

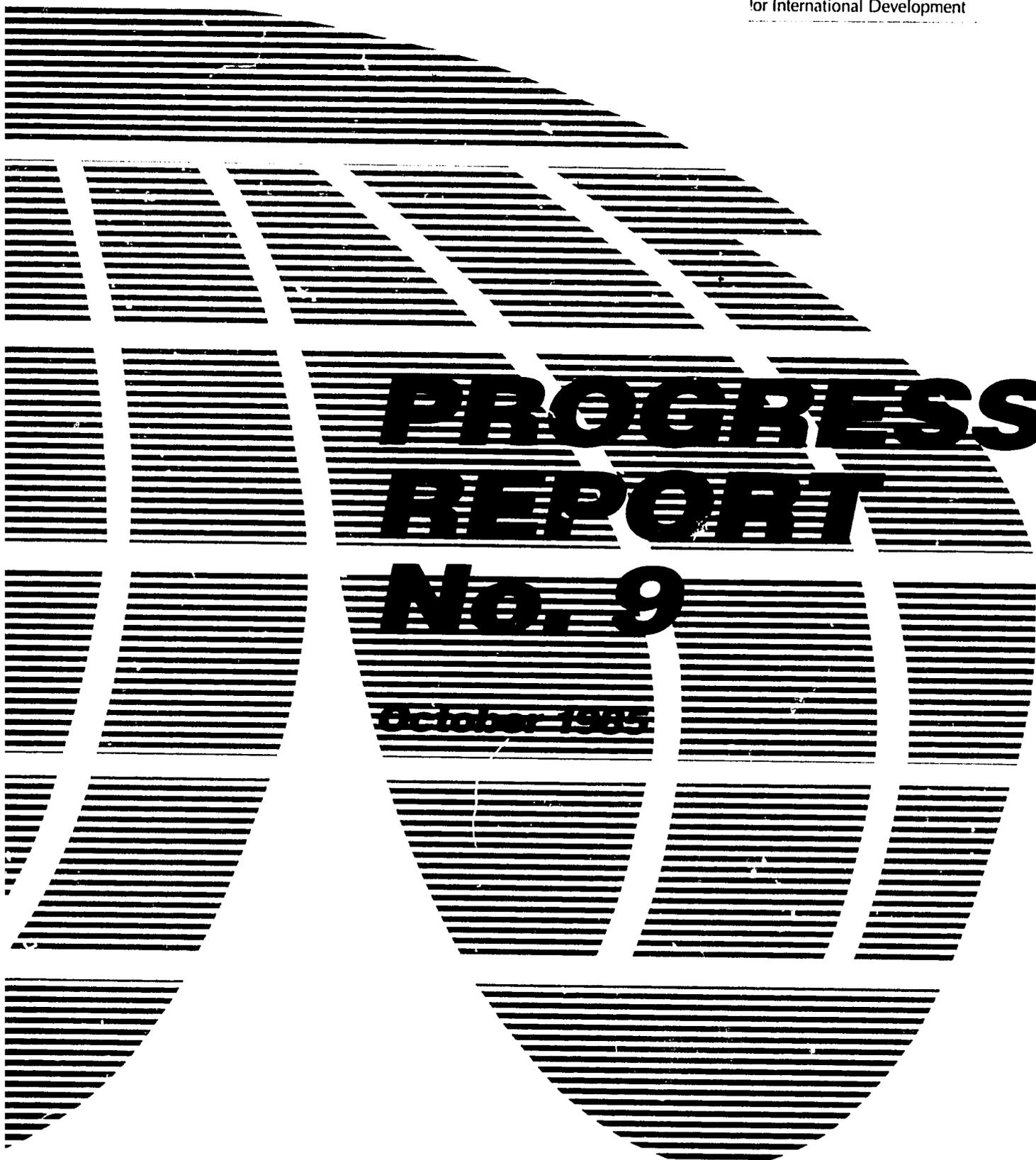
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WASH

WATER AND SANITATION
FOR HEALTH PROJECT

Sponsored by the U.S. Agency
for International Development



PROGRESS REPORT

No. 9

October 1985

Operated by CDM and Associates

Dresser & McKee International Inc.
ciates in Rural Development, Inc.

International Science and Technology Institute
Research Triangle Institute

Training Resources Group
University of North Carolina at Chapel Hill



Villagers collecting water from a stream because the local water system is not working.



Masonry water storage tank under construction.



Inspecting a spring box which protects the source for a gravity-fed water supply system. See WASH Field Report No. 121. Bolivia.

WATER AND SANITATION FOR HEALTH PROJECT

WASH Progress Report No. 9

October 1985

Summary of CDM Contract Activities August 29, 1980, to September 30, 1985

*Prepared by James E. Beverly
Associate Director for Information Services*

Water and Sanitation Health Project
Contract No. 5942-C-OO-4085-00, Project No. 936-5942
Sponsored by the Office of Health, Bureau of Science and Technology
U.S. Agency for International Development
Washington, D.C. 20523



Trench latrines in refugee camp in Ethiopia. These open latrines were built when camp residents refused to use enclosed latrine shelters. See WASH Field Report No. 145.



In the unsewered areas of Giza City near Cairo, Egypt, household sewage vaults must be emptied by hand into donkey-drawn sewage carts. See WASH Field Report No. 52.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

The initials and acronyms in this Glossary appear in the titles and summaries of WASH task or work assignments. Note that the title of an organizational unit may change from time to time, i.e., the current Bureau for Science and Technology (S&T) was formerly the Bureau for Development Support (DS).

- ACT—Activity — the name given to specific work or task assignments (from the Office of Health to CDM/WASH under the WASH II Contract)
- AFR/DR—Africa Bureau, Office of Project Development
- AFR/TR/HNP—Africa Bureau, Office of Technical Resources, Division of Health and Population
- AID—Agency for International Development
- AID/AFR—AID Bureau of Africa
- AID/ANE—AID Bureau for Asia and Near East
- AID/ASIA—AID Bureau for Asia (now in ANE)
- AID/LAC—AID Bureau for Latin America and the Caribbean
- AID/NE—AID Bureau for Near East (now in ANE)
- AIDIS—Inter American Association of Sanitary Engineers
- ARD—Associates in Rural Development
- AWWA—American Water Works Association
- CARE—Cooperative for American Relief Everywhere
- CDM—Camp Dresser & McKee
- CEP—Community Education and Participation
- DS/ENGR—Development Support Bureau, Office of Engineering
- DS/HEA—Development Support Bureau, Office of Health
- DS/POP—Development Support Bureau, Office of Population
- FR—WASHI Field Report
- HRD—Human Resource Development
- IRC—International Reference Center for Community Water Supply and Sanitation (The Hague)
- ISTI—International Science and Technology Institute
- LAC/DR—Bureau for Latin America and the Caribbean/ Office of Development Resources
- LDC—Less or least developed country
- NE/PD/ENV—Near East Bureau, Office of Project Development, Environmental Protection
- NE/TECH—Near East Bureau, Office of Technical Support
- NE/TECH/HPN—Near East Bureau, Office of Technical Support, Health Population and Nutrition Development Division
- OFDA—Office of Foreign Disaster Assistance
- ORT—Oral rehydration therapy
- OTD—Order of Technical Direction — the name given to specific work or task assignments (from the Office of Health to CDM/WASH under the WASH I Contract)
- PAHO—Pan American Health Organization
- PCV—Peace Corps Volunteer
- PPC/E—Bureau for Program and Policy Coordination, Office of Evaluation
- PPC/EI—Bureau for Program and Policy Coordination, Office of Evaluation and Information
- PRE—Bureau for Private Enterprise
- REDSO/EA — Regional Economic Development Service Offices/ East Africa
- REDSO/WA — Regional Economic Development Service Office/ West Africa
- RHUDO—Regional Housing Development Office
- ROCAP—Regional Office for Central American Programs
- RM—Request Memorandum
- RTI—Research Triangle Institute
- S&T/H—Bureau for Science and Technology, Office of Health
- S&T/HEA—Bureau for Science and Technology, Office of Health
- S&T/H/WS—Bureau for Science and Technology, Office of Health, Division of Community Water Supply and Sanitation
- TOT—Training-of-Trainers
- TR—WASH Technical Report
- TRG—Training Resources Group
- UNC—University of North Carolina
- UNICEF—United Nations Children's Fund
- USAID—United States Agency for International Development
- WASH—Water and Sanitation for Health Project
- WHO—World Health Organization
- WS&S—Water Supply and Sanitation

1. INTRODUCTION

This is the first Progress Report to be issued in the second phase of the Water and Sanitation for Health (WASH) Project which is under the sponsorship of the Office of Health, Bureau for Science and Technology, U.S. Agency for International Development. The first phase of WASH ran from August 1980 through October 1984. The second phase (WASH II) will be completed in September 1989. Progress Report Number 9, like its predecessors, includes a cumulative summary of all WASH technical assignments in the United States and overseas. It illustrates the scope, diversity, and multi-disciplinary accomplishments of the WASH Project. The task summaries and related WASH Reports can assist AID staff, client organizations, ministries, PVOs, etc., in preparing proposed scopes of work for WASH as well as identifying planning elements in the water supply, sanitation and environmental health sector.

The WASH Project provides AID Bureaus and Missions with short-term, multi-disciplinary technical services and information to support its drinking water and sanitation projects with a minimum of administrative effort and delay. WASH supplies experts in engineering, operations and maintenance, planning, economics, social sciences, public health, human resource development, training, and the technology of low-cost water supply and sanitation. WASH Project services are available to AID Missions, Regional Bureaus and Central Offices, and where appropriate, to host country governments, private voluntary organizations, U.S. agencies, and organizations in the AID-assisted developing countries. WASH also collaborates with other international organizations and is an active participant in the United Nation's International Drinking Water Supply and Sanitation Decade (1981-1990).

The following sections of the Introduction briefly discuss the expanded WASH contract team of CDM and Associates, operational planning in WASH, planned AID Mission and Bureau requests for WASH services, and how WASH services may be obtained from AID. Page 3 is a geographic summary table listing all WASH work assignments in developing countries since August 1980 by task identification number. Chapter 2 presents a subject index and summaries of all WASH technical work done for AID in two sections; one for WASH I (September 1980 - September 1984) and the next for WASH II (October 1984 - September 1985). The third chapter includes the WASH Publications List which is organized with a subject index, a country and AID office index, an author index and the citation listing of the 182 Technical and Field Reports in numerical sequence.

Expanded WASH Contract Team

While WASH II will continue to provide essentially the same services to AID and to organizations and countries assisted by AID, the capabilities of the WASH contract team have been broadened and strengthened and operational planning procedures have been improved. Camp Dresser and McKee International Inc. (CDM) continues as the prime contractor for the WASH Project. Three WASH Associates, subcontractors to CDM in WASH I also continue in WASH II: the International Science and Technology Institute, Inc. (ISTI), Washington, D.C.; the Research Triangle Institute (RTI), Research Triangle Park, North Carolina; and the University of North Carolina at Chapel Hill.

Under WASH II, CDM and Associates have been reinforced by two additional organizations—Associates in Rural Development, Inc. (ARD), Burlington, Vermont; and the Training Resources Group (TRG), Alexandria, Virginia. ARD supplies expertise in the transfer of appropriate technology and TRG supports training and institutional and human resource development. ISTI will continue to backstop WASH in information management and project design and evaluation; RTI will support WASH in the social sciences, financial analysis, health and laboratory testing; and UNC will continue to provide skills in applied investigations and issues analysis, health education, and institutional and policy aspects of engineering applications.

WASH Planning

Operational planning in WASH II has become more formal and has enabled more efficient use of WASH resources and more effective and timely support to AID missions and AID assisted institutions. The WASH fiscal year 1986 Annual Plan, which will run from October 1, 1985 through September 30, 1986, includes twelve planned initiatives and fourteen AID Mission and Bureau requests for specific services, all of which will be scheduled into an integrated work plan. Of course, time and WASH resources are also reserved to service on a flexible basis additional requests as developed by Missions and Bureaus later on during the year.

Initiatives

The WASH initiatives are intended to be directly supportive of AID's objectives in the areas of institutional and human resource development, private enterprise, and technology development and transfer

within the WS&S sector. It is also proposed that WASH undertake an initiative to improve the practice of project design and implementation with regard to the health and sanitation aspects of irrigation projects.

These initiatives were developed by CDM and its subcontractors in close consultation and collaboration with AID and other organizations active in the WS&S sector. The initiatives are designed to be consistent with AID's overall objective, of significant benefit to a broad audience, likely to advance the "state-of-the-art" in important areas in the WS&S sector, and implementable through the WASH mechanism.

Approximately 40 new initiatives were developed for consideration over a period of several months. The following were determined to be of highest priority:

- 86-118 Development of Scope of Work for HRD Management Activity
- 86-119 Strategy for Developing Training Capability in a WS&S Institution
- 86-120 Development of Management Training Course for WS&S Managers
- 86-121 Continuation of Financial Management Planning Task
- 86-122 Financial Issues and Analysis for WS&S Sector Strategic Planning
- 86-123 Financing Methods and Cost Recovery Strategies for WS&S Programs
- 86-124 Cost Management: Comparative Performance Measurement in WS&S Systems
- 86-125 Control of Childhood Defecation Patterns
- 86-126 Development of O&M Assessment Guide for Additional Types of Water Systems
- 86-127 Privatization and O&M
- 86-128 Technology Transfer Intervention for WASH
- 86-129 Domestic Water Supply and Sanitation in Irrigation Projects

Mission and Bureau Requests

The FY 1986 work plan includes 14 activities based on direct requests from AID Missions and Bureaus. Many of these activities are the result of a cable from the Office of Health to AID Bureaus requesting their input to this annual work plan. The requests contained in this plan have been reviewed and approved on a preliminary basis. Prior to implementation, WASH staff will work with AID to fully define the scope and budget for these activities.

- 86-130 Sri Lanka: Information Assistance
- 86-131 Sri Lanka: Monitoring/evaluation of WS&S Sector Project
- 86-132 Sri Lanka: Periodic Technical Assistance
- 86-133 Sri Lanka: Reorganization of NWSDB
- 86-134 Swaziland: Community Participation Workshop
- 86-135 Tunisia: RHUDO Seminar on Parastatal Water and Wastewater Experience

- 86-136 Tunisia: RHUDO Sanitation Upgrading Project Review
- 86-137 Morocco: RHUDO Water/Wastewater Project Review
- 86-138 Rwanda: Ruhengeri Water Resources Issues
- 86-139 Malawi: Training of Trainers/Health Education Training
- 86-140 Ivory Coast: Review of WS&S Institutions
- 86-141 Ivory Coast: Evaluation of Prototype Latrines
- 86-142 Bolivia: Operations and Maintenance Training
- 86-143 Sudan: Training of Trainers (TOT)/Sanitation Workshop for Rural Health Support Project

How WASH Services May be Obtained

WASH provides a broad range of short-term technical assistance services to help conceive, plan, implement, and evaluate rural and urban water supply and sanitation projects. Water and sanitation components of health, agriculture, disaster relief, nutrition, housing, private enterprise, voluntary assistance, science and technology, and urban and rural development projects are also eligible for WASH assistance.

