visits. Some of the pump sites, not so far from the RWS Office, around 60 Km, were found flooded and some sites could not be got because the grounds along the tracks were too soft to withstand the weight of the mobile truck due to heavy rain; and therefore only 4 pump sites were found useful for installation in Lopburi Province. For these reasons, some of the existing pump sites in Saraburi Province were reconsidered to be installed to meet the installation of projected 20 Dempster handpumps.

As the size of the Dempster pump base is smaller than that of existing one, the new holes for anchored bolts are necessary to be drilled at the existing pump base and to be welded whereever necessary.

The most suitable [illegible] existing PVC shallow well pumps were already selected for our field trials in Saraburi Province; and monitoring visits are to be carried out after the installation of Dempster pumps are completed.

20 PVC deep well pumps are expected to be installed within November as soon as site selection and purchase of these pump sets have been made.

19 water monitors (8 electro digital and 11 electro chemical water monitors) have already been installed at the water spouts of the Korat pump stands in Saraburi Province and monitoring visits are being carried out on a weekly basis. (monitor readings attached).

Since I had to pay attention to the site selection and handpump installation visits and some data were not available, some of the monitoring forms were not still completed. These works can be carried out only after the completion of the installation of handpumps.

With reference to our discussion with Khun Devaraksa of RWSD at Saraburi on 14 October, being a handpump monitor and having heavy workloads with monitoring visits as well as data analysis, I realize that I am not responsible for preparation of the training program for village handpump caretakers as previously assigned.

A draft for village caretaker log book (monitoring form No. 4), duties of the handpump caretaker and schedule for maintenance of simple handpumps are already prepared. (attached)

With my best regards.

Yours Faithfully,

Khin Maung Than

Khin Maung Than
United Nations Volunteer
INT/81/026

cc: 1. Khun chetpan Karnkaew
Director, RWSD, Bangkok
2. Mr. Winston Prattley
Regional Representative, UNDP, Bangkok
3. Khun Viroj Viwattanachaisang
Regional Director, [illegible] Regional Office, Saraburi

DUTIES OF THE HANDPUMP CARETAKER

The duties of the village handpump caretaker include:

1. See that the villagers operate the handpump properly so that it will have a long life.
2. Service the handpump once a week
3. See that excess water is channelled into a garden or soakage pit.
4. Keep the area around the handpump clean and free of refuse.
5. If the handpump breaks down, report it to the proper authority.
6. Maintain the handpump log book.
7. Explain to the villagers that water from a handpump is better for their health than water from a pond, river, or over well.

Preventive Maintenance

Once a week the Caretaker should do the following:

1. Check axle-bolt. Make sure lock - nut is tight.
2. Check flange bolts fastening water chamber to pedestal and make sure they are tight.
3. Lubricate the moving parts .
4. Make sure handpump is firm on its base.

Care and Operation of the Handpump

Proper care and operation of the handpump will lengthen its life and reduce the chances of breakdown. Proper use of the handpump is important. While pumping:

1. Stand directly behind the handpump.
2. Use long strokes , not short ones.
3. When finished, let handle return slowly to resting position .
4. Don't let excess water collect around the handpump. See that it runs into a garden or a soakage pit.
5. Keep the area around handpump clean and free of refuse.

Schedule fer maintenance of Simple handpumps

DAILY

1. Clean the well - head

WEEKLY

1. thorough clean - up of pump, well - head and surroundings.

2. oil or grease all hinge pins, bearings, and sliding parts (pump rods) after checking that no rust has developed on them.

3. record any comments from users about irregularities in working (tightness of parts, leaks from stuffing box, fall - off in water raised). Correct these when possible.

MONTHLY

1. if necessary, adjust the stuffing box or gland. Usually this is done by tightening the packing nut. This should not be tootight - there should be a slight leak when the adjustment is correct.

2. check that all nuts and bolts are tight, and check that there is no evidence of loose connections on the pump rods.