WASH services are available in the following areas:

- Engineering and technology
- Health education
- Institutional development
- Policy and strategy planning/implementation
- Latrine and sanitation technology
- Rural and urban development
- Public health
- Research and development
- Community participation
- Technology transfer
- Human resource development
- Training (all levels)
- Operations and maintenance
- Private enterprise development
- Environmental assessment
- Water Decade planning
- Technical and development information
- Social soundness analysis
- Project/program evaluation
- Housing
- Economics
- Financing/rate structure/economic analysis
- Ground/surface water development
- Wastewater and sewage treatment and disposal
- Solid waste disposal
- Vector control
- Environmental health sector assessment
- Disaster relief

Countries Served by WASH
WASH Task Assignment Index by Countries, 1980-1985

AFRICA

Benin: *O-45, A-150*
 Botswana: *O-95,* A-144, A-189*
 Burkina Faso: *O-174, A-143,* A-167, A-171*
 Burundi: *O-36,* O-137**
 Cameroon: *O-108, O-118,* A-122*
 Central African Republic: *O-106,* A-156*
 Chad: *A-134*
 Ethiopia: *R-112,* A-121, A-131**
 Ghana: *O-189**
 Ivory Coast: *O-164**
 Kenya: *O-104, O-157,* A-188*
 Lesotho: *O-88,* A-145, A-181*
 Mali: *O-64**
 Malawi: *O-144,* O-149**
 Mauritania: *O-16,* O-172**
 Mozambique: *O-179*
 Niger: *O-27*
 Senegal: *O-78,* O-127, O-147**
 Sierra Leone: *O-166, A-162*
 Sudan: *O-60,* O-192, R-111*
 Swaziland: *O-131,* O-168,* A-169, A-170*
 Tanzania: *O-26,* O-75,* O-142**
 Togo: *O-45,* O-53,* O-91, O-116,* O-145,* O-170, A-176, A-179*

Upper Volta: (See Burkina Faso)
 Zaire: *O-47, O-100,* O-141,* O-167,* O-188,* R-114,* A-161, A-174, A-187*

ASIA/NEAR EAST

Bangladesh: *O-169*
 Egypt: *O-62,* O-77,* O-177, O-180, O-186,* O-191, R-108, A-118, A-158*
 India: *O-28*
 Indonesia: *O-25,* O-44,* O-73,* O-79,* O-113,* O-117,* O-133,* O-136,* O-155**
 Jordan: *O-31,* O-55,* O-59,* O-183*
 Lebanon: *O-20,* O-124,* O-134**
 Morocco: *O-61,* O-111**
 Nepal: *A-163*
 Oman: *A-132, A-159, A-182*
 Philippines: *O-11,* O-40,* O-43,* O-113,* O-119, A-164*
 Sri Lanka: *O-113,* O-138,* O-156, A-151**
 Thailand: *O-38,* O-123,* O-139, A-160*
 Tunisia: *O-15,* O-52,* O-63,* O-92,** O-120,* O-146, O-158,* O-181, R-110,* A-130,* A-153*

Turkey: *O-171*
 Yemen: *O-39,* O-161, A-175*

LATIN AMERICA

Bolivia: *O-93, O-151, O-173, O-182, R-104, A-168, A-178*
 Belize: *O-187, R-113, A-117*
 Brazil: *O-66**
 Chile: *R-107*
 Costa Rica: *O-98*
 Dominican Republic: *O-1,* O-21,* O-48,* O-58,* O-84, O-97,* O-99,* O-103,* O-113,* O-130,* O-132, O-143,* R-106,* A-136, A-172*
 Ecuador: *O-14,* O-24,* O-42,* O-71,* O-82,* O-96,* O-102,* O-105,* O-178,* O-193**
 El Salvador: *O-17,* O-148*
 Guatemala: *O-19,* O-30,* O-76,* O-150**
 Haiti: *O-9,* O-46,* O-129,* O-140,* O-162, O-165*
 Honduras: *O-29,* O-72,* O-85,* O-94,* O-101,* O-113,* O-115,* O-126, O-135,* O-185,* A-137*
 Jamaica: *O-176*
 Peru: *O-5,* O-6,* O-18,* O-32,* O-74,* O-114,* O-152, O-175,* O-190**

* = WASH Report published for this task. See WASH Publication List Country Index.
 O = WASH I Tasks (OTD)
 R = WASH II Tasks (Request Memorandums)
 A = WASH II Tasks (Activities)

The Application Procedure

1. AID Mission, Regional Bureau, or AID/W Office identifies a drinking water or sanitation problem to be addressed by the WASH Project on its own initiative or in cooperation with an AID client organization such as a Ministry or PVO.

2. Requesting Office contacts the appropriate backstopping Office in the Regional Bureau by cable or letter with an information copy to the AID WASH Project Office outlining:

- The problem
- Scope of services required
- Coordinating organizations or contact persons
- Start/stop time for services

3. The appropriate Bureau backstopping office staff then contacts the WASH Project Officer (S&T/H) in the Office of Health, Bureau for Science and Technology, at (703)-235-9823 to discuss the scope and timing of services.

4. The S&T/H/WS WASH Project Officer reviews the user's request in relation to other requests for services, the current WASH Annual Work Plan, and funds available to the WASH Project. Missions, Bureaus and Offices may transfer funds to the WASH Project to assure availability of WASH services.

5. After the S&T/H WASH Project Officer responds positively to a request for services, he requests the services from the Project Director of the WASH contract. WASH staff then works directly with Missions/Regional Bureaus and the client organization, when appropriate, on final implementation details and timing and delivery of the requested services.

Figure 1 illustrates the flow of requests to WASH and the delivery of WASH services.

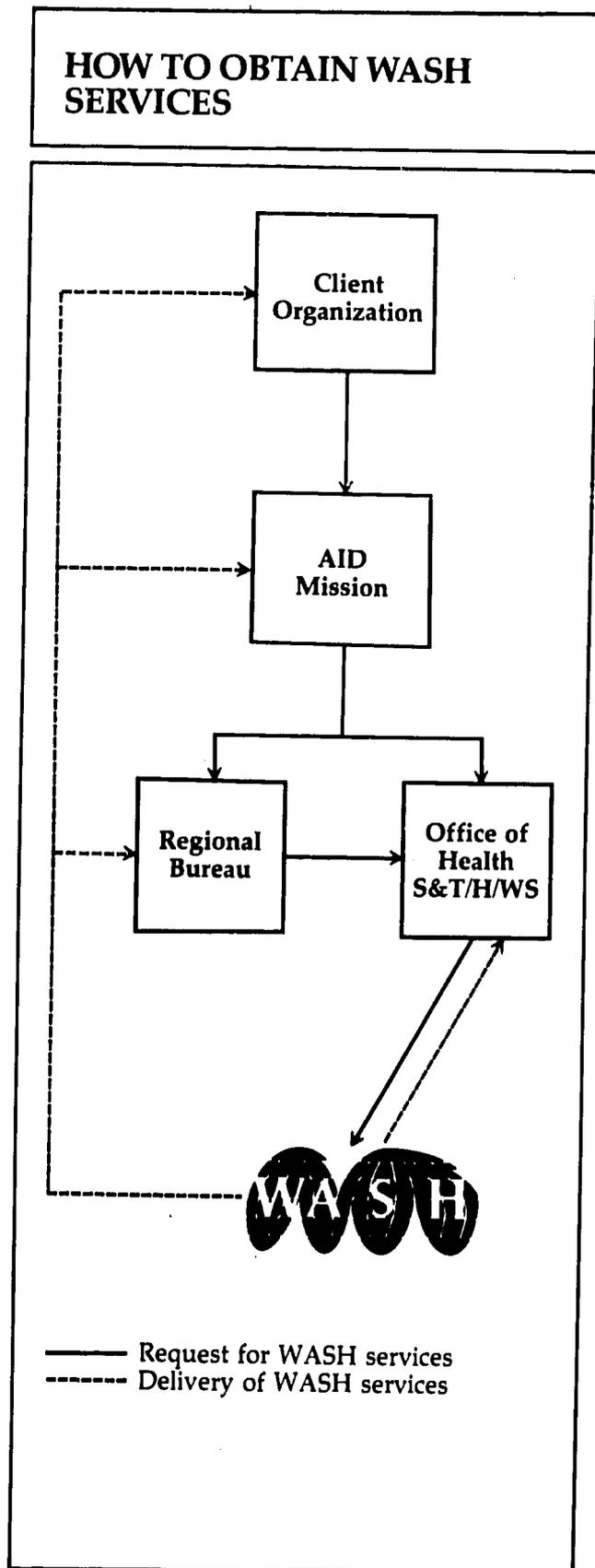


Figure 1. Flow Chart of WASH Services

2. WASH Task Assignment Summaries 1980-1985

This chapter contains summaries of all major task assignments given to WASH by the Office of Health. The first section is a subject index of task assignments, such as community education and participation, evaluation, geology, latrines, training, etc. Each task is numbered with a letter prefix. During WASH I, all tasks had the prefix "O", standing for Order of Technical Direction from the Office of Health. All of the WASH I tasks, from September 1980 through September 1985, are found in the second section of this Chapter. The third section contains summaries of task assignments for WASH II, beginning in October 1984 and running through September 1985. WASH II tasks have a prefix letter of either "R", for Request Memorandum from the Office of Health, or an "A" for an Activity authorized by the Office of Health.

Each summary includes a task assignment number; the month and year the task was begun; its status, whether completed, cancelled or on-going; the last name of the task manager; the title of the task; and the country or AID Bureau or Office that initiated the task. If a WASH Report was prepared as part of the task, the number of the Technical or Field Report will be noted, as well as references to related Reports or tasks. All WASH Reports are listed and indexed by subject, country, AID Office, and author in Chapter 3.

Subject-Index of Task Assignments

Note: Bold-face type indicates tasks primarily devoted to index subject. Where there is no boldface under a subject, all tasks were primarily devoted to that subject.

O = Order of Technical Direction (WASH I)
R = Request Memorandum (WASH II)
A = Activity (WASH II)

Bibliographies and Synthesis Documents: O-3, O-17, O-65, O-160, O-165

Community Education and Participation: O-24, O-41, O-56, O-73, O-79, O-91, O-96, O-101, O-127, O-129, O-142, O-144, O-146, O-147, O-155, O-166, O-167, O-173, O-182, O-185, O-190, R-104, A-117, A-124, A-171

Community/Rural Water Supply and Sanitation: O-9, O-14, O-18, O-24, O-27, O-36, O-38, O-41, O-43, O-44, O-45, O-57, O-58, O-60, O-64, O-73, O-74, O-76, O-78, O-79, O-91, O-92, O-93, O-95, O-96, O-101, O-116, O-117, O-118, O-120, O-121, O-127, O-129, O-132, O-133, O-135, O-139, O-140, O-144, O-145, O-147, O-149, O-150, O-151, O-152, O-155, O-157, O-161, O-152, O-168, O-174, O-175, O-177, O-182, O-185, O-186, O-187, O-188, O-189, O-190, O-191, O-192, R-104, R-108, R-113, R-114, A-117, A-138, A-139, A-140, A-145, A-150, A-152, A-154, A-160, A-162, A-163, A-164, A-165, A-168, A-172, A-181, A-185, A-187, A-188

Computers: O-99, O-103, O-105, O-193, A-154, A-159

Dams: O-16, A-143, A-166

Disaster Assistance: (See OFDA in last section)

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Housing: O-94, O-104, O-128, O-158, O-164, O-176, O-181, O-186, R-110, A-188

Human Resource Development (HRD) including

Training: O-4, O-25, O-26, O-41, O-44, O-45, O-46, O-49, O-55, O-74, O-75, O-76, O-78, O-80, O-82, O-85, O-86, O-87, O-90, O-92, O-93, O-96, O-100, O-105, O-110, O-111, O-112, O-116, O-121, O-122, O-123, O-127, O-129, O-131, O-137, O-138, O-139, O-141, O-142, O-152, O-153, O-154, O-157, O-160, O-165, O-166, O-167, O-175, O-177, O-184, O-187, O-191, O-192, R-105, R-107, R-108, R-115, A-116, A-124, A-130, A-133, A-138, A-151, A-163, A-174, A-176, A-179, A-187

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Sanitation (see also *Latrines, Waste Disposal and Wastewater Treatment*): O-142, O-158, O-191

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Task Assignments in WASH I, September 1980–September 1984

OTD #1 September 1980: Completed Warner

Handpump Manufacturing–Dominican

Republic The AID Health Sector Loan Project for manufacturing AID handpumps in the Dominican Republic was having trouble with quality control, materials processing and testing in the foundry operation, in-shop techniques of assembly, and in the organization of larger scale production activities. The WASH consultant identified casting, design and dimensional errors in several materials which would make pump assembly and maintenance difficult, if not impossible. These problems were solved and the possible use of locally manufactured PVC deep well cylinders was considered. See WASH Field Report No. 20.

OTD #2 September 1980: Completed Beverly

American Public Health Association Meeting–Exhibit of Aid Appropriate Technology Water Supply and Sanitation Devices–Detroit, Michigan–DS/HEA

The purpose of this exhibit, held 17-23 October 1980 in Detroit, was to show interested health professionals from the United States and foreign countries appropriate water supply technologies developed under AID auspices. The devices shown were: 1) the AID handpump; 2) the Robometer (a low-cost, household, user activated, CO2 cartridge powered device to release measured volumes of water); 3) the Robovalve (a PVC heavy duty, essentially leak proof, faucet/valve for use on public and private water hydrants); and 4) the Roboscreen (low-cost PVC slotted pipe to screen out gravel and sand in well pipes).

OTD #3 October 1980: Completed Beverly

Project Design Manual References

Development–Near East Bureau The Near East Bureau developed a manual to assist USAID staff in identifying and describing water supply and sanitation projects in the field. An important component of the WS&S Manual is its “reference library” consisting of seventeen texts, papers and reports, some unpublished, which was supplied by WASH under this OTD. Similar “library sets” and bibliographies on relevant water supply and sanitation themes can be developed on request from Missions and Bureaus.

OTD #4 October 1980: Completed Hafner

Competency-Based Training/Planning for

Agency–DS/HEA; AID/W The purpose of this OTD was to collect and analyze information about training in past and present AID projects involving water and sanitation components. The results of this analysis are used by WASH in responding to training assistance requests

from Missions and Bureaus and in planning training conferences, workshops and seminars. This process was aimed at developing appropriate strategies and guidelines for the training aspects of water supply and sanitation project design, implementation, and evaluation at all levels in developing countries.

OTD #5 October 1980: Completed Isely

UNICEF/Pan American Health Organization Water Supply and Sanitation Workshop and Discussion of WASH Services, Lima, Peru–PAHO; DS/HEA

This meeting was one of six held by UNICEF in its several regions for the purpose of defining UNICEF's activities during the International Drinking Water Supply and Sanitation Decade, 1981-1990. It was held in Lima, Peru 17-22 November 1980. The purposes of having a representative of the WASH Project present were: 1) to learn more about UNICEF's and PAHO's plans and programs for the Water Decade; 2) to explain the WASH Project and how its work could be coordinated with other organizations; and 3) to meet LDC people active in water supply and sanitation. See WASH Field Report No. 30.

OTD #6 October 1980: Completed Isely

Social Science Analysis for Water Supply and Sanitation: Aid Administrator Bennet Project

Evaluation–PPC/EI As part of its program of impact evaluation of rural projects, the Bureau for Program and Policy Coordination (PPC) requested social science expertise on Peru from the WASH Project. A social scientist did a document search and data analysis on health, socio-economic, institutional and demographic indicators for the provinces of Ancash and Libertad, Peru. Corresponding information was also developed describing the broader characteristics of the sierra region and the nation. See WASH Field Report No. 1.

OTD #7 November 1980: Completed Isely

Oral Rehydration Therapy (ORT): Review Discussion of Need for Using Potable Water in ORT

Solutions–DS/HEA; DS/POP Major issues discussed were the effects of oral rehydration solutions made with contaminated water and how the provision of potable drinking water might improve health and have a desirable effect on morbidity, mortality and fertility rates, and on nutrition. The results of this meeting, which includes a limited literature search on oral rehydration fluids and disinfection, may be found in WASH Technical Report No. 2

OTD #8 November 1980: Completed Isely

Plan American Health Organization/Caribbean Community Water Supply and Sanitation Planning Meeting in Barbados-PAHO; DS/HEA The purpose of this international meeting, sponsored by the Pan American Health Organization and the Caribbean community, was to discuss: 1) proposed national environmental health activities in the Caribbean to improve programming 2) the International Drinking Water Supply and Sanitation Decade; and 3) the new AID Water and Sanitation for Health Project (WASH) which began operating in September, 1980. Twenty senior environmental, health project and engineering officers from Caribbean countries and international agencies attended the meeting.

OTD #9 November 1980: Completed Warner

Rural Water Supply Review-Haiti AID has supported the CARE and other PVO rural water supply projects in Haiti for several years with good results but with much room for improvement and expansion. Fourteen rural water systems were visited and appropriate recommendations made. Since a dozen or more PVOs are active in Haiti's water supply and sanitation development, a major recommendation was that WASH support a practical workshop for all local PVO's and others concerned with water supply and sanitation in Haiti. A workshop was held in February 1983. See WASH Field Report No. 2. See also WASH Field Reports Nos. 77 and 96, and OTDs Nos. 129, 140 and 162.

OTD #10 November 1980: Cancelled Beverly

Regional Health Officers Conference Participation for West Africa-REDSO/WA; AFR/DR After the WASH Project staff had spent several days organizing a presentation and procuring documents for distribution at this Conference, scheduled for 7-13 December 1980 at Abidjan, Ivory Coast, a decision was made by the Africa Bureau to delete the subject of water and sanitation from the agenda. However, the documents on water supply and sanitation that were to have been distributed at the Conference were mailed to the participants at their missions.

OTD #11 November 1980: Completed Warner

Local Manufacturing for Water Supply and Sanitation Devices-Philippines The AID Offices of Capital Development and Engineering in Manila had programmed the local manufacture of AID handpumps and Roboscreens, which are used in wells and infiltration galleries to screen out sand. They requested WASH Project assistance in laying out the scope of work for the procurement, supervision and production of this equipment and of complete wind-powered water pumping system/facilities. The draft scope of work was reviewed by the Mission and led to OTD #40 below. See WASH Field Report No. 3. See also WASH Field Report No. 54.

OTD #12 November 1980: Completed Warner

Research and Development Prototype Water Supply and Sanitation Devices-DS/HEA The purpose of this OTD was to review options, prepare recommendations to DS/HEA for discussion, and develop a subcontract with an organization having highly innovative, inventive industrial and mechanical engineering professionals with demonstrated expertise in going from concept to operational prototype in short periods of time. Georgia Tech Research Institute was selected to provide these R&D services during WASH I. Georgia Tech in turn let a subcontract with the University of Maryland for joint use of the latter's International Rural Water Resources Development Laboratory at College Park, Maryland in addition to its own R&D facilities in Atlanta, Georgia.