3. check for symptons of wear at the leathers, noting any comments from users about any falling off in the water raised. If the pump fails to raise water when worked slowly(e.g., at 10 strokes per minute) , replace the leathers.

4. carry out all weekly maintenance tasks.

ANNUALLY

1. paint all exposed parts to prevent development of rust.
2. repair any cracked concrete in the well - head and surrounds.
3. check wear at handle bearings and replace parts as necessary.
4. check plunger valve and foot valve; replace if found leaking.
5. check the pump rod and replace any defective lengths or connectors.
6. replace packing at the stuffing box or gland.
7. carry out all monthly maintenance tasks.

B1	B2	B3	B4	B5	B6	B7	B8
	Date	CONDITION OF		Preventive Maintenance	If failure, nature of failure	Action taken	Remarks
		Pump	Surroundings				
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							

FORM FOR WATER MONITOR READINGS

SR. NO.	TYPE OF MONITOR	WATER POINT	PUMP	INSTALLATION						READING (1)						READING (2)						READING ( )					
				DATE	M	D	H	M	S	DATE	M	D	H	M	S	DATE	M	D	H	M	S	DATE	M	D	H	M	S
1	DIGITAL	01/P.10/3SB29/24	KORAT (CONV)	13-10-83	1	1	12	00	00	21-10-83	1	1	12	48	30	28-10-83	1	1	13	11	35						
2	CHEMICAL	01/AR.2/12SB49/24	"	"	–	–	70	–	–	"	–	–	70	–	–	"	–	–	70	–	–						
3	"	01/R-7/16SB13/24	"	"	–	–	70	–	–	"	–	–	70	–	–	"	–	–	70	–	–						
4	DIGITAL	01/R-7/17SB14/24	"	"	1	1	12	00	00	"	1	1	12	57	30	"	1	1	13	28	30						
5.	"	01/R-8/15SB17/24	"	"	1	1	12	00	00	"	1	1	13	11	50	"	1	1	13	55	50						
6.	"	01/P-10/15SB27/24	KORAT (MODF.)	"	1	1	12	00	00	"	1	1	12	38	43	"	1	1	13	18	30						
7.	CHEMICAL	01/AR-2/5SB40/24	KORAT (CONV.)	"	–	–	70	–	–	"	–	–	70	–	–	"	–	–	70	–	–						
8.	"	01/AR-2/4SB39/24	"	"	–	–	70	–	–	"	–	–	70	–	–	"	–	–	70	–	–						
9.	"	01/AR.2/6SB41/24	KORAT (MODF.)	"	–	–	88	–	–	"	–	–	88	–	–	"	–	–	88	–	–						
10.	"	01/AR-2/28SB58/25	"	"	–	–	70			"	–	–	70	–	–	"	–	–	70	–	–						
11.	DIGITAL	01/AR-2/11SB46/24	KORAT (CONV)	"	1	1	12	00	00	"	1	1	12	48	12	"	1	1	17	13	27						
12.	CHEMICAL	01/AR.2/36SB63/25	"	"	–	–	88	–	–	"	–	–	88	–	–	"	–	–	88	–	–						
13.	DIGITAL	01/AR.2/27SB57/25	"	"	1	1	12	00	00	"	1	1	12	37	40	"	1	1	13	11	43						
14.	CHEMICAL	01/P-10/49SB56/25	"	"	–	–	105	–	–	"	–	–	105	–	–	"	–	–	105	–	–						
15.	DIGITAL	01/R-7/63SB67/25	"	"	1	1	12	00	00	"	1	1	12	12	58	"	1	1	14	26	16						
16.	CHEMICAL	01/P.10/38SB55/25	"	21-10-83	–	–	70	–	–	28-10-83	–	–	70	–	–												
17.	DIGITAL	01/R-7/62SB66/25	"	"	1	1	12	00	00	"	1	1	20	51	26												
18.	CHEMICAL	01/AR.2/14SB53/25	"	"	–	–	70	–	–	"	–	–	70	–	–												
19.	"	01/AR-2/31SB61/25	KORAT (MODF.)	"	–	–	70	–	–	"	–	–	70	–	–												