OTD #13 December 1980: Completed Warner

Italian Earthquake Relief Assistance-OFDA (Office of Foreign Disaster Assistance) Following a visit to the disaster areas near Naples by an AID representative in early December 1980, the WASH Project Staff was requested to identify and contact United States and European sources of suitable sanitation equipment that was available for shipment to the disaster area. Estimates of the homeless population ranged from 50,000 to over 150,000 people. A twenty-five page report (plus technical appendices) outlining twelve alternative solutions to the community water supply and sanitation situation was dispatched by courier to Naples on December 13, 1980 for use by the local U.S. Disaster Relief Team. See WASH Field Report No. 25.

OTD #14 December 1980: Completed Warner

Peri-Urban and Rural Water Supply and Sanitation Program Review and Project Development-Ecuador This task for USAID/Ecuador had two distinct parts: peri-urban and rural. The peri-urban review and assessment involved working with an Ecuadorian private volunteer organization (Fundacion Natura) and local municipal sewerage companies in Quito, Guayaquil and other cities. The work included analyzing environmental sanitation and sewerage problems, plans and constraints, suggesting alternative strategies, identifying high priority projects, and making overall recommendations. Constraints of concern were high-cost inappropriate technologies, lack of trained manpower and funding, and absence of policy direction. The technical analysis in selected rural towns was of integrated approaches that included low-cost housing, water, sewerage and related infrastructure, social services and employment generation/training activities. See WASH Field Reports Nos. 9 and 12.

OTD #15 December 1980: Completed Warner

Well Drilling Equipment Specifications and Procedures-Tunisia As part of its rural potable water subproject, the AID Mission in Tunisia was examining

the use of low-cost technology for drilling relatively shallow wells (maximum 200 meters) having low to moderate yields. The government of Tunisia was experienced in drilling larger and deeper wells for irrigation water but needed assistance in preparing a suitable invitation for bidders for the purchase of a smaller, less expensive drilling rig. The Mission was also interested in the use of PVC in well casing and self-purification of receiving waters as a function of treatment; 2) participated in a round-table conference on design review and discussion of guideline scope and contents with Jordanian and AID officials and consultants; and 3) prepared an outline of guidelines and recommendations for the National Planning Commission. See WASH Field Report No. 4.

OTD #16 December 1980: Completed Isely

Water Supplies for Rural Land

Reclamation-Mauritania The AID Mission in Mauritania needed assistance with a Project Paper for rural land reclamation intended to improve the traditional construction of "barrages" (dams). The dams retain rainwater runoff for recession agriculture in the dryland interior of the country, e.g., earth/rock dams are broken in October and the moist soil behind the dam (70-150 hectares) is used for agriculture. The dams are later patched up for the next rainy season. Ideas suggested to the Mission included establishing schistosomiasis surveillance and control teams; a pilot project in one dam area to chemically control urinary schistosomiasis; to disturb snail growth and kill mosquito larvae by fluctuating the water level behind the dams; and to provide better wells for human and animal use as well as the organization of populations around these tasks. See WASH Field Report No. 11.

OTD #17 December 1980: Completed Warner

Review of Appropriate Water Supply Technologies, Implementation Planning, Local Manufacturing and Training-El Salvador Field work on this task was cancelled, but a brief review and bibliography of appropriate technology for rural water supply and sanitation suitable for El Salvador was prepared as WASH Field Report No. 26.

OTD #18 December 1980: Completed Warner

Water Supply and Sanitation Implementation Plan Design for Rural Water Project-Peru The purpose of this AID Project in Peru was to provide potable water systems, latrines and health education to 420 communities of about 500 inhabitants each in selected regions of the sierra and high jungle over a five year period. The eight million dollar project (five million from AID) integrated these activities into the primary health programs of those communities and simultaneously strengthened the administrative and technical capacity of the Peruvian Regional Health Office involved in the project. The WASH consultant provided a list of suggestions and recommended revisions of the implementation plan, procedures and schedule. See WASH Field Report No.

6. Also see OTD #74 below and WASH Field Report No. 38.

OTD #19 January 1981: Completed Isely

Food Wastage Project: Expert Panel Review-PPC/E; DS/HEA The purpose of this OTD was to coordinate the development of a comprehensive, in-depth review of the Food Wastage/Sanitation Cost-Benefit Methodology Project carried on from 1971-1976 by the University of North Carolina at Chapel Hill and the Institute of Nutrition of Central America and Panama (INCAP). See WASH Technical Report No. 12.

OTD #20 January 1981: Completed Warner

Small Wastewater Stabilization Pond Design and Analysis-Lebanon Under an Environmental Subproject, AID was supporting the American University in Beirut, Lebanon, and the Ministry of Public Health, in the design, construction and testing of small wastewater stabilization ponds to treat sewage from small towns. The Mission requested technical advice on design alternatives to minimize construction costs. After reviewing the situation, plans, sites, operation, budgets and schedules with AID and Lebanese officials, the WASH consultant developed recommendations on the most appropriate and acceptable approaches to small wastewater stabilization pond utilization. See WASH Field Report No. 10.

OTD #21 January 1981: Completed Donaldson

Latrine and Water Container Design Analysis, and Planning of Evaluations and of Health Materials-Dominican Republic Under Health Sector Loan II, AID was assisting the Secretariat of Health in the Dominican Republic to provide water supply, latrines and health education in 500 rural villages having 26,500 homes. The Mission requested technical assistance in: 1) designing and carrying out evaluation plans for Health Sector Loan II; 2) providing information on waterseal latrines; 3) preparing specifications for household water containers and water treatment; and 4) designing health education materials for potable water and sewage disposal activities. See WASH Field Report Nos. 5, 21 and 23.

OTD #22 January 1981: Cancelled

Review of Testing Prediction Sanitation Model Project-DS/HEA

OTD #23 January 1981: Completed Warner

Preparation of Guidelines for Water Supply and Sanitation Project Design and Implementation, Inter-Regional-DS/HEA Many missions and several AID Bureaus have expressed a need for guidelines of this kind. The WASH staff reviewed relevant AID work and reports on this subject and developed realistic and useful guidelines for water supply and sanitation project design and implementation to be used for and in developing countries. Draft guidelines are under review.

OTD #24 January 1981: Completed Warner

Rural Water Supply and Sanitation System Design for Aid Project Paper-Ecuador Mission required technical assistance in two areas: rural sanitation delivery systems, and engineering analysis of proposed water supply systems. The IEOS (Ecuadorian Institute of Sanitation Work) needed guidance in determining specific numbers of persons to be trained, person-months and types of technical assistance to be provided, vehicle requirements, and inter-governmental agency organizational restructuring. See WASH Field Report No. 13.

OTD #25 February 1981: Completed Isely

Rural Sanitation Manpower Development (RSMD): Workshop and Program Assistance-Indonesia The Government of Indonesia, with AID support, was in final planning stages of its Rural Sanitation Manpower Development (RSMD) Project, and requested WASH guidance on the project and for a training workshop. Topics included water supply and sanitation appropriate technology (AT) alternatives, planning for technological research and development, development of systems and practices for effective wide-scale application of appropriate techniques and methods, curriculum development for inservice training and/or retraining of existing sanitation personnel, and review and comment on approximately 12 proposals for research already submitted by RSMD staff in Regional Centers. See WASH Field Report No. 16.

OTD #26 February 1981: Completed Warner

Project Design Assistance for Health and Environmental Monitoring Project (HEMP) and Water Supply and Sanitation Manpower Training-

Tanzania USAID Tanzania requested project design support for work with the Ministry of Lands, Housing and Urban Development (ARHDI) on training, and with the Muhimbili Medical Center (MMC) in the Department of Community Medicine, University of Dar es Salaam, on the Health and Environmental Monitoring Project (HEMP). The work in training with ARHDI concerned development of a sanitation education master plan and the possible creation of new facilities. Facilitation will involve public health engineering curricula at the University, technician training at the ARHDI Institute, health officer training at three regional centers, health educator training at Muhimbili Hospital, and health assistant training. This work will provide background information for a Project Identification Document (PID). See WASH Field Reports Nos. 7 and 8.

OTD #27 February 1981: Completed Isely

Evaluation of Rural Health

Project-Niger USAID/Niger requested two French speaking consultants to participate in a four-man evaluation team. Components of the project to be evaluated included: public health administration (epidemiology, logistics, supplies distribution, cold chain, construction of dispensaries); training (curriculum development at the certified and state level nursing schools); supervi-

sion and management of rural health teams, rural sanitation and water supply; and cost control.

OTD #28 February 1981: Completed Isely

Representation of DS/HEA and WASH at Conference of World Federation of Public Health Associations, Calcutta, India, 23-26 February 1981-DS/HEA The WASH consultant set up and manned an AID/WASH display, participated in the conference as an international health expert, and explained the WASH Project to all concerned. A folding graphic and photographic display of WASH functions was prepared and sample AID Robovalves and Roboscreens were taken for exhibition, along with relevant descriptive information for distribution. The consultant also visited the National Environmental Engineering Research Institute (NEERI) at Nagpur, India, to discuss the WASH Project and possible modes of collaboration. See WASH Field Report No. 14.

OTD #29 February 1981: Completed Donaldson

Development of Local Capability to Fabricate Handpumps and Well Screens-

Honduras USAID/Honduras requested WASH assistance in local manufacture of the AID Handpump and Roboscreen. Sites were selected for installing 30 AID handpumps as well as 10 Dempster pumps, 10 Moyno pumps and 10 locally-manufactured SANDPAR pumps in order to compare their performance. Installation of the handpumps and assistance in developing a program and manuals for their operation and maintenance was conducted under WASH OTD No. 85. See WASH Field Report No. 85. See also WASH Field Report No. 103.

OTD #30 March 1981: Completed Warner

Participation in XIII Central American Congress of Sanitary Engineering Meeting, 16-20 March 1981, Guatemala City-Guatemala USAID/Guatemala and ROCAP requested WASH to present the WASH Project and its capabilities to Latin American engineers who were assembling to discuss Central American cooperation during the U.N. International Drinking Water Supply and Sanitation Decade. See WASH Field Report No. 15.

OTD #31 March 1981: Completed Warner

Wastewater Treatment Design Review and Guideline Preparation-Jordan USAID/Amman and the National Planning Commission had reviewed the need and value of the "standardization" of design, construction, operation and maintenance of wastewater treatment processes and plants in the cities and rural towns of Jordan. The WASH consultant 1) analyzed and evaluated the feasibility studies and designs for all wastewater treatment plants and processes under review in Jordan, including plant visits for consideration of appropriateness and of effluent quality, standards, and self-purification of receiving waters as a function of treatment; 2)

participated in a round-table conference on design review and discussion of guideline scope and contents with Jordanian and AID officials and consultants; and 3) prepared an outline of guidelines and recommendations for the National Planning Commission. See WASH Field Report No. 17.

OTD #32 March 1981: Completed Beverly

Coordination of WASH Information Activities and Exchange with International Information Centers—

DS/HEA The purpose of the WASH Project Information Center is to provide information gathering synthesis, reproduction, dissemination and follow-up services, including water supply and sanitation (WS&S) guideline development to AID Missions, Geographic Bureaus and other offices of AID. The Information Center is a clearinghouse information retrieval facility which stores and disseminates WS&S information on request. To further the development of WASH Project international information capabilities, the WASH Information Director was authorized to visit specified information organizations and centers in Europe, Asia, and Latin America. These organizations are cooperating with the International Reference Center for Community Water Supply and Sanitation (IRC) The Hague, and its Program on Exchange and Transfer of Information (POETRI) under WHO auspices for the UN Water Decade. These visits established sound, long-term working relationships on WS&S matters concerning information exchange and various modes of collaboration on information development, acquisition, analysis and dissemination. In addition, possible cooperative interactions on WS&S training, technical assistance, and technology transfer/adaptation were explored.

Coordinating visits were made to the IRC, the Intermediate Technology Development Group (London), the Water Research Center (Stevenage, U.K.), the TOOL Foundation (Amsterdam), the Pan American Center for Sanitary Engineering and Environmental Science—CEPIS (Lima, Peru), the Asian Institute of Technology and its Environmental Sanitation Information Center (AIT-ENSIX) in Bangkok, and the World Health Organization (WHO) in Geneva. See WASH Field Reports Nos. 18,48 and 64.

OTD #33 April 1981: Completed Warner

Development of Testing Protocol for Mobile Water Treatment and Disinfection Units in Disaster Situations—

DS/HEA; OFDA A sanitary engineer with background in development and coordination of testing experimental design and protocols for water treatment and disinfection devices was supplied by WASH to act as facilitator between AID/Office of Disaster Assistance, the U.S. EPA (Office of Registration) and the U.S. Army Medical Research and Development Laboratory (Ft. Detrick, MD) in development of chemical, biological and virological testing protocols for mobile water treatment and disinfection units.

OTD #34 April 1981: Completed Hafner

Coordination and Facilitation of Use of WASH Technical Assistance Service in Africa—

AFR/DR; DS/HEA The Africa Bureau requested the services of a Technical Assistance coordinator to work with the AFR Bureau and the field missions for increased utilization and awareness of WASH technical services in water and sanitation. The WASH Senior Project Officer coordinated directly with DS/HEA and AFR/TR officials, desk officers and other personnel as necessary. He made three trips to Africa and visited Botswana, Cameroon, Ivory Coast, Kenya, Lesotho, Malawi, Sierra Leone, Swaziland and Zaire. Fifteen OTDs resulted from these trips.

OTD #35 April 1981: Completed Isely

Participation in the AWWA Meeting, St. Louis, 8-12

June, 1981 DS/ENGR; DS/HEA The American Waterworks Association International Affairs Committee (AWWA) extended an invitation to WASH to address the Conference on the general subject of "Acceptance of Public Water Supply in Developing Countries." See WASH Technical Report No. 6, "Women, Water and the Decade."

OTD #36 April 1981: Completed Warner

Evaluation of Rural Water Supply Project—

Burundi WASH assistance was sought through the AID Representative to evaluate an ongoing rural water supply project in Burundi. The WASH team assessed the impact of this UNICEF project, investigated other opportunities to increase the accessibility of rural populations to safe water and suggested further means of fostering community health/sanitation education. The team developed criteria for evaluating spring captation, conducted a brief evaluation by visiting representative cross sections of the communes, and reviewed other donor gravity fed water projects to assist in obtaining the most cost-effective systems. See WASH Field Report No. 24.

OTD #37 April 1981: Completed Isely

Participation in Session on Water, Sanitation and Health Education, UNICEF, New York, 22-23 April

1981—DS/HEA A session involving UNICEF headquarters and field staff plus invited experts from other institutions addressed the complexities of water supply and sanitation, its impact upon health, and the critical mix of interventions which might assure or increase such benefits. Also on the agenda was a discussion of the role of sanitation/health education in water programs. Two WASH consultants participated. See WASH Field Report No. 31.

OTD #38 April 1981: Completed Warner

Further Development of Rural Water and Sanitation

Project—Thailand WASH pre-project design work assistance was provided for preliminary assessment of

technical and economic feasibility of providing clean water to small communities or rural population concentrations of 2,000 or less using piped water systems. Appropriate non-piped alternative supply systems were identified and assessed for certain areas of northeast Thailand. Scopes of work for design and feasibility studies of the above and related matters were also prepared. See WASH Field Report No. 19.

OTD #39 May 1981: Completed Warner

Evaluation of the Water Supply Systems Management Project for the National Water and Sewage Authority (NWSA)—Yemen WASH assistance was sought to evaluate the ongoing Water Supply Systems Management project in the Yemen Arab Republic. The project evaluation included: 1. Evaluation of progress towards attainment of project objectives and goals. 2. Recommended revision of project objectives and goals as appropriate and recommended project modification/reductions as appropriate. 3. Identification and evaluation of problems or conditions which may impede progress towards those objectives. 4. Assessment of steps that can be taken to overcome or minimize those problems. See WASH Field Report No. 22. Also see OTD #161.

OTD #40 May 1981: Completed Donaldson

AID Handpump Manufacture—Philippines As part of the Barangay Water Program (BWP), AID/Philippines requested technical assistance for local manufacture and installation of the AID handpump and training BWP engineers and technicians in well siting, construction and pump installation, operation and maintenance. The WASH subcontractor assisted a local foundry in manufacturing the AID handpump and conducted final acceptance inspection of the pumps in March 1982. An extensive manual was prepared for use by the BWP engineers in well construction and pump installation, operation and maintenance. A week-long seminar was held in April 1982 to train BWP engineers and technicians in the content of and use of the manual. See WASH Field Report No. 54.

OTD #41 June 1981: Completed Hafner

Technical Assistance of Cultural Anthropologist in Peace Corps Training Program—Peace Corps; DS/HEA The Peace Corps Water and Sanitation Sector requested WASH assistance in providing a cultural anthropologist to train thirty Peace Corps trainers in New Mexico May 31 to July 3, 1981, in conjunction with the U.S. Indian Health Service. The trainees were preparing for work in Kenya, Guatemala, Togo, Yemen, Lesotho and Tonga. The purpose of the training program was to prepare the trainees with basic skills and knowledge in the following areas: the role of the volunteer in development, construction skills, water systems (springs, wells, pumps, hydrology, surveying, system design, etc.), waste disposal, health education and group participation training techniques. The WASH

consultant provided guidance on the relationship of water and sanitation technologies to community acceptance and development activities.