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

Urgent

INT/81/026

DATE November 7, 1983

TO Messrs. O. Langenegger, D. Grey, T. Journey, L. Rosenhall

FROM S. Arlosoroff

SA

EXTENSION 61790

SUBJECT CATR R&D Report and Proposed Program for 1987 - Joint Funding by O.D.A. and INT/81/026

Shall be grateful for your comments and views as early as possible. They are essential for us to make the final decision on our extended R&D work with CATR co-funded with the O.D.A. of the United Kingdom. Please telex us brief comments.

We attach now the Final Report of the 1983 activities and the proposed plan for O.D.A. funding. The other items in the priority list telexed to you sometime ago will have to be funded by us more or less on a 1:1 funding ratio with O.D.A. This means that the total scope, at present, may be limited to around US$50-60,000 split between O.D.A. and us.

We cannot use CIDA or GTZ funds for these activities - only UNDP funds.

Attachment

SArlosoroff:phm

cc: Messrs. M. Cohen, G. Tschannerl, R. Middleton, K. McLeod,
Y. Sternberg, M. Potashnik

FORM NO. 27 - OCR
(3/82)

WORLD BANK OUTGOING MESSAGE FORM Cable, Telex INT/81/026

IMPORTANT—PLEASE READ INSTRUCTIONS BELOW BEFORE TYPING FORM

F338

Typewritten Character Must Fall Completely in Box!

PAGE 1 OF 1 | OFFICIAL DEPT/DIV ABBREVIATION 61790 | MESSAGE NUMBER 1619 | TEST NUMBER (FOR CASHIER'S USE ONLY)

START HERE

ROSENHALL, INTBAFRAD, BANGKOK, THAILAND. OUR TELEX NO. 1469.

AAA PLEASE QUOTE OUR REFERENCE TELEX NUMBER CORRECTLY WHEN REPLYING. USE THE NUMBER GIVEN IN THE TEXT OF THE TELEX NOT ANY NUMBERS APPEARING ABOVE OR BELOW THE TEXT.

BBB PLEASE START NUMBERING YOUR TELEXES TO US CONSEQUETIVELY.

CCC RE YOUR TELEX DATED NOVEMBER 7 WITH NO NUMBER. RE AAA SCHEDULE CONFIRMED. RE BBB PUMP ORDERING IS COMPLICATED AND LENGTHY. BEST ARRANGEMENT AFTER WEIGHING OTHERS IS VIA UNICEF NEW YORK. EACH BATCH WILL BE ORDERED SEPARATELY AFTER RECEIVING WRITTEN PRICE PROPOSALS. WILL TAKE TIME. BEST JUDJEMENT THREE TO SIX MONTHS UNTIL INSTALLATION. IF YOU HAVE A BETTER IDEAS PLEASE LET US KNOW. RE CCC NO NEWS AFTER WE GOT YOURS ON YOUR DISCUSSION WITH UNICEF, RANGOON. RE DDD BORS ARE INTERESTING. TOO ELABORATE. CAN BE SHORTENED. HALF A PAGE ON MAJOR POINTS IS IMPORTANT. COVER LETTER TO US WITH SENSITIVE POINTS AS BORS SHOULD BE SENT BY YOU TO GOVERNMENTS AFTER OUR CLEARANCE. GERHARD WILL REPLY TO YOU IN ABOUT A WEEK. ARLOSOROFF, INTBAFRAD

END OF TEXT

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INFORMATION BELOW NOT TO BE TRANSMITTED

CLASS OF SERVICE: telex | TELEX NO.: 788-82817 | DATE: NOV.7,1983

SUBJECT:

DRAFTED BY: SARLOSOROFF:PHM | EXTENSION: 61790

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FORM NO. 27 - OCR (3/82)

INT/81/026

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1 PAGE OF

OFFICIAL DEPT/DIV ABBREVIATION 61790

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BOOK OF TWO

Red 1. ROSENHALL, INTBAFRAD, BANGKOK, THAILAND (TELEX 788-82817)
#1615

2. GREY, INTBAFRAD, NAIROBI, KENYA (TELEX 963-22022)
4064

END OF TEXT

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CLASS OF SERVICE: TELEX NO.: DATE: 11-7-83

SUBJECT: DRAFTED BY: EXTENSION:

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ATTENTION ROSENHALL, INTBAFRAD, BANGKOK. INFORMATION GREY, INTBAFRAD, NAIROBI. OUR TELEX NO. 1470. I CALL YOUR ATTENTION TO THE UNICEF MEMO I SENT YOU WRITTEN BY S. H. UMEMOTO DATED SEPTEMBER 16, 1983, PAGE 4, 6 AND ANNEX ON MALAWI. THE LESSONS FROM EAST AFRICA IN RELATION TO THE PACIFIC REGION INCLUDING TAKING PUMPS FROM MALAWI AND ZIMBABWE FOR TESTING IN THE PACIFIC. PLEASE CONTACT THEM IN MANILA AND SEEK TO COORDINATE THE EFFORTS. ALOSOROFF, INTBAFRAD

END OF TEXT

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CLASS OF SERVICE:

TELEX NO.:

DATE: NOV.7,1983

SUBJECT:

DRAFTED BY: SARLOSOROFF:PHM

EXTENSION: 61790

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INT/81/026

November 3, 1983

Mr. Ron Schatz
CIDA
200 Promenade du Portage
Hull, Quebec
K1A OG4
Canada

Dear Ron:

Re: UNDP INT/81/026 Handpumps Project

As per your request, we are enclosing a copy of the agreements on the handpumps project between the World Bank and the Governments of Ivory Coast, Ghana, Bangladesh and Sri Lanka.

Ivory Coast:	Exchange of letters with CHD, the latest dated May 11, 1982 (Annex I). Letter from DCH covering the CIDA contribution of March 14, 1983 (Annex II).
Ghana:	Letter of agreement from GWSC of March 14, 1983, convering CIDA funded activities in the handpumps project (Annex III).
Bangladesh:	Handpumps field trials are taking place in conjuction with the IDA Credit for Hand Tubewells, signed on July 8, 1981.
Sri Lanka:	Agreement with the National Water Supply and Drainage Board and GTZ dated July 2, 1982 (Annex IV).

I hope you will find the information useful.

Yours,

Gerhard Tschannerl
Senior Project Officer
Applied Research & Technology Div., WUD

Enc.

cc: Mr. S. Arlosoroff (WUD)

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GT:slj

INT/81/026

November 3, 1983

Mr. Michael A. Roumi
Manager, International Sales
Monarch Industries Limited
International Division
889 Erin Stret
Winnipeg, Canada

Dear Mr. Roumi:

Re: UNDP INT/81/026 Handpumps Project

We are in receipt of your letter of September 27, 1983. At this point we are able to send you only a brief reply due to a busy travel schedule. We propose to discuss other issues of mutual interest in 2-3 weeks after my return to the office.

We have agreed with Mr. Schatz to include Monarch pumps in the field trials in Ghana and are in full agreement that the head portion of the pumps (as yet not installed) should be replaced to accommodate your up-to-date design changes. The CIDA budget contribution to the handpumps project, however, does not include an item for Canadian handpumps in Ghana. Mr. Schatz likewise informed us that his budget does not provide for the replacements due to design improvements. We would therefore suggest that you make the replacements you suggest at your own cost as a promotional outlay. You can rest assured that we shall do our part in disseminating the findings from the field trials of your pumps to all the major assistance agencies and developing countries.

We hope to cooperate with you on the field trials on that basis. Please let us have your decision soon so that we can begin with implementation. A Country Monitoring Engineer specifically for the Upper Region of Ghana has been selected and approved by the Government, and will arrive in Accra shortly to take up his post.