OTD #42 June 1981: Completed Warner

Technical Assistance to AID Office of Foreign Disaster Assistance (OFDA)—DS/HEA WASH was requested by DS/HEA and OFDA to develop, and to maintain on a stand-by basis, a team of qualified disaster assistance personnel. The team includes experienced water supply and sanitation engineers to provide disaster assessment and coordination services plus technical personnel to operate emergency water purification plants in or near disaster areas. Team members have been selected and trained in advance and are available for short-term overseas assignments on short notice. WASH disaster teams were deployed for emergency water supply duties in flooded areas of Tunisia in November, 1982, and in Ecuador in January, 1983. See WASH Field Report No. 74. See also Field Reports Nos. 25, 41, 79 and 112.

OTD #43 June 1981: Completed Warner

Technical Assistance for the Barangay Water Program—Philippines The Barangay Water Program (BWP) is designed to provide potable water via small systems of public faucets or individual house connections, including household storage facilities, to small rural farming and fishing communities. AID/Manila requested technical assistance from WASH for the start-up, delivery, performance testing and post-completion training, as well as recommendations for improving the SAPANAG BATO water system. Other assistance was desired in refining designs, revising the post-completion manual, and improving local manufacture of BWP system components. The consultant also inspected each operational BWP "Level II-A" system, made appropriate recommendations, and produced a set of 35mm color slides of these systems for training, orientation and debriefing purposes. See WASH Field Report No. 57.

OTD #44 June 1981: Completed Isely

Training and Technical Assistance for Technology Development and Dissemination in Water and Sanitation for Rural Sanitation Manpower Project—Indonesia The Center for Education and Training (PUSDIKLAT) of the Indonesian Ministry of Health is the implementing agency for the Rural Sanitation Manpower Development Project. It requested support from USAID/Jakarta in the design of a program of training and technical assistance in the development and dissemination of appropriate technology in water and sanitation. Specific assistance was needed to refine the proposed design and to identify required program inputs. This work was a follow-on to OTD #25. See WASH Field Report No. 28.

OTD #45 July 1981: Completed Hafner

Village Health Education and Training: Program Planning, Implementation and Evaluation—Benin and Togo AID Missions in Benin and Togo requested WASH assistance in village health education and training for program planning, implementation and evaluation. Work included developing the overall training strategy and sequencing of events; determining who needs to be trained to do what; designing and implementing training of trainer workshops; developing job aids; and developing management, evaluation and performance analysis procedures and instruments. In addition, the WASH consultant developed procedures for coordination among groups in Togo and groups outside of Togo, assisted in the training of Togo Peace Corps Volunteers and their co-workers; supported the Peace Corps Associate Director in various planning tasks; and assisted the Benin Peace Corps Director in designing health education training materials. See WASH Field Reports Nos. 27 and 51 and OTD No. 91 below.

OTD #46 July 1981: Completed Donaldson

Handpump Installation Operation, Maintenance and Training Project—Haiti AID/Port-au-Prince requested WASH technical assistance in securing and installing AID and other handpumps and in training suitable public or private agencies, including PVOs, in installation, operation and maintenance of the pumps. The WASH consultants obtained AID handpumps from the Dominican Republic, selected sites and installed the handpumps at Camp Perrin and La Gonave. They also developed an operation and maintenance plan for the pumps being installed. In addition to the Dominican Republic/AID handpumps, some Moyno deep well handpumps and a prototype AID Handpump manufactured at Fonderie Nationale in Haiti were installed. Observation of the performance of the latter pumps provided useful information concerning the feasibility of manufacturing the AID handpump in Haiti. See WASH Field Report No. 128.

OTD #47 July 1981: Completed Isely

Technical Assistance in Review of Rural Primary Health Care Project Paper—Zaire AID/Zaire requested the services of WASH to review the Rural Primary Health Care Project Paper with the Mission and Ministry of Health officials. Preventative health measures were emphasized in the review.

OTD #48 July 1981: Completed Donaldson

Technical Assistance in Handpump Maintenance and Plastic Valve and Faucet Manufacture—Dominican Republic AID/Santo Domingo requested WASH technical assistance in support of its Health Sector Loan II Project in two areas: handpump quality control and maintenance and local manufacture of a plastic foot valve and water container faucets. The WASH consultant made recommendations for a quality control program at the local foundry; the content and format of

handpump service manuals being prepared by the Ministry of Health; planning and organizing handpump maintenance programs at regional and community levels; logistical planning for spare parts, and preventive maintenance guidelines and schedules. He also worked with a local firm on the manufacture of the plastic valves and faucets. See WASH Field Report No. 101.

OTD #49 August 1981: Completed Hafner

Survey of Potential Subcontractors for Human Resources Development Support—S&T/HEA The Office of Health requested WASH to survey potential human resources development (HRD) subcontractors with demonstrated effectiveness and proficiency in innovative approaches to the analysis of human resource needs, training system development and implementation, and training system evaluation to support HRD activities. Relevant selection criteria included knowledge of subject matter in key areas, e.g., operation and maintenance of small water supply systems; language capability; LDC experience; availability; experience in use of performance based systems in solving problems in knowledge, skill and attitudinal areas of performance; demonstrated capability to work in human resource needs assessment and evaluation, task analysis, performance problem solving, training material development, training of trainers, training system development, implementation of training and development of job aids.

OTD #50 September 1981: Completed Beverly

Technical Assistance in Technology Transfer Including Development and Testing (Lab and Field) of Low Cost Technology for Developing Countries—S&T/HEA WASH was requested to provide technical assistance and information to S&T/HEA in the development, adaptation and testing of certain low cost technologies in water supply and sanitation for developing countries. The scope of this work included six related sub-tasks: 1. Collection and analysis of technical information on flow limiters, family water purification units, hydraulic rams, 'package' water treatment plants, sewerless excreta disposal units, and alternatives to reciprocating handpumps. 2. Activation and preparation of product development, testing and demonstration facilities under contracts with Georgia Tech and the University of Maryland. 3. Establishment of a steering committee of experts inside and outside AID, and the planning, organizing and conducting of a seminar on WS&S technology appropriate for manufacture in LDCs. 4. Review and analysis of simple, low cost appropriate well drilling technologies. 5. Review, analysis and conceptual modification or replacement of Moyno type deep well handpump design to substantially reduce costs and render suitable for LDC manufacture. 6. Provision of professional services of additional consultants as required to perform above sub-tasks. A Technology Transfer Workshop was held April 12-20, 1983. Twenty-six consultants, WASH staff and AID personnel participated in the Workshop.

OTD #51 August 1981: Completed Hafner

Implementation of Workshop on Excreta Disposal in Non-Sewered Areas—NE/TECH The Near East Bureau requested WASH assistance in developing and implementing the above workshop. This included: 1. Contacting speakers and participants in consultation with NE/TECH. 2. Preparing workshop agenda. 3. Arranging for workshop site. 4. Arranging for instructional materials. 5. Taping workshop. 6. Preparing workshop proceedings. The workshop was attended by twenty-five participants and was held on September 10, 1981, in the Conference room of the International Science and Technology Institute (ISTI), one of the CDM Associates.

OTD #52 August 1981: Completed Isely

Participation in Workshop on Primary Health Care, 31 August to 3 September, 1981 in Sousse, Tunisia—NE/TECH/HPN WASH was requested to provide consultant services to NE/TECH/HPN for the above workshop. The purpose of this workshop was to bring together key health representatives of Near East nations, A.I.D. and other institutions to share their experience with primary health care programs and to discuss the technical, institutional and operational aspects of primary health care programs and their components parts. Special attention was focussed on the need for water supply and sanitation facilities to serve as models in all health facilities, especially in peri-urban and rural areas. See WASH Technical Report No. 8 and Field Report No. 29.

OTD #53 August 1981: Completed Isely

Participation in AID Health Officers Workshop in Lome, Togo, 15-20 November, 1981—AFR/H WASH design and implementation assistance for the above workshop was requested by the Africa Bureau. WASH prepared the agenda and educational materials for that portion of the workshop dealing with water supply and sanitation in relation to the proper planning and implementation of primary health care programs. See WASH Technical Report No. 13.

OTD #54 August 1981: Completed Isely

Participation in AID Health Officers Workshop in Chiang Mai, Thailand, 8-14 November, 1981—Asia/TR WASH participation in the above workshop was requested by the Asia Bureau in order to plan and facilitate discussions of Bureau policy on water supply and sanitation. WASH had earlier provided a draft policy paper. The WASH consultant served as a resource person during workshop sessions and was available to participants for consultation. The American Public Health Association was responsible for the overall organization of the workshop.

OTD #55 September 1981: Completed Hafner

Analysis of Human Resources Development Needs in the Hashemite Kingdom of Jordan The AID Mis-

sion in Amman, Jordan, requested assistance in developing a national water resources training program. Following intensive preparation in the U.S., the field work included review of human resources development (HRD) in Jordan with AID and relevant agencies, visiting agencies and facilities, reviewing documentation and preparing a preliminary HRD plan, program and schedule. These were discussed with Mission staff and government officials and modified appropriately before formal presentation to the concerned institutions. See WASH Field Report No. 34.

OTD #56 September 1981: Completed Isely

WASH Participation in International Reference Center (IRC) Advisory Group on Community Education and Participation (CEP)—IRC; S&T/HEA The International Reference Center for community Water Supply and Sanitation, the Hague, requested, through AID's Office of Health, that WASH provide a working member to serve on the above Advisory Group and to participate in the first meeting of the Group. The terms of reference of the Advisory Group were: 1. To provide overall guidance to the CEP Programme and coordination with other relevant international activities. 2. To review and evaluate, from a scientific and technical standpoint, the content, scope and dimension of the programme. 3. To recommend priorities for technical cooperation activities, studies and services of the CEP Programme. 4. To provide the Steering Committee for Cooperation Action, donor organizations, bank, and Governments with a continuous independent assessment of the CEP Programme and related activities. 5. To recommend joint plans and actions for the further development of the CEP Programme and other relevant international activities. See OTD #65 below.

OTD #57 September 1981: Completed Isely

Technical Assistance to the National Council for International Health for Development and Implementation of Water and Sanitation: A Workshop for PVOS—S&T/HEA WASH was requested to supply technical assistance to the Office of Health in the development of a workshop on implementation, preparation and evaluation of water supply and sanitation for PVOs in collaboration with the National Council for International Health (NCIH). The activities included: 1. Designing and formatting the workshop, incorporating results of survey of PVOs, 2. Identifying and selecting speakers with survey input from the planning committee, 3. Compiling bibliography and supplying selected materials for workshop participants, 4. Supervising the dress rehearsal of sessions that needed to be rehearsed, 5. Identifying possibly exhibitors for poster sessions, commodity or equipment displays, 6. Preparing background papers for the workshop, 7. Assisting with workshop implementation the first week of December 1981, and 8. Providing technical editing of the proceedings. See WASH Technical Report No. 14 and OTD No. 70 below.

OTD #58 October 1981: Completed Donaldson

Technical Assistance to Develop Scope of Work for Impact Evaluation of Health Sector—Dominican Republic

WASH was requested to assist USAID/Dominican Republic in preparing a cost estimate and scope of work for implementing the evaluation plan for Health Sector Loan II. The loan is to provide water, latrines and health education in 500 rural communities. Mortality and anthropometric data for the evaluation were to be gathered by local health promoters in 100 communities. The evaluation plan included sections on sample design; data collection, monitoring, processing and analysis; personnel requirements and qualifications; and a contract schedule with estimated costs by task. See WASH Field Report No. 35.

OTD #59 October 1981: Completed Isely

Technical Assistance for Water Conservation Seminar—Jordan

WASH was requested to support USAID/Jordan in planning and conducting a day-and-a-half water conservation seminar for Jordan's water supply institutions. The work for this task included consultant preparation in the U.S.; discussions with relevant officials in Jordan; orientation visits to water supply/conservation areas in Jordan; planning and implementing the seminar; and preparing a report on the seminar and recommendations to improve water conservation practices in Jordan. See WASH Field Report No. 36.

OTD #60 October 1981: Completed Isely

Technical Assistance in Water Supply and Sanitation Planning and Training—Sudan

WASH was requested to supply technical assistance in assessing and making recommendations in relation to USAID/Sudan planning efforts in water supply and sanitation in six project areas. These were: 1. Northern Primary Health Care Project—a regional project to construct new health centers in North and South Kordofan Provinces, 2. Rural Health Support—a national dispensary and school construction project contracted to the African Medical Research Foundation of Nairobi, 3. Reforestation Program—provision of potable water to farmers in this program in conjunction with CARE, 4. Refugee camps on three borders of Sudan—WS&S requirements, 5. Port Sudan Refugee Water Supply Project—in conjunction with CARE, and 6. Darfor Region—study of allocation of water for domestic, livestock and agricultural uses. See WASH Field Report No. 37.

OTD #61 October 1981: Completed Donaldson

Technical Assistance in Operation and Maintenance of Water Pumping Systems—Morocco

WASH was requested to provide training for fifteen Peace Corps volunteers in Morocco in the installation, maintenance and repair of selected water pumping systems. The scope of work included collection and preparation of training materials; briefings with Peace Corps staff in the U.S. and Morocco; detailed planning of a four-week training course; conducting training; and preparing a final re-

port. See WASH Field Report No. 43.

OTD #62 October 1981: Completed Warner

Technical Assistance for Health Sector Assessment—Egypt

WASH was requested to provide technical assistance for the health sector assessment in Egypt and preparation of an environmental health working paper. The scope of work included preparation and briefing of WASH consultants at AID/W; in-country travel and review and analysis of relevant available documents and data; and preparation of a final report. The report reviewed and summarized existing data on environmental determinants of health status in Egypt; identified important gaps in existing data; discussed priority problems, changes and trends; identified institutions and interrelationships between health status and AID's assistance to the water, sewage, housing industrial and agricultural sectors; and concluded with a set of recommendations for AID action. See WASH Field Report No. 33.

OTD #63 October 1981: Completed Donaldson

Technical Assistance in Local Handpump Manufacture and Maintenance—Tunisia

AID/Tunisia requested WASH technical assistance in local manufacture, field monitoring and adaptation of the AID Handpump in support of an on-going program. The scope of work included improving quality control of pump manufacturing at the foundry, assuring that pump designs were properly adapted to conditions in rural Tunisia, and planning and managing an integrated field installation, re-installation, repair, maintenance, monitoring and training program. The WASH consultants coordinated activities with AID/Tunis, government officials, manufacturing companies and suppliers, and the Ecole Nationale d'Ingenieurs de Tunis (ENIT) which installed the pumps. See WASH Field report No. 100.

OTD #64 October 1981: Completed Isely

Technical Assistance for Well Siting—Mali

USAID/Mali requested technical assistance for recommending siting of twenty-nine wells in twenty-five villages of the First Region of Mali (Yalimane Circle). The WASH consultant was a hydrogeologist with experience in siting hand-dug and borehole wells using aerial photography, soil resistivity tests and investigative drilling. This work included reviewing aerial photographs in Bamako, working closely with regional and local government officials and technicians, visiting all well site areas, and consulting with the local water committee in Yelimane. See WASH Field Report No. 32.

OTD #65 November 1981: Completed Isely

Collaboration with the International Reference Center (The Hague) on Directory of Resources—IRC; S&T/HEA

The Office of Health requested WASH technical support in jointly developing, printing and disseminating a "Directory of Resources for Community Participation in Water Supply and Sanitation for De-

veloping Countries." The Directory was based on existing descriptions of institutions in WASH and IRC files supplemented by information from a questionnaire sent to European and American NGOs, PVOs, bilateral agencies, and other organizations and researchers in community education and participation, and relevant LDC organizations. The Directory provides an essential tool for everyone involved in the Water Decade to facilitate the exchange and transfer of information and guidance on community education and participation. The Directory is not part of the WASH Technical and Field Report series. See OTD No. 56 above.

OTD #66 November 1981: Completed Donaldson

Technical Assistance in Well Drilling for Private Voluntary Organization (PVO) Fundacao Esperanca in Amazon Basin—Brazil USAID/Brazil requested WASH technical assistance in preparing a proposal for the AID supported PVO Fundacao Esperanca, in Santarem, Para, Brazil. The Foundation needed technical advice in deep well drilling in the highland villages it serves. See WASH Field Report No. 40.

OTD #67 November 1981: Completed Rosensweig

Preparation of Manual on the Installation, Operation and Maintenance of Portable Packaged Water Treatment and Disinfection System—S&T/HEA;

OFDA WASH assistance was requested by S&T/HEA and the Office of Foreign Disaster Assistance (OFDA) to prepare a manual on the installation, operation and maintenance of a portable packaged water treatment and disinfection system. An instructional manual was prepared to accompany the equipment for use anywhere in the world where it is sent to disaster areas. The manual was designed for ease of comprehension and use by people of diverse cultural backgrounds who may have little formal education or mechanical training. Simple graphics and photos that are culturally neutral were used where appropriate.