We also would like to purchase from you two complete pumps for laboratory testing at the Consumers' Association Testing and Research (CATR) laboratory in U.K. at our cost. After receipt of your quotation, including shipping to Gosfield (near London), considering alternatively sea and air freight, we shall place the formal order.

Sincerely yours,

S. Arlosoroff
Applied Research and Technology Division, WUD
UNDP Projects Manager, INT/81/026, GLO/80/004, INT/82/002

cc: Messrs. Schatz (Canada), Langenegger (WB/Abidjan)
Ms. Mc Donald (Canada), del Castillo (WUD).

GT:slj

INT/81/026 yellow

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street, N.W.
Washington, D.C. 20433
U.S.A.

(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

November 3, 1983

The Charotar Iron Factory
Opp. New Ramji Mandir
M.G. Road
ANAND
Gujarat (388 001), India

Dear Sir:

Thank you for your letter of October 20, 1983, and the enclosed material. Like many other manufacturers, your pump has not been included in the testing because of lack of funds, support of recipient governments and donors and performance data for the expert panel selecting the pumps. The Mark II has been selected from India for laboratory and field testing on the basis of performance data received by us.

Our recommendation for getting your handpump into the UNDP INT/81/026 field trials program is to have it tested in our contracted laboratory. The results of the laboratory testing are widely distributed and, therefore, will probably be the most effective way to reach the market (however, it is not a prerequisite).

Due to budget limitations, pump manufacturers must cover the costs or raise funds for the laboratory testing of their pumps to be tested. An additional point is that the results of the laboratory testing will be disseminated unrestrictedly according to the scope of the project.

Another possibility would be to integrate your pump into a field trial of our project. However, as the field trials, as well as the handpumps to be field tested, are financed by donors such as governmental and non-governmental organizations involved in rural water supply projects in developing countries, you would need to approach such organizations.

If you are interested in having your pump tested in our contracted laboratory, you may contact Mr. Ken Mills, Testing Manager of CATR, and request detailed information about costs, available space, technical matters, etc. The address is as follows:

Consumers' Association Testing and Research
Harpenden Rise, Harpenden
Hertfordshire AL5 3BJ, England
Tel: 05827-64411; Telex: 826619

The selection of handpumps to be considered in the laboratory testing is handled by us, the UNDP INT/81/026 project management. Therefore, we ask you to provide us with all the available information about your pump: technical data and specifications, application, price, numbers of pumps installed, dates of installation, objectives and results of tests and performances.

Please let us know if we can be of any further assistance. We are interested in learning more about your pumps.

Sincerely yours,

S. Arlosoroff, Chief
Applied Research & Technology Division, WUD
(UNDP Projects Manager, INT/81/026, GLO/80/004, INT/82/002)

cc: Mr. K. Mills, CATR
Mr. K. Gray, UNICEF, New Delhi

SA/rkb

FORM NO. 27 - OCR
(3/82)