OTD #68 November 1981: Completed Donaldson

Analysis, Design, Prototype Development, and Demonstration System Construction and Operation of PAHO "Pumpless Pump" - S&T/HEA WASH was requested to provide technical assistance to S&T/HEA in the design, testing and demonstration of the PAHO "pumpless pump" system. The scope of work included engineering analysis and mathematical modeling of the system, design and construction of a system capable of serving a community of 5,000 persons, and the preparation of a user application manual suitable for use in developing countries. Also required was the planning of an information dissemination and demonstration program to alert development officials throughout the world of the operational feasibility of this technology.

OTD #69 November 1981: Completed Donaldson

Design and Implementation for AID Handpump Testing Program—Dominican Republic, Ecuador, Honduras, Philippines and Tunisia—S&T/HEA WASH was requested by S&T/HEA to design and implement a testing program for the AID Handpump being manufactured in the Dominican Republic, Ecuador, Honduras, Philippines and Tunisia. The scope of work includes shipment of pumps from the countries to the Georgia Institute of Technology, design and execution of a time-stress component testing program, procurement of test equipment and material, documentation of test procedures and results, redesign and testing of components and systems as appropriate, and preparation of test reports and recommendations. See WASH Field Report No. 131.

OTD #70 November 1981: Completed Hafner

Technical Assistance for Seminar on Handpumps for Community Water Supply in Developing Countries—S&T/HEA WASH was requested to supply technical support and information materials for a half-day seminar on handpumps sponsored by S&T/HEA. The seminar was conducted on December 1, 1981, in conjunction with the National Council for International Health (NCIH) Workshop for Private Volunteer Organizations held December 2-4, 1981 and attended by forty-five participants. (OTD 57).

OTD #71 November 1981: Completed Donaldson

Design and Implementation of Robo-Valve Testing Program—Ecuador—S&T/HEA WASH was requested to design and implement a testing program for the Robovalves being manufactured in Ecuador. The scope of work included acquisition and time stress testing of seventy Ecuadorian-made Robovalves for a continuous day-in and day-out period of three months to determine design, material and fabrication flaws. The work was done at the International Rural Water Resources Development Laboratory of the University of Maryland. See WASH Field Report No. 102.

OTD #72 December 1981: Completed Donaldson

Laboratory Assessment and Testing of AID Handpump—S&T/HEA WASH was requested by S&T/HEA to provide it with results of a laboratory assessment and testing of the AID Handpump. The results are based on the World Bank/UNDP approved testing protocol which was applied by the Consumers Association (CA) of the United Kingdom to some thirty different pumps from all over the world. WASH supplied two AID deep-well handpumps manufactured in a developing country to the CA Harpenden Rise Laboratory in Hertfordshire, England, for testing over a twenty month period. See WASH Field report No. 130.

OTD #73 December 1981: Completed Isely

Technical Assistance in Revision of Care Water Supply and Sanitation Project—

Indonesia USAID/Indonesia requested WASH technical assistance in reviewing and refining the scope of work of an AID-funded CARE water and sanitation project. Specific assistance was desired to integrate a health education component into the project including the assessment. Plans were formulated for training CARE field staff in health education methods including the use of supportive materials with an emphasis on community participation. See WASH Field Report No. 39.

OTD #74 December 1981: Completed Donaldson

Evaluation, Planning and Training Assistance to Rural Water Supply and Sanitation Project (RWSS)—

Peru USAID/Peru requested WASH technical assistance for the Peru Rural Water Supply and Sanitation Project (RWSS) in several areas. The work included a technical evaluation of the plans for thirty gravity water systems, the design of a training seminar, and assistance to the National Directorate of Sanitary Engineering in analyzing future technical assistance and procurement needs. See WASH Field Report No. 38.

OTD #75 December 1981: Completed Hafner

Development of the National Sanitation Environmental Education Master Plan—Tanzania AID/Tanzania requested WASH technical assistance to develop the plan recommended in WASH Field Report No. 7 of March 9, 1981. "Tanzania—A National Environmental Sanitation Education Master Plan—A Preliminary Review." The scope of work included collection of relevant information on training and on the status of sanitation programs and projects in Tanzania and the development of the Master Plan based on the Field Trip Report. The Plan outlined educational and training objectives, operational strategies, roles of participating institutions, implementation requirements and schedules, evaluation procedures and estimated financial needs. See WASH Field Report No. 58.

OTD #76 December 1981: Completed Donaldson

Small Water Supply Systems: Training Program Design and Implementation with Agua del Pueblo—Guatemala USAID/Guatemala and Agua del Pueblo, a PVO, requested technical assistance in the design and implementation of a comprehensive workshop on small scale pumped water supply systems. The resulting workshop program included training in technology and design selection; training in the planning, design, construction, operation and maintenance of small scale pumped water supply systems; and the development of organizational capacities to transfer technical knowledge from the engineer level to the professional level. The workshop took place July 5-30, 1982, with ten Guatemalan engineers participating. See WASH Field Report No. 56.

OTD #77 January 1982: Completed Warner

Planning for Improved Excreta and Wastewater Pilot Demonstrations—Egypt

USAID/Egypt requested a WASH Advance Team to prepare an implementation plan for pilot demonstration projects for improved excreta and wastewater disposal methods in selected unsewered areas of Greater Cairo in Giza Governorate. For an immediate solution, the WASH team recommended field tests into the improvement of equipment, including pumper trucks, tractor drawn trailers, and animal drawn carts, for the collection and transport of sanitary wastes from sewage vaults. For long term solutions, the team recommended three types of field tests: community-financed sewers, small diameter sewers connected to existing sewage vaults, and septic tanks. Overall recommendations included sites, personnel, support requirements, and costs. See WASH Field Report No. 52.

OTD #78 January 1982: Completed Isely

Training of Sanitarians—Senegal AID/Senegal requested WASH assistance in improving the sanitarian training school which furnishes personnel to the Sine Saloum Rural Health project. The work included collecting relevant training materials in French and English; assisting in task analysis and performance objective development; suggesting training activities and appropriate evaluation techniques; designing and assisting delivery of a two week program emphasizing hands-on skills; making recommendations for improving the supervision and continuing education of sanitarians; and preparing a final report. The WASH consultant also assisted in preparation and supervision of the construction of latrines, composting sites, and well protection and deepening activities, which are part of the two week practical training program. See WASH Field Report No. 44. Also see OTD #14 and WASH Field Report No. 91.

OTD #79 January 1982: Completed Isely

Technical Assistance in Planning Diarrheal Disease Control Subproject—Indonesia USAID/Indonesia requested WASH to assist ACEH Province officials in planning a diarrheal disease control subproject that includes a water supply and sanitation component. The work included assessing water supply and sanitation facilities in Kabupaten Pidie, reviewing existing training and supervision activities in water supply and sanitation and the community participation situation, and developing recommendations and appropriate interventions which might be used in the subproject. The team contributed to a work plan for the subproject which integrates water supply and sanitation activities with diarrheal disease control, surveillance, treatment, training, and community participation. See WASH Field Report No. 42.

OTD #80 February 1982: Completed Rosensweig

Training-of-Trainers Workshop for AID Handpump Technology Transfer Personnel—S&T/HEA The Office of Health requested WASH assistance in the design and implementation of a six day Training-of-Trainers Workshop for selected personnel involved in the transfer of AID handpump technology. Ten participants came from Georgia Institute of Technology, the University of Maryland, ISTI and S&T/HEA staff. The purpose of the workshop was to upgrade the training skills of the participants so they could more effectively implement the transfer and proper utilization of the AID handpump in-country. The workshop was held February 21-27, 1982, and covered basic principles of adult learning, needs assessment, writing objectives, and designing and delivering training. Participants were trained in task and performance oriented approaches. See WASH Field Report No. 45.

OTD #81 February 1982: Completed Beverly

Collection and Analysis of AID Program Data for Interregional Planning in Water Supply and Sanitation—S&T/HEA The Office of Health requested WASH to provide consultant and consultant support services for management and analysis of AID water supply and sanitation data from 1973 to the present. The principal consultant collected relevant AID programmatic and historic project data base materials and then entered, stored, processed and read out data in desired formats using standard and self-developed computer programs. This data is continuously up-dated under a separate ISTI contract with the Office of Health.

OTD #82 February 1982: Completed Rosensweig

Local Manufacture of AID Handpumps—Ecuador WASH provided technical assistance to two local manufacturers for the production of 30 AID handpumps, which were to be used in a USAID funded rural water project. The OTD included the preparation of job aids for quality control of the production process and for the installation and maintenance of the handpump. WASH also trained twenty Peace Corps Volunteer and PVO personnel in installation and maintenance. See WASH Field Reports Nos. 110, 123, 124 and 125.

OTD #83 February 1982: Completed Donaldson

Testing of Portable Water Purification Units for use in Disaster Assistance—OFDA; S&T/HEA The AID Office of Foreign Disaster Assistance requested an evaluation of the quality of water produced by portable water purification and disinfection units which were developed for use in disaster assistance operations. A total of 30 samples of heavily polluted water were tested at a certified laboratory. After running through the disinfection units, 29 of the samples showed no coliform organisms. The effluent quality, therefore, was within USEPA drinking water standards. See WASH Field Report No. 41.

OTD #84 February 1982: Completed Donaldson

Technical Assistance in Project Identification for Water Supply, Sewage and Health Sector Loan Project—Dominican Republic USAID/Santo Domingo requested WASH technical assistance in the development of data for a Project Identification Document for the water/sewage/health education element under Health Sector Loan III. The work included reviewing status of past and current projects, resource availabilities and existing plans, assisting in identifying the problem and in the determination of project purpose, scope, size, constraints, desired inputs and outputs, relationships with the government and local organizations, and estimated impacts on beneficiaries and the environment.

OTD #85 February 1982: Completed Donaldson

Technical Assistance in Field Installation, Training, Testing and Evaluation of Handpumps—Honduras USAID/Honduras requested WASH assistance in implementing Stage II of the Honduras Handpump Project. WASH was asked to install several types of handpumps in up to fifty sites selected under Stage I (WASH OTD No. 29) and to test and evaluate the performance of a handpump manufacturer's quality control training manual and a handpump installation, operation and maintenance manual. Government health promoters were also trained in pump installation, operation and maintenance and in water quality testing and well disinfection. See WASH Field Report No. 103.

OTD #86 March 1982: Completed Rosensweig

Attendance of WASH Training Officer at Meeting of Interagency Task Force on Human Resource Development—U.N. Water Decade, Geneva—S&T/HEA The Office of Health requested that the WASH Training Officer participate in the March 11-12, 1982, Geneva meeting of the U.N. Interagency Task Force on Human Resources Development. This was part of WHO coordination efforts for the International Drinking Water Supply and Sanitation Decade. The agenda of the meeting included a review of U.N. agency and donor countries' development plans, programs and proposals, a discussion of means to achieve a cooperative approach to Decade HRD, and development of a short- and medium-term plan of action. The Training Officer also stopped in London in order to establish linkages with the Industrial Training Service.

OTD #87 March 1982: Completed Isely

Participation in AIDIS/PAHO Regional Symposiums on Human Resources for the Water Decade, Panama July 26—August 3, 1982—S&T/HEA The Office of Health requested WASH to participate in and prepare a workshop for two meetings in Panama City, Panama. The first meeting on human resource development aspects of water supply and sanitation was sponsored by PAHO. WASH worked with PAHO and the Office of Health in planning and implementing a session of

"Training of Trainers" and in designing and coordinating the working group. The second meeting was the XVIII Congress of AIDIS—Interamerican Association of Sanitary Engineers. Its theme was also human resource development aspects of the International Drinking Water Supply and Sanitation Decade.

OTD #88 April 1982: Completed Hafner

Feasibility Analysis and Design Study of Effluent Re-use and Night Soil Disposal for Maseru—Lesotho USAID/Lesotho requested WASH technical assistance for feasibility analysis and preliminary design work on utilization and disposition of human wastes from the city of Maseru. The scope of work for the first task, effluent re-use from the sewage treatment plant for crop irrigation, included a feasibility analysis; determination of rough design parameters, cost/benefits, and a preliminary pilot plant design; evaluation of health hazards and control requirements; and preparation of a report. The scope of work of the second task, night soil disposal, included investigation of alternatives, their feasibility and costs, and recommendations for the most appropriate method of disposal. See WASH Field Report No. 55.

OTD #89 April 1982: Completed Donaldson

Preparation of a Manual on "Practical Water Treatment for Communities in Developing Countries"—S&T/HEA The AID Office of Health requested WASH to prepare a manual on "Practical Water Treatment for Communities in Developing Countries." The resulting manual contains information on the technical, managerial, and human resource aspects of operating and maintaining community water treatment systems. See WASH Technical Report No. 29. A revised version of this report was published in 1984 by John Wiley & Sons with the same title.

OTD #90 April 1982: Completed Rosensweig

Second Trainer-of-Trainers Workshop for AID Handpump Technology Transfer Personnel, September 15-17, 1982—S&T/HEA The Office of Health requested WASH to plan and conduct the second "Trainer-of-Trainers Workshop for AID Handpump Technology Transfer Personnel," September 15-17, 1982. This workshop reinforced and expanded on the material covered in the February 1982 Workshop (OTD #80). Among other topics, it reviewed progress, identified training problems, reinforced training design and delivery skills, and provided practice in using training techniques and writing training materials. There were eight participants from the Georgia Institute of Technology and staff from the WASH CIC who are involved in technology transfer operations. See WASH Field Report No. 60.

OTD #91 May 1982: Completed Isely

Planning Assistance for Rural and Village Health Activities—Togo USAID/Togo requested WASH techni-

cal assistance for planning rural and village level health activities in Plateaux and Savane regions. The scope of work included review and revision of baseline medical, hygiene and water usage surveys and procedures; assisting in the planning of management and implementation strategies to integrate current Affaires Sociales activities into the proposed water project health program; and exploration of technical possibilities for alternative water resource development strategies in villages where drilled wells have proven unfeasible. The consultant also worked with government officials to outline ways of increasing community participation in village health activities.

OTD #92 May 1982: Completed Isely

Technical Assistance for Workshop on Water Supply and Sanitation for Rural Dispersed Populations—Tunisia USAID/Tunisia requested WASH planning and implementation support for a Tunisian Workshop on Water Supply and Sanitation for Rural Dispersed Populations in Arid Countries. The purpose of the workshop was to exchange information and experience on rural water services, on technologies for disinfection at water points and in homes, on equipment and fittings for use at water points, including handpumps, and on related activities. Workshop outputs included recommendations for action and training in the format of an execution plan and the creation of a network of professionals in Tunisia and Francophone Africa. The workshop was held in November 1982 in Kasserine. See WASH Field Report No. 67.

OTD #93 May 1982: Completed Donaldson

Technical Assistance in Administration of Rural Sanitation Project—Bolivia USAID/Bolivia requested WASH assistance in improving the administration of the Bolivia Rural Sanitation Project. The purpose of the project was to create an institutional capability within the Ministry of Social Welfare and Public Health and its Division of Environmental Sanitation to provide potable water and sanitation facilities to small Bolivian rural villages of 800 persons or less. The WASH consultant assisted the Mission and the Division of Environmental Sanitation in establishing a simplified information and accounting system, among other things. See WASH Field Report No. 47.

OTD #94 May 1982: Completed Donaldson

Review of Design Standards, Specification and Costs for Water Supply and Sanitation Systems for Low Income Housing—Honduras The USAID Regional Housing and Urban Development Office in Honduras requested WASH technical assistance to develop mechanisms for accelerating the current process of project implementation, to review current design standards of WS&S infrastructure systems for low income housing, and to participate in a seminar on appropriate design standards for water and waste disposal in low income shelter projects in Latin America. The WASH consultant worked closely with the two Honduran water au-

thorities and other public and private sector organizations in the course of review and evaluation activities. See WASH Field Report No. 46, available in English and Spanish.

OTD #95 May 1982: Completed Donaldson

Kanye Village Sewerage and Sanitation Feasibility Study—Botswana USAID/Botswana requested WASH assistance to conduct a feasibility study for sanitation in Kanye Village, which has a population of about 22,000 people. WASH consultants carried out a need assessment, developed sanitation options, and recommended an integrated approach involving ventilated improved pit (VIP) latrines, sanitation seminars, and broad based community participation. See WASH Field Report No. 95.

OTD #96 May 1982: Completed Rosensweig

Monitoring and Evaluation of Community Health Promoter Training Course—Ecuador AID/Ecuador requested WASH assistance to observe and review a three week classroom and field demonstration training course being held for community health promoters from eighteen provinces in Ecuador. The course was given by the Ecuadorian Institute of Sanitary Works (IEOS) in conjunction with AID. The purpose of the review was to develop insights and recommendations to strengthen future training courses and the IEOS program in rural water supply, sanitation and community participation. See WASH Field Report No. 49.

OTD #97 May 1982: Completed Donaldson

Technical Assistance in Well Siting and Drilling—Dominican Republic USAID/Dominican Republic requested WASH assistance in the well siting aspects of Health Sector Loan II. The original well drilling program had resulted in a high incidence of dry holes which required review. The WASH consultant made recommendations to improve the productivity of local well drilling companies and assisted in revising the well drilling contracting program to minimize the problem of reduced drilling capacity. See WASH Field Report No. 50.

OTD #98 June 1982: Cancelled

Training Assistance on Groundwater Contamination and Quality—Costa Rica Cancelled at request of Mission.

OTD #99 June 1982: Completed Beverly

Health Information System Development: Microcomputer Demonstration—Dominican Republic USAID/Dominican Republic requested WASH technical assistance to design and present a demonstration of how information generated by the Secretariat of Health (SESPAS) could be processed, analyzed and displayed using a microcomputer system. Some 6,000 SESPAS primary health care workers, or promoters, were each collecting basic health and household data on 100-300

families. Methods of efficiently using this information for analytical, planning and management purposes were under consideration and the microcomputer may provide a cost effective method of processing and analysis. The scope of work included meeting with Mission and SESPAS personnel to determine the characteristics of the data and the data collection system and to determine appropriate uses of processed data. Based on these findings, a preliminary set of file structures, record formats and displays was established for demonstration to SESPAS and Mission officials. Suggestions were also made as to possible hardware/software combinations that might be appropriate for later assessment in a feasibility study (see OTD #10). The demonstration was given in September, 1982. See WASH Field Report No. 111.

OTD #100 June 1982: Completed Hafner

Technical Assistance in Training-of-Trainers for Public Health Nurse Supervisors and in Training for Spring Cappers—Zaire USAID/Zaire requested technical assistance in two training tasks: training-of-trainers (TOT) for fifteen public health nurse supervisors who would work with village health committees, and training of 20 Peace Corps Volunteers (PCVs) in spring capping techniques. The two week training-of-trainers course conducted in July and August 1982 emphasized adult learning processes, preparation of training objectives, planning of training sessions, and innovative health education approaches. In the Peace Corps spring capping course, held in October, the sanitary engineering training consultant assisted the Peace Corps on-site trainer and emphasized practical site assessment, flow measurement, and physical design. This consultant also advised PCVs and Zairians of possible solutions to water flow, drainage and design problems of existing spring boxes in specific areas and prepared a draft spring capping instructional manual. See WASH Field Report Nos. 62 and 73. Also see WASH Technical Report No. 28.

OTD #101 June 1982: Completed Donaldson

Evaluation Assistance for Rural Water and Sanitation Project—Honduras USAID/Honduras requested WASH assistance in evaluating the status of the Honduras rural water supply and sanitation project, which was intended to provide 247,000 families with access to safe water and to adequate human waste disposal facilities but was experiencing serious delays in implementation. WASH consultants recommended changes in project organization, management, and financial procedures as well as in technical design, construction, and operations and maintenance. See WASH Field Report No. 69.

OTD #102 June 1982: Completed Rosensweig

Technical Assistance on Appropriate Well Drilling Equipment—Ecuador USAID/Ecuador requested WASH assistance to provide Meals for Millions/Free-dom from Hunger Foundation, a U.S. private voluntary organization operating in Ecuador, with technical advice on well drilling equipment appropriate for local

use. Meals for Millions has a project to provide water for improvement of the nutritional and health status of the population of the Santa Elena peninsula in Southern Ecuador. The WASH consultant assessed the situation and capabilities of local organizations to procure, and/or manufacture, operate, and maintain various types of well drilling equipment and recommended the appropriate drilling rig. See WASH Field Report No. 59.

OTD #103 June 1982: Completed Beverly

Health Information System Development: Assessment and System Design Study—Dominican Republic

USAID/Dominican Republic requested WASH technical assistance to make an assessment and system design study of the data collection activities of the Secretariat of Health (SESPAS) under Health Sector Loan II. The scope of work included review of forms and of data collection procedures, definition of information requirements, information system design, and preparation of manual and computerized system specifications, as appropriate. Two specific areas of information system design were selected for detailed analysis: inventory control and field operations management. Recommendations identified design assumptions and addressed trade-offs of manual vs. computerized systems with specific attention being given to accuracy, availability, accessibility, flexibility and possible external applications of data and analyses. See WASH Field Report No. 111 and OTD #99.

OTD #104 July 1982: Completed Warner

Investigation of Appropriate Water and Sanitation Systems for Low Cost Housing—Kenya The USAID Regional Office of Housing and Urban Development in Nairobi requested WASH technical assistance in investigating appropriate water supply and sanitation systems for low cost housing in the Umoja II housing project in Nairobi. Working with a technical committee of the Nairobi City Council, WASH consultants developed four alternatives for water and sanitation systems, including (1) temporary community sanitary facility, (2) Kayole I project standards, (3) courtyard standpipe with pourflush toilet, septic, tank and small diameter sewer, and (4) minimum cost conventional system. Interim reports are available.

OTD #105 July 1982: Completed Donaldson

Technical Assistance in Lecture Workshop on Sanitary Engineering Design for Developing Countries—Ecuador

USAID/Ecuador requested a WASH consultant to participate in a week-long training seminar on cost efficiency in the design and implementation of sanitary engineering facilities in developing countries. The consultant demonstrated the use of a computerized planning model on a minicomputer and conducted seminars on efficient sanitary engineering design and appropriate technology. See WASH Field Report No. 63.

OTD #106 July 1982: Completed Hafner

Technical Assistance in Developing a National Drinking Water Supply and Sanitation Plan—Central African Republic

USAID/Central African Republic (CAR) requested WASH assistance in developing a national drinking water supply and sanitation plan similar to that prepared for Sri Lanka. The WASH consultant provided preliminary coordination for plan formulation which included discussions with AID and CAR officials of the water supply and sanitation situation, needs and implementation capabilities; review of resources required to design a national plan; and an initial schedule of plan development activities. A National Action Committee for the Water Decade has been established and a Technical Coordinator has been appointed. Follow-up WASH assignments included assisting in the formulation of a water supply and sanitation policy document; a national seminar to review and approve the policy; and the development of a short-term action plan. See WASH Field Reports Nos. 53, 72, and 97.

OTD #107 July 1982: Completed Isely

Technical Assistance in Development of Inter-Sectoral Water Supply and Sanitation Strategy Paper for the Africa Bureau—AFR/TR/HNP

The Africa Bureau Health/Nutrition/Population Division requested WASH assistance to develop an intersectoral water supply and sanitation (WS&S) strategy statement. WASH consultants had been drafting an Africa WS&S strategy paper primarily from the health sector viewpoint and with an emphasis on human and institutional resource development. In reviewing this paper, the Africa Bureau recognized the need for a broader, more comprehensive inter-sectoral perspective and requested an appropriate revision of the paper. The revision emphasized rural and peri-urban water supply and sanitation in sub-Saharan Africa. See WASH Technical Report No. 19.

OTD #108 August 1982: Cancelled

Training Assistance to the Assistant Sanitary Technician Schools—Cameroon Cancelled at request of Mission.

OTD #109 August 1982: Completed Isely

Technical Assistance to Peace Corps Water Supply and Sanitation Sector—S&T/H/WS

WASH was requested to assist the Peace Corps in a review of its water supply and sanitation activities to serve as a basis for planning and implementing future operations in the water supply and sanitation sector. The scope of work included interviewing key Peace Corps staff, collecting and analyzing relevant documentation and data, identifying strategic opportunities, resource requirements, and possible deployments, and preparing a final report. In addition, the consultants updated the 1980-1981 Peace Corps Project Summary of Water and Sanitation Projects for 1982-1983. See WASH Field Report No. 86.

OTD #110 August 1982: Completed Donaldson

Coordination/Collaboration on LDC Training with the International Water Supply Association (IWSA)-S&T/H/WS WASH was requested to participate in a planning meeting of the Committee on Waterworks Personnel of the IWSA in Zurich, Switzerland, on September 6, 1982. The agenda of the Committee included: reviewing the minutes of earlier Working Group meetings as well as reports of Regional Conference (1981-India, 1982-Africa); considering papers for the 1984 Tunis Congress; examining arrangements for Post Congress Seminars in developing countries; and discussing a proposal for a training workshop to be held for developing countries in 1983.

OTD #111 August 1982: Completed Rosensweig

In-Service Training for Peace Corps Volunteers in Rural Potable Water Supply Project-

Morocco USAID/Morocco requested WASH to provide in-service training to 11 Peace Corps Volunteers (PCVs) in the operation and maintenance of water pumping systems for the rural potable water supply project and to review the status of the project. Since completing initial training under OTD No. 61 in February 1982, PCVs had identified unresolved problems and had expressed a need for further training. The assignment included reviewing the situation with PCVs, preparing a work plan and material requirements for in-service training of PCVs, conducting in-service training at selected field sites, and providing assistance in the design of a diesel repair trouble shooting course to be given by others. See WASH Field Report No. 61.

OTD #112 September 1982: Completed Rosensweig

Participation in Practice of Management Seminar-

S&T/H/WS The Office of Health authorized the WASH Senior Training Officer to participate in a seminar on "The Practice of Management Principles," October 25-29, 1982, in Rosslyn, Virginia. The seminar was conducted by the Coverdale Organization, an internationally recognized consulting firm specializing in increasing awareness and skills in the human, non-technical "process" areas of management. Understanding and proficiency in these areas is vital to the achievement of quality organizational results and the personal satisfaction of those involved. The approaches and techniques demonstrated in the seminar are being applied to WASH activities in the area of management training.

OTD #113 September 1982: Completed Donaldson

Technical/Managerial Review of the AID Handpump Technology Transfer Program in Sri Lanka, Philippines, Indonesia, Honduras, and Dominican Republic-S&T/H/WS

The AID Office of Health requested that WASH participate in a technical/managerial review of the AID Handpump Technology Transfer Program in Sri Lanka, Philippines, Indonesia, Honduras and Dominican Republic. During the field visits, WASH consultants reviewed the current and anticipated future status of handpump manufacturing, handpump mar-

keting, pricing, and distribution, and the supply and delivery of spare parts; field installation effectiveness; and training and community participation effectiveness. The consultants also ascertained current and future USAID handpump technology transfer activities. See WASH Field Report No. 76.

OTD #114 September 1982: Completed Donaldson

Assessment and Evaluation of the Feasibility of Local Manufacturing of the AID Handpump-

Peru USAID/Peru requested WASH to conduct an evaluation of the feasibility of local manufacturing and marketing of the AID Handpump and Robodevices in Peru. WASH consultants carried out a needs assessment, marketing study, and a review of manufacturing and maintenance capabilities. They concluded that low manufacture of the AID handpump was feasible in Peru but that further cost analyses were required to decide on future handpump production. See WASH Field Report No. 89.

OTD #115 September 1982: Completed Donaldson

Technical Assistance in Design of Well Drilling Program-Honduras

USAID/Honduras requested WASH assistance in designing a well construction program for western Honduras that would encompass an estimated 3,000 drilled and hand dug wells. A WASH consultant reviewed the hydrogeological and well construction practices of the area. He recommended increased emphasis on cable tool drilling methods, private sector contractors, and gravity flow water systems. See WASH Field Report No. 65.

OTD #116 September 1982: Completed Isely

Technical Assistance in Training Social Promotional Agents in Spring Capping and Rainwater Harvesting-Togo

USAID/Togo requested WASH assistance in the training of social promotion agents in village level water supply and sanitation system design and construction as part of on-going AID funded projects. The technical and training instruction given to these agents was to prepare them to assist village populations in developing local springs and rainwater harvesting systems. The training-of-trainers training plan addressed preparation, coordination, training sequence, agenda, and types of performance demonstrations in the field. It also identified controls to insure that the training materials/methodology used for these efforts with the Togo trainees resulted in a package of field tested materials and methodology that can be translated and applied in other country/geographic situations. See WASH Field Report No. 87. Also see Technical Reports Nos. 27 and 28.

OTD #117 September 1982: Completed Isely

Technical Assistance in Evaluation of Foster Parents Plan Water Projects-Indonesia

USAID/Indonesia requested WASH assistance with the technical aspects of evaluating the 2,000 site water supply program of the private volunteer organization Foster Parents Plan. The

social and health aspects were evaluated by the staff of Foster Parents Plan. The scope of work included review of relevant project documents; interviews with staff of AID, Foster Parents Plan, and ministries and with village committees; inspection of existing and planned water source sites; and preparation of an evaluation report. The report considered suitability of location and effectiveness of existing wells and gravity systems, appropriateness of planned sites, construction program, technology selection and training, and the strengths and weaknesses of the overall program. See WASH Field Report No. 71.

OTD #118 September 1982: Completed Hafner

Technical Assistance in Assessing and Planning Care Water Supply and Sanitation Projects—

Cameroon USAID/Cameroon requested WASH assistance in assessing CARE water supply and sanitation programs and in preparing the CARE 1983-1987 Development Plan. The scope of work had two major tasks. The first was to assess the current status of CARE-managed water supply and sanitation (WS&S) programs in the Northern and Eastern Regions. The second task was to assist CARE in making reasonable and feasible projections of WS&S activities for the next five years. Sub-tasks included the development of practical targets and reasonable "indicators" against which to measure progress and to prepare a draft of relevant sections of CARE's multi-year plan. See WASH Field Report No. 75.

OTD #119 September 1982: Cancelled

Technical Assistance in Planning the Evaluation of Water Supply, Sanitation and Health Projects—Philippines Cancelled at request of the Mission.

OTD #120 September 1982: Completed Isely

Technical Assistance in Evaluation of Water Supply, Sanitation and Health Aspects of Spring-Fed Irrigation Project—Tunisia USAID/Tunisia requested WASH assistance in conducting an interim evaluation of the water supply, sanitation and health aspects of a spring-fed irrigation project. The evaluation was undertaken jointly with the Central Tunisia Development Authority and AID. The scope of work included reviewing relevant documentation, interviewing AID and government officials, visiting sites and preparing an evaluation report and recommendations. See WASH Field Report No. 84.

OTD #121 September 1982: Completed Rosensweig

Technical Assistance for Training-of-Trainers Workshop for Peace Corps—S&T/H/WS The Peace Corps requested WASH assistance in the design and delivery of a training-of-trainers (TOT) workshop December 6-9, 1982 for the Indian Health Service in Alaska. Eighteen Indian Health Service engineers and sanitarians who participated in the workshop were trained to serve as technical trainers in the continental U.S. for Peace Corps Volunteers assigned to water supply and sanitation projects.

The scope of work encompassed the design and delivery of a four day TOT workshop and the preparation of a final report which included an evaluation and recommendations. See WASH Field Report No. 70.

OTD #122 September 1982: Completed Rosensweig

Development of Trainers' Guides on Handpump Installation and Maintenance, and Latrine Construction—S&T/H/WS WASH developed two training guides on handpump installation and maintenance and latrine construction. Both training guides contain all the information a trainer needs to plan and conduct a comprehensive workshop, including training designs, trainer guidelines, and participant handouts. The guides were developed for trainers to use in training field workers. The training guides can be adapted with minor changes for use in a wide variety of situations. See WASH Technical Reports Nos. 25 and 26.

OTD #123 October 1982: Completed Rosensweig

Technical Assistance in Design and Delivery of a Training Workshop on Management Team Building—Thailand USAID/Thailand requested WASH training assistance in designing and delivering a workshop on management team building for the Provincial Waterwork Authority (PWA) of Thailand. The workshop was held for the 30 top managers of PWA from November 1-5, 1982. The workshop was a first step in future PWA activities to strengthen its management and its training capability. Most of the workshop was conducted in Thai. See WASH Field Report No. 68.

OTD #124 October 1982: Completed Donaldson

Technical Assistance to Assess Solid Waste, Wastewater and Water Supply Situation and Requirements—Lebanon USAID/Lebanon requested WASH assistance to assess the solid waste, wastewater and water supply situation and requirements in Metropolitan Beirut. The scope of work included contacting public, private and foreign organizations active in these subsectors; reviewing their activities and plans; estimating the effectiveness of their individual and collective efforts; and determining areas of need and future resource requirements for the subsectors. From this data the WASH consultants prepared a suggested action plan, schedule and estimates of resource requirements, and other recommendations considered appropriate. See WASH Field Report No. 66.

OTD #125 October 1982: Completed Donaldson

Technical Assistance in Staffing AID/WASH Exhibition Booth at APHA Annual Meeting, Montreal, November 13-19, 1982—S&T/H/WS The AID Office of Health requested WASH to provide professional staff for the AID/WASH exhibition booth at the annual meeting of the American Public Health Association in Montreal, Canada, November 13-19, 1982. The WASH portion of the booth contained display panels with photographs, an operational AID Handpump, and a vari-

ety of WASH reports and publications for discussion and distribution to visitors to the booth.

OTD #126 November 1982: Completed Donaldson

Review of Water-Seal Latrine Field Acceptance and Possible Local Manufacture—Honduras USAID/Honduras requested WASH assistance in reviewing the acceptance of water-seal latrines and the feasibility of manufacturing them in Honduras. At the time, Honduras had programmed the installation of 18,000 pit latrines and 14,000 water-seal latrines. A WASH consultant then in Honduras on another task made a preliminary survey to determine what steps should be taken next.

OTD #127 November 1982: Completed Rosensweig

Reconnaissance Visit in Preparation for Sanitation Workshop—Senegal USAID/Senegal requested WASH services to plan a workshop on latrine construction and solid waste disposal for nurses working in the Bakel Health Component of the Irrigated Perimeters Project. The planning visit took place in December 1982. The purposes of the planning visit were to review workshop planning to date, assess the proposed workshop site, and investigate the participation of other Senegalese institutions. As a result of the planning visit the workshop was scheduled for April 1983. See OTD No. 147.