WORLD BANK OUTGOING MESSAGE FORM Cable, Telex

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1 OF 2	61790		

START HERE

ATTENTION DR. EMANUEL IDELOVICH, TAHAL CONSULTING ENGINEERS, TEL AVIV 64 364, ISRAEL. OUR TELEX NO. 1453. AAA SHALL BE GRATEFUL FOR YOUR ASSISTANCE. BBB WE URGENTLY NEED THE UP TO DATE MATERIAL OF ISRAEL'S EXPERIENCE ON GROUND WATER RECHARGE BY SEWAGE EFFLUENTS AND PRIMARY TREATED SEWAGE IF AVAILABLE. CCC OUR INTEREST IS THE TWO MAJOR PROBLEMS 111 CLOGGING, THE RATE OF RECHARGE REDUCTION AND THE MEANS TO COPE WITH THE DIFFICULTIES. 222 THE REDUCTION OF POLLUTANTS, BOD, COD, TOC ETC. DDD I WOULD PROPOSE TO INCLUDE MATERIAL FROM ASHKELON TRIALS AND DAN PROJECT. AND OTHER TRIALS THAT I MAY NOT BE FAMILIAR WITH. EEE THE IMMEDIATE PROBLEM WE FACE IS RELEVANT TO TWO COUNTRIES WHERE PROPOSALS ARE BEING CONSIDERED FOR RECHARGE OF PRIMARY TREATED LAGOON EFFLUENTS THROUGH LAYERS OF SIX TO EIGHT METERS OF SAND ABOVE LIME STONE AQUIFER AND SECOND CASE SECONDARY TREATED LAGOON EFFLUENTS THROUGH SHALLOW (2-3 METERS) LAYER OF SAND ELUVIAL (40-50%) CLAY OVER BASALT AQUIFER, DISCHARGING THE WATER TO A STREAM 1 KILOMETER AWAY. WATER IN THE STREAM IS USED FOR DOMESTIC PURPOSES AND IRRIGATION OF VEGETABLES FOR THE NEARBY TOWN WHICH IS THE SOURCE OF THE EFFLUENTS. WE SHALL BE GRATEFUL FOR EARLY DELIVERY OF THE

END OF TEXT

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PAGE 2 OF 2

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MATERIAL WITH A COVER LETTER FROM YOU GIVING YOUR VIEWS ON THE ISSUE. ARLOSOROFF, CHIEF, APPLIED RESEARCH AND TECHNOLOGY DIVISION AND UNDP PROJECTS MANAGER, INTBAFRAD

END OF TEXT

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TELEX NO.:

DATE: NOV.2,1983

SUBJECT:

DRAFTED BY: SARLOSOROFF:PHM S.A.

EXTENSION: 61790

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cc: Messrs. A. Thys
R.Costa, J.Pettigrew

AUTHORIZED BY (Name and Signature): S.ARLOSOROFF S.A.

DEPARTMENT: WUD

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INT/81/026

November 1, 1983

Mr. Amaury Mauro de Oliveira
Director Tecnico - CERB
Companhia de Engenheria Rural de Bahia
Av. Luiz Viana Filho (Av. Paralela)
Centro Administrativo de Estado da Bahia
Salvado, Brazil

Dear Mr. de Oliveira,

I understand that the State Rural Water Supply Company of Bahia (CERB) has recently started to install locally designed handpumps in a number of areas in Bahia. The World Bank is the executing agency for a UNDP Rural Water Supply Handpumps project which has been conducting extensive laboratory and field tests of handpumps to provide the necessary technological basis for the development of cost-effective handpump installation in developing countries. Ultimately we expect to be instrumental in the development of VLOM (Village Level Operation and Maintenance) pumps which can be manufactured in the developing countries and repaired by trained village operators. Therefore we are extremely interested in your experience with locally designed pumps.

Generally, we would very much appreciate knowing where the pumps are being installed, what the static water levels are, what type of wells (dug, drilled, etc.) are involved, name and model pf pump, manufacturer(s), general description of pump(s), (i.e., materials, pumping element, stroke, etc.), what sort of use the pumps are getting (number of persons or households using pump, hours per day utilized), and how and by whom they are being maintained. Any data on costs -- of well, pump, maintenance -- which you have developed would also be appreciated.

For your information I am enclosing a short brochure on our project, one of our published reports which detail some of our experiences from laboratory testing of various handpumps, and several articles that describe our operations and objectives.

Thank you in advance for your consideration.

Sincerely yours,

S. ARLOSOROFF, CHIEF
(WUD/ART)

S. Arlosoroff, Chief
Applied Research and Technology Division (WUD)
(UNDP Projects Manager, INT/81/026, GLO/80/004, INT/82/002)

Enclosures

cc. Messrs. A. Zavala (WUD), G. Yepes (LCPWS)

AIR/aga

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