OTD #128 December 1982: Completed Donaldson

Coordination/Collaboration on Water and Sanitation in Asia—S&T/H/WS At the request of the AID Office of Health, WASH partially financed the travel costs of a keynote speaker at the International Seminar on Human Waste Management for Low-Income Settlements, in Bangkok, Thailand, January 16-22, 1983, sponsored by the Asian Institute of Technology and others.

OTD #129 January 1983: Completed Donaldson

PVO Seminar on Rural Potable Water and Sanitation Systems—Haiti USAID/Haiti requested WASH technical services in the design and implementation of a seminar on rural potable water and sanitation systems for private volunteer organizations (PVOs). WASH consultants provided these services and the seminar was held in February 1983. A seminar of this kind was recommended by WASH under OTD #9 in November 1981 in WASH Field Report No. 2. See WASH Field Report No. 77

OTD #130 January 1983: Completed Donaldson

Comparative Life Cycle Cost Analysis of AID and Moyno Design Handpumps—LAC/DR; S&T/H/WS WASH was requested by the AID Latin American Bureau, the Dominican Republic Mission, and the Office of Health to make a comparative life cycle cost analysis of the AID and Moyno design handpumps that are used in the Dominican Republic. The AID handpumps were manufactured in the Dominican Republic while

the Moyno pumps were imported from the U.S. The cost analysis included annual operational and maintenance cost estimates, sensitivity analyses, and the use of several interest rates. Although the analysis was sensitive to the interest rate employed, it was found that the Moyno pumps were slightly more expensive on an annual or life cycle basis than the locally manufactured pumps. See WASH Field Report No. 80.

OTD #131 January 1983: Completed Rosensweig

Technical Assistance to Improve Management Structure and Systems of Public Health Inspectorate—Swaziland USAID/Swaziland requested WASH assistance to strengthen the management structure and systems of the Public Health Inspectorate in the Ministry of Health. The Inspectorate is responsible for latrine construction, spring protection, food inspection and the control of pest and communicable diseases. The scope of work included evaluation of present level of management skills, identification of key management skills to perform job duties, review of proposed organization structure of the Inspectorate, preparation and delivery of an in-service management training program for health inspectors, and development of a management information system and of other recommendations as appropriate. See WASH Field Report No. 108.

OTD #132 February 1983: Completed Rosensweig

Planning of Latrine Construction Workshop and Determination of Training Needs in Water Supply and Sanitation—Dominican Republic USAID/Dominican Republic requested WASH technical assistance in planning a latrine construction workshop for Peace Corps Volunteers and Dominican field personnel working under Health Sector Loan II. The scope of work included establishing the workshop objectives, collecting information on participants and planning for all logistical arrangements. Additional assistance was provided to review and discuss short and long term training needs in water supply and sanitation within the scope of Health Sector Loan II. As a result of the planning, two workshops were scheduled in April-May 1983 under OTD #143 below.

OTD #133 February 1983: Completed Isely

Feasibility Study and Planning of Water Supply and Sanitation Systems for Private Volunteer Organizations—Indonesia USAID/Indonesia requested WASH to provide assistance to several private volunteer organizations (PVOs) operating in Irian Jaya, Indonesia. WASH assisted the Mission in making a feasibility study and plan for a PVO Operating Grant project involving 70-80 small scale water systems and the World Relief Corporation in the Minyambou area of Irian Jaya. WASH also assisted the PVO Development Information Service in planning a water supply and sanitation project in the Jaya Paura of Irian Jaya. See WASH Field Report No. 90.

OTD #134 February 1983: Completed Donaldson

Development of Solid Waste Disposal Plan for Beirut and other areas in Lebanon—Lebanon USAID/Lebanon requested WASH technical assistance in developing, with Mission, Near East Bureau and Lebanon Government staff, an environmentally sound "Plan of Action" to stop the continuing pollution of the Mediterranean from improper solid waste dumping. The plan prepared by a WASH consultant included potential institutional participants, recommendations for future dump site operations, and estimated costs of plan implementation. See WASH Field Report No. 79.

OTD #135 February 1983: Completed Donaldson

Revision of Plan for Rural Water Supply and Sanitation Project—Honduras USAID/Honduras requested WASH technical assistance to revise the work content and financial plan of the ongoing Rural Water Supply and Sanitation Project, which was experiencing serious delays in implementation. Working with the Programa de Saneamiento y Agua Rural (PRASAR), the WASH consultant recommended installing 950 handpumps out of the 3,000 originally planned and constructing 600 new wells. In addition, recommendations were made regarding scheduling, project siting, and equipment acquisition. See WASH Field Report No. 81.

OTD #136 February 1983: Completed Isely

Preparation of Scope of Work for Evaluation of CARE Rural Water Project—Indonesia USAID/Indonesia requested WASH technical assistance in preparing the scope of work for the evaluation of the ongoing CARE Rural Water Project. Since 1980 CARE has constructed 70 small scale rural water supply systems of 500 wells and numerous gravity flow systems in over 100 villages at a cost of about \$2,500,000. The evaluation of progress to date enhanced future programming by assessing the cost-effectiveness and impact of completed works. The WASH consultant also assisted the Mission in considering a strategy for CARE to leverage its resources for greater impact on government water programs. See WASH Field Report No. 83 and OTD No. 155 below.

OTD #137 February 1983: Completed Isely

Development of Comprehensive Training Plan for Rural Spring Capping Project—Burundi USAID/Burundi requested WASH technical assistance to develop a comprehensive training plan for rural workers involved in the installation and maintenance of capped springs and in the promotion of domestic hygiene and sanitation. The scope of work included reviewing current health and sanitation programs of the Ministries of Health and Social Affairs and of UNICEF's spring capping project and assessing the training resources of each Ministry and of the Ministry of Development, which is in charge of the Project. It also included developing a comprehensive training program aimed at maximizing the health and sanitation benefits of spring capping, providing a list of required equipment and

materials, and furnishing guidelines for the Ministries to institutionalize this program in their long-term plans of operation. See WASH Field Report No. 78.

OTD #138 February 1983: Completed Hafner

Technical, Training and Management Assistance to the National Water Supply and Drainage Board—Sri Lanka USAID/Sri Lanka requested that WASH provide technical, training and management assistance to the National Water Supply and Drainage Board (NWSDB) and also to the Ministry of Local Government, Housing and Construction (MLGHCL). Areas needing improvement included training, operations and maintenance, rehabilitation, water quality monitoring, planning, technology evaluation, organizational development and community financing of water supply and sanitation systems. The specific tasks of the WASH consultants were to prepare and conduct a workshop for 20 NWSDB staff on the management of operations and maintenance activities and to develop procedures and methods for the maintenance of water supply and sanitation activities. See WASH Field Reports Nos. 94 and 122.

OTD #139 February 1983: Completed Donaldson

Technical Assistance with Design of a Rural Water Supply Project—Thailand USAID/Thailand requested WASH assistance in preparing materials for a project paper for a rural water supply project. The Provincial Water Authority (PWA), which operates some 700 rural piped water systems, sought to improve its capacity to design, install, manage and maintain these systems. The proposed project was intended to up-grade PWA's technical and management skills and identify measures to reduce capital and operating costs. The WASH consultants, working as members of the project design team, specifically addressed requirements for manpower training needs assessments, and the planning and implementation of training delivery systems.

OTD #140 March 1983: Completed Isely

Engineering Evaluation of Foster Parents Plan Water Projects—Haiti USAID/Haiti requested that WASH provide technical assistance for an engineering evaluation of the private volunteer organization Foster Parents Plan (FPP) water projects. The scope of work included assessing existing water supply sources, distribution networks, and maintenance activities; examining the unused filter system and reservoirs near Croix-des-Bouquets to determine costs and feasibility of future use; designing simple drains for public fountain areas and a storage tank for spring water; and making recommendations as appropriate, e.g., rainwater catchments, etc. See WASH Field Report No. 96.

OTD #141 March 1983: Completed Hafner

Rural Health Zone Directors Workshop—Zaire USAID/Zaire requested WASH participation in a health zone directors workshop, which is part of the Annual Conference of the AID Basic Rural Health

Project in Zaire. The scope of work included identifying and discussing needs for spring capping, rain water harvesting and well construction, development of training strategies to meet the needs, planning regional water-related seminars for 1983-84, and specific seminar planning on rainwater harvesting for two rural health zones seminars for 1983. See WASH Field Report No. 88 and OTD No. 167 below.

OTD #142 March 1983: Completed Hafner

Public Health Education for Low-Cost Sanitation—Tanzania USAID/Tanzania requested WASH to provide a public health educator to assist the Ministry of Lands, Housing and Urban Development (ARDHI) in preparing strategy outlines for health education and promotion in low-cost sanitation for peri-urban areas of Dar es Salaam. The consultant worked with the low-cost sanitation unit, the Institute of Adult Education, the City Council, and other organizations. The scope of work for the strategy outline included defining objectives; determining personnel and logistic requirements and methods of operation and promotion; identifying teaching/promotion aids needed; designing the monitoring and evaluation process; and estimating program costs. See WASH Field Report No. 92.

OTD #143 March 1983: Completed Rosensweig

Design and Delivery of Two Workshops on Latrine Construction—Dominican Republic As a follow-up to OTD #132 USAID/Dominican Republic requested WASH to design and deliver two workshops on latrine construction as part of AID Health Sector Loan II activities. The participants were Peace Corps Volunteers and Dominican Health Promoters, the latter being responsible for the latrine component and health education activity of Health Sector Loan II. The scope of work included preparing training materials, organizing the workshops, which included solid waste disposal and potable water handling in addition to latrine construction, conducting the workshops, and preparing an evaluation and final report. The first workshop was conducted from April 4–15, 1983 for twenty-five participants and the second from April 25–May 6, 1983 for twenty-two participants. The workshop also served as a field test for the WASH Training Guide on Latrine Construction. See WASH Field Report No. 93. The Training Guide is Technical Report No. 25.

OTD #144 March 1983: Completed Hafner

Design and Delivery of Three Training-of-Trainers Workshops on Community Participation in Water Supply Projects—Malawi USAID/Malawi requested WASH technical assistance in the design and delivery of a training-of-trainers workshop for six Malawian trainers and two three-week-long workshops on community participation in relation to the AID piped water project. Sixty-five Ministry of Health field staff were trained in health education and sanitation improvements in rural piped water supply areas. Workshop topics included

the communication process, adult learning theory, community motivation methods, shared approaches to developing problem-oriented learning programs, community education techniques and materials, and village health committee formation, function, administration and supervision. See WASH Field Report No. 99.

OTD #145 March 1983: Completed Isely

Assistance in Evaluation of Rural Supply

Project—Togo USAID/Togo requested WASH assistance as member of a team to evaluate the Rural Water Supply Project. The overall evaluation assessed the effectiveness of the establishment and functioning of wells, village health committees, AID and Togo government project staff, and of pump maintenance systems; and the effectiveness of training village pump mechanics and of micro-project planning in the plateau region. The WASH consultant specifically addressed training effectiveness and relationships between villagers and field agents, identified problems encountered in carrying out project activities at the village level, and suggested possible solutions. See WASH Field Report No. 82.

OTD #146 March 1983: Completed Isely

Design of Research/Action Demonstration Study on Community Participation—Tunisia

USAID/Tunisia requested WASH planning assistance for the Central Tunisia Development Authority (CTDA). The WASH consultant assisted CTDA in the detailed planning and budgeting of a study designed to demonstrate the impact of community participation on the attainment of water supply, sanitation, and primary health care program objectives. The initial study concept is to take three different groups of communities with varying degrees of historical community participation and assess relative costs, resource utilizations, effectiveness, and impact of community participation activities on program objectives.

OTD #147 March 1983: Completed Rosensweig

Design and Delivery of Workshop on Latrine Construction, Solid Waste Disposal, and Wastewater Disposal for Rural Areas—Senegal USAID/Senegal requested WASH assistance to design and deliver a sanitation workshop and to provide additional follow-up technical assistance with participants from the Bakel Project. The workshop covered latrine construction, solid waste disposal and wastewater disposal for rural areas. The activity included planning the workshop for sixteen participants, developing the training materials, arranging logistic requirements, conducting the workshop, evaluating the workshop and preparing a final report and recommendations. The workshop was held in Bakel from April 20–May 3, 1983. This follows up OTD No. 127 above. See WASH Field Report No. 91.

OTD #148 May 1983: Completed Donaldson

Technical Assistance in Development of a Water Supply and Sanitation Project—El Salvador USAID/El Salvador requested WASH assistance to support a

health systems project development team in El Salvador. The WASH consultant identified targets of opportunity to be incorporated into the project paper related to improving the on-going Ministry of Health latrine program (design and construction) and assessed needs for the development of appropriate technology in household water systems.

OTD #149 July 1983: Completed Hafner

Rural Water Supply Evaluation—Malawi

USAID/Malawi requested WASH assistance in designing and conducting a mid-project evaluation of the Self-Help Rural Water Supply Project. The purposes of this formative evaluation were to establish a baseline of evaluation data for the final evaluation and to measure current progress towards achieving project outputs, purposes, goals and end-of-project status. Five areas were investigated by the WASH evaluation team: project inputs by AID and the Government of Malawi; strengthening of the institutions involved in the project; project outputs; the construction and operational status of community water systems; the performance of the community water systems; and the economic, social and health impacts of the project. See WASH Field Report No. 105.

OTD #150 July 1983: Completed Donaldson

Evaluation of Construction Aspects of Integrated Rural Health Project—Guatemala USAID/Guatemala requested WASH assistance in evaluating the construction aspects of the Community-based Integrated Health and Nutrition System Project for rural health delivery. The project included construction of 114 small gravity fed potable water systems, 7,000 latrines, 1,500 housing improvements, 13 health posts, one regional service center and the renovation of 44 health posts. The WASH consultant reviewed Ministry of Health implementation plans and its logistic and administrative capabilities to monitor and meet project objectives, and made recommendations relevant to the timely and satisfactory completion of the project. See WASH Field Report No. 104.

OTD #151 July 1983: Completed Donaldson

Technical Assistance for Private Sector Water Program—Bolivia

USAID/Bolivia requested WASH assistance in preparing a proposal for a private sector potable water and rural sanitation project. The WASH consultant assessed the technical feasibility of the proposed private sector initiative which involved Bolivian savings and loan institutional financing. A representative of the AID Bureau of Private Enterprise developed the institutional financing aspects of the proposal.

OTD #152 July 1983: Completed Rosensweig

Preparation of Scopes of Work for Human Resource Development Programs—Peru

USAID/Peru requested WASH assistance in designing scopes of work for regional level rural water supply training programs for the Ministry of Health. The three training program

subjects were 1) design and supervision of construction of rural water systems, 2) operation and maintenance of rural water systems, and 3) health education programs which integrate primary health care with the construction of rural water systems and latrines.

OTD #153 August 1983: Completed Hafner

Development and Testing of Rainwater Harvesting Training Materials—Inter-Regional; S&T/H/WS

The Office of Health requested that WASH continue development and testing of rainwater harvesting training materials on a more extensive basis than previously authorized. The scope of work included a technical review of existing materials; review and revision following field pilot test which was conducted under OTD No. 167; development of a dissemination strategy for the final products to reach key people with operational program interests; and distribution of the training materials to these individuals. See WASH Technical Report No. 27 and Field Report No. 115.

OTD #154 August 1983: Completed Rosensweig

Development and Testing of Spring-Capping Trainers Guide—Interregional; S&T/H/WS

The Office of Health requested that WASH develop and test the spring-capping training guide. The scope of work included the development of the first draft, revisions based on a field test, and final production. The training guide contains all the information a trainer needs to plan and conduct a comprehensive two-week workshop, including training designs, trainer guidelines, and participant handouts. The guide was developed for trainers to use in training field workers with responsibility for rural water supply and sanitation. See WASH Technical Report No. 28.

OTD #155 August 1983: Completed Donaldson

Technical Assistance in Evaluation of CARE Water Program—Indonesia

USAID/Indonesia requested WASH assistance in conducting the second part of an evaluation of the CARE Water Project. The scope of work included evaluation of CARE's field staff, of CARE's community involvement approach, and the involvement of the Government of Indonesia in CARE water project activities. Recommendations addressed how the CARE approach and training program might be incorporated into Government operations, how it might be used by other development organizations and PVOs, and how alternative financing methods may be applicable to CARE water projects. See WASH Field Report No. 107.

OTD #156 August 1983: Completed Hafner

Technical Assistance in Evaluation of National Institute of Health Science Project—Sri Lanka

USAID/Sri Lanka requested WASH assistance in the mid-project evaluation of the National Institute of Health Science Project in the Ministry of Health, Sri Lanka. The WASH consultant was a member of the evaluation team and provided expertise in public health, water supply,

sanitation and institutional training of community workers at the paraprofessional level in developing countries.

OTD #157 August 1983: Completed Hafner

Technical Assistance in Evaluation of CARE/Kenya Rural Water Projects—Kenya USAID/Kenya requested WASH assistance in the design and execution of an evaluation of several rural water supply projects that CARE had worked on over the past three years. The scope of work included determining what has worked well, the reasons therefor and the impact on recipient communities; recommending viable community-based maintenance systems for future CARE projects in Kenya; reviewing and recommending realistic project goals and an appropriate goal accomplishment indicator system; developing a practical evaluation methodology for future CARE projects; and informally training CARE staff in evaluation approaches and methodologies. See WASH Field Report No. 106.

OTD #158 September 1983: Completed Rosensweig

Technical Assistance in Assessment of Sanitation Sector and Strategy Design—Tunisia/RHUDO

USAID/Tunisia, the AID Regional Housing Office (RHUO) in Tunisia, and the AID Office of Housing and Urban Programs in the Bureau for Private Enterprise (PRE/H), requested WASH assistance in undertaking an assessment of the sanitation sector in Tunisia and in developing a strategy for meeting urban and periurban sanitation needs. The scope of work included reviewing selected current and planned sewerage and drainage projects of other donors; assessing dimensions of sanitation sector needs, constraints, programs, policies and institution, managerial, and financial capabilities; reviewing projects submitted for funding and identifying those eligible for AID/Housing financing; and assisting in an initial development of a strategy and options for undertaking AID financing of future programs and projects in the sanitation sector. See WASH Field Report No. 109.

OTD #159 September 1983: Completed Rosensweig

Technical Assistance in Institution Building—Near East Bureau AID/NE requested WASH assistance in assessing the institution-building needs and plans of the water sector in the Near East region. WASH assisted the Near East Bureau Water Resources Subcommittee on Institutional Development in assessing the capabilities of Near East institutions in Yemen, Egypt, Tunisia, and Jordan based on literature reviews and interviews with experts. The Report provides a description of the institutional setting, discusses sector trends in terms of programs and investments, identifies problems and constraints affecting the sector, and provides a framework for examining the status and institutions in each country. See WASH Field Report No. 119.

OTD #160 September 1983: Completed Rosensweig

Technical Assistance in Human Resource Develop-

ment—Near East Bureau At the request of the Water Resources Committee of the Near East Bureau, WASH was asked to identify and assess the organizations and institutions that offer high quality training and educational programs in the water and wastewater sector. A handbook was developed which catalogues programs by length of the course, type of training offered and relation to key job functions in the sector. A companion document identifies sources of training materials for operations and maintenance. See WASH Field Reports Nos. 117 and 118.

OTD #161 September 1983: Completed Donaldson

Technical Assistance in Evaluation of Small Rural Water Systems—Yemen USAID/Yemen requested WASH assistance in evaluation of the small rural water systems project and preparing the terms of reference for the water sector assessment planned for early 1984. The general scope of work included assessing activities and plans of the organization; staffing of the contractor and the rural water department; project replicability; the role and impact of Peace Corps and of women in the project; and the long range requirements for similar water supply projects in Yemen. See OTD No. 39 and WASH Field Report No. 22.

OTD #162 September 1983: Completed Isely

Technical Assistance on Project Paper for Community Water Systems Development—Haiti USAID/Haiti requested WASH assistance in preparing a Project Paper for Community Water Systems Development. The WASH consulting team focused on site and water supply technical alternatives, options for institutional arrangements with PVOs, baseline data acquisition for socio-economic and health impact evaluation, technology transfer opportunities and resources, and utilization of local experience in project design and development of financing schemes.

OTD #163 September 1983: Completed Beverly

Technical Assistance in Staffing AID/WASH Exhibition Booth at APHA Annual Meeting, Dallas, Texas, November 13-17, 1983—S&T/H/WS WASH was requested by the Office of Health to provide professional staff for the AID/WASH exhibition booth at the annual meeting of the American Public Health Association. WASH display panels with photographs were part of the AID exhibit. The WASH section also included an operational AID Handpump and a variety of WASH reports and publications for discussion and distribution to visitors to the booth.

OTD #164 October 1983: Completed Donaldson

Technical Assistance in Reviewing Low-Cost Alternative Water Supply and Sanitation Concepts and Designs—Ivory Coast The USAID Regional Housing and Urban Development Office in Abidjan requested WASH assistance in reviewing low-cost alternative water supply and sanitation concepts and designs. The WASH team worked with the Housing Office in the

Ivory Coast to identify and evaluate alternatives that were within the social, financial, and technical resources of the Ivory Coast for its low-cost housing projects. Key issues addressed included the social, technical, and financial range of affordable solutions; capital costs per user; environmental impacts; local availability of materials and equipment; possible financing schemes, such as a revolving fund; and feasible changes in current technical standards. See WASH Field Report No. 113.

OTD #165 October 1983: Completed Isely

Collection and Presentation of Water and Sanitation Related Health Education Materials—S&T/H/WS

The Office of Health requested that WASH prepare a collection of water and sanitation related health education materials produced in developing countries and especially descriptions of how they were developed and used. The materials and associated descriptions will be used as examples and as guidance and inspiration for the creation of new indigenously prepared materials by health educators and trainers in developing countries and by consultants. The scope of work included obtaining copies and/or descriptions of materials and of their development and use; reviewing, cataloging and abstracting the materials; and preparing a health education resource bibliography. See WASH Technical Report No. 30.

OTD #166 October 1983: Completed Rosensweig

Technical Assistance for Workshop on Sanitation and Latrine Construction—Sierra Leone

USAID/Sierra Leone and the Peace Corps requested WASH assistance to design and deliver a two week sanitation and latrine construction workshop for twenty-four Peace Corps Volunteers and staff from the Ministry of Energy and Power and the Ministry of Health. The workshop included hands-on experience in latrine construction and maintenance, as well as consideration of community participation, local practices, health education strategies, and project development and planning skills. The WASH training guide on latrine construction was piloted during this workshop. See WASH Field Report No. 114. Also see Technical Report No. 25.

OTD #167 October 1983: Completed Hafner

Technical Assistance for Rainwater Harvesting Workshop—Zaire

USAID/Zaire requested WASH assistance to design and deliver a two-week workshop on rainwater harvesting for twenty-five national rural health workers, missionary health staff and Peace Corps Volunteers. The workshop concentrated on the technical skills and practices applied in the construction, operation, and maintenance of gutters and above-and-below-ground cistern systems used for household, institutional and community water supply. Previously developed WASH training materials on rainwater harvesting were adapted to Zaire and translated into French for use in the workshop. See WASH Field Report No. 115. Also see WASH Technical Report No. 27.

OTD #168 October 1983: Completed Hafner

Technical Assistance in Evaluation of Rural Water-Borne Disease Control Project—Swaziland

USAID/Swaziland requested WASH assistance in conducting a mid-project evaluation of the Rural Water-borne Disease Control Project. The project has three major inter-related components—health education, environmental sanitation and public health engineering, and a survey of schistosomiasis and water-related diseases—aimed at expanding the capacity of the government to deliver effective preventive health services. In addition to assessing progress on eighteen specific aspects of the project, the WASH evaluation team reviewed the scope and content of the project, work plan priorities and time requirements and the appropriateness of the implementation strategy and of support received by the contracting team. The team also assessed the need for a post-project knowledge, attitudes and practices survey, and made appropriate recommendations. See WASH Field Report No. 120.

OTD #169 October 1983: Completed Isely

Participation in International Workshop on Measuring the Health Impacts of Water Supply and Sanitation Projects, November 21-25, 1983

Dhaka—Bangladesh

The Office of Health authorized WASH participation in the International Workshop on Measuring the Health Impacts of Water Supply and Sanitation Projects. The workshop was organized by the International Centre for Diarrheal Disease Research, Bangladesh, and the London School of Hygiene and Tropical Medicine, and had some thirty invited participants plus observers. The WASH consultant presented a paper entitled "Opportunities, Problems and Pitfalls in Using Health Status Measures to Evaluate Water Supply and Sanitation Projects in Togo, Malawi and Tunisia."

OTD #170 October 1983: Cancelled

Technical Assistance for Development of Project Paper Amendment for Rural Water Supply and Sanitation Project—Togo. Cancelled at request of Mission.

OTD #171 November 1983: Completed Donaldson

Disaster Assistance Following Earthquake—Turkey

The AID Office of Health and the Office of Foreign Disaster Assistance requested WASH technical assistance in evaluating the earthquake situation and its requirements in eastern Turkey. A WASH consultant and the AID WASH Project Manager analyzed water supply and sanitation conditions, requirements and opportunities resulting from the earthquake and coordinated water purification and planning activities in consort with U.S. and Turkish government officials.

OTD #172 November 1983: Completed Donaldson

Drought Emergency Assistance—Mauritania

The AID Office of Foreign Disaster Assistance and the Mauritania Mission requested WASH services in planning

relief measures for the drought situation in Mauritania. The WASH team recommended short term technical assistance activities as well as long-term water supply improvements involving equipment replacement, well drilling, well maintenance, operator training programs, and drilling rig repairs. See WASH Field Report No. 112.

OTD #173 January 1984: Completed Donaldson

Technical Assistance in Well Drilling and Community Participation—Bolivia USAID/Bolivia requested WASH assistance in the well drilling and community participation aspects of the Bolivia Rural Water Supply and Sanitation Project, which had been suspended in 1980 and reactivated in 1983. WASH consultants developed recommendations on drilling rigs, well siting, pumps, and generators as well as on the community participation aspects of staff deployment, transportation, recruitment, equipment, technical assistance, and community promotion. See WASH Field Reports Nos. 116 and 121.

OTD #174 January 1984: Completed Isely

Technical Assistance in Evaluation of Rural Water Supply Project—Upper Volta USAID/Upper Volta requested WASH assistance in conducting a benchmark assessment of the on-going rural water supply project. The assessment report reviewed the overall management of the project and its major components; choice of technology, well construction, and pump installation; pump and well maintenance organization and financing; host country management capability to continue well site identification and future well drilling; training of health assistants and village health workers; content of the health education component; and coordination of the component with well construction and use.

OTD #175 January 1984: Completed Rosensweig

Technical Assistance in Organizing a Training Unit in the Directorate of Rural Sanitation (DISAR)—Peru USAID/Peru requested WASH assistance in organizing and planning the initial operations of the central training unit recently established in the Directorate of Rural Sanitation (DISAR). The WASH consultants assisted DISAR in organizing the training unit; establishing objectives, functions, positions and procedures; in developing a model for courses that DISAR will conduct; and in coordinating DISAR's training delivery system with other AID projects, other donors, and other national agencies. See WASH Field Report No. 126.

OTD #176 February 1984: Completed Hafner

Technical Assistance on Project Paper for Urban Development—Jamaica USAID/Jamaica and the Regional Housing Office/Caribbean requested WASH assistance in reviewing and refining a scope of work for the preparation of the project paper for an urban development project. The WASH consultant was involved

with the water supply, sanitation, solid waste disposal and environmental health components of the paper.

OTD #177 February 1984: Completed Donaldson

Evaluation of Basic Village Services Project—Egypt USAID/Egypt requested WASH to provide an experienced rural public works engineer to assist in the third mid-project evaluation of the Basic Village Services Project. The purpose of this Project was to improve and expand the capacity of villages and governates to plan, manage, finance, implement and maintain selected infrastructure projects. At the time of the evaluation, there were 3,560 sub-projects encompassing 1,425 villages in 20 rural governates. Over 3,000 people had been given technical and managerial training, with 3,000 more in the training pipeline. The contribution of the rural public works engineer to the evaluation included assessment of the quality, quantity and effectiveness of sub-project engineering and of technical assistance and training, and the preparation of recommendations in these areas for successful project completion.

OTD #178 February 1984: Completed Rosensweig

Evaluation of the Integrated Health Delivery Project—Ecuador USAID/Ecuador requested WASH assistance in evaluating the water supply and sanitation component of the ongoing Integrated Health Delivery Project which was being implemented by the Ecuadorian Institute of Sanitary Works (IEOS). The WASH evaluation team assessed IEOS' overall management capabilities and structure, cost/effectiveness in appropriate technology utilization, and its training programs, especially for paraprofessionals. The team also determined the status, quantitative results and effectiveness of IEOS' vehicle and equipment procurement, operations and maintenance program; the gravity water supply system construction program; the handpump and latrine installation program; and the community health education and participation program. Inter-institutional arrangements and the role of AID's sanitary engineer were considered and appropriate recommendations made to improve over-all project performance. See WASH Field Report No. 127.

OTD #179 February 1984: Completed Donaldson

Assessment of Water and Sanitation Emergency Situation—Mozambique The AID Office of Foreign Disaster Assistance and the U.S. Embassy in Mozambique requested WASH technical assistance to assess the damage caused by Typhoon Domitia in February 1984. Torrential rains caused the worst flooding in recorded history. A WASH consultant reviewed the overall water supply and sanitation condition in the capital of Maputa and surrounding areas and recommended replacements of needed irrigation, water supply, and sanitation equipment.

OTD #180 February 1984: Completed Donaldson

Technical Assistance in Evaluation of Provincial Cit-

ies Project-Egypt USAID/Egypt requested WASH assistance as part of a team to evaluate the on-going Provincial Cities Project. Principal issues addressed by the evaluation were whether inputs were being achieved in a timely and effective manner, had they resulted to date in the outputs envisaged in the project paper, and had the inputs/outputs contributed to the timely accomplishment of the project goal and purpose. Other topics considered were the role of the Egyptian private sector in project implementation; the effectiveness of coordinated action by the Egyptian government, AID and the AID contractor; the role of Provincial Cities in decentralization and Egyptian development; and the extent to which capacity building ("institutionalization") is occurring as a result of the project.

OTD #181 February 1984: Completed Rosensweig

Technical Assistance on Project Paper for Housing/Sanitation Program-Tunisia The USAID Regional Housing Office (RHUDO) in Tunisia requested WASH technical assistance in preparing the project paper for a combined Housing/Sanitation Program. This assistance was a follow-up to OTD #158. WASH provided a sanitary engineer and an economist who, as part of a five-person team, prepared the sanitation/sewerage component. Their contribution included criteria for beneficiary identification, technical project descriptions, review of standards, a program financing plan, and a cost/benefit analysis. The team also assisted in coordinating efforts with existing sanitation projects funded by the World Bank, Kuwait Fund, and Tunisian government agencies, and in identifying specific sanitation/sewerage projects to be funded.

OTD #182 May 1984: Completed Rosensweig

Follow-up Technical Assistance for Private Water Sector Water Program-Bolivia USAID/Bolivia requested WASH technical assistance for the private sector water program. This was a follow-up to work done under OTD #151 for the Bolivian Savings and Loan System (CACEN) and AID's Bureau for Private Enterprise. The scope of work included development of site selection criteria, advice on appropriate design and construction of water, wastewater and excreta disposal systems, counsel on community participation, promotion, operation and maintenance of systems, and a review of CACEN's proposed general project plan. Guidelines for project evaluation were also considered.

OTD #183 May 1984: Completed Donaldson

Review of Wastewater Treatment Facilities-Jordan and NE/PD/ENV USAID/Jordan requested WASH technical assistance in conducting a comparative review of two operational wastewater treatment facilities. Aspects covered included the methods being used to recover the wastewater for further economically productive use; design operation, and maintenance problems and procedures; the monitoring plan being used to protect public health and the environment; and the procedures undertaken to insure that there are no adverse public health or environmental impacts.

OTD #184 May 1984: Completed Rosensweig

Participation in Human Resource Development Core Group Meeting-S&T/H/WS In February, 1984, the World Health Organization invited WASH to participate in the work of a Core Group on Human Resources Development (HRD) for the UN Water Decade. Other members of the Core Group are AID, WHO, PAHO, ILO and the World Bank. The Core Group is an advisory group to the Task Force on HRD. Agenda topics included exchange of information on training activities; assessment of training needs in support of the Decade; the need to develop presentations illustrating the benefits of an integrated and systematic approach to HRD; the difficulty of mounting effective HRD programs where existing water and sanitation programs are weak and rarely coordinate their programs; and preparation and publication of a series of guidance articles focusing on organizational development and HRD. The meeting was held May 29-June 1, 1984 in Washington, D.C.

OTD #185 June 1984: Completed Donaldson

Technical Assistance in Evaluating and Planning Rural Water and Sanitation Maintenance Systems-

Honduras USAID/Honduras requested WASH technical assistance to evaluate alternative maintenance arrangements and to recommend appropriate maintenance systems for the on-going rural water supply and sanitation project. A WASH consultant assisted SANAA and the Ministry of Health to develop a self-financing operations and maintenance plan which made maximum use of existing human and technical resources. The consultant also recommended that there be a plan director, that an information system be developed, that in-service training be established, and that implementation begin in a pilot area. See WASH Field Report No. 129.

OTD #186 June 1984: Completed Hafner

Technical Assistance in Evaluation of the Upgrading Component of the Housing and Community Services Project-Egypt USAID/Egypt requested that WASH provide an experienced civil engineer as part of a team that will evaluate the upgrading component of the housing and community service project for low-income areas in Egypt. The WASH consultant was concerned primarily with the community planning and water supply and sanitation infrastructure design standards aspects of the project. Since community upgrading programs should minimize the costs of physical improvements so that cost recovery can be maximized through affordable special assessments, particular attention was paid to service level trade-offs with appropriate infrastructure/facility designs and costs. See WASH Field Report No. 133.

OTD #187 June 1984: Completed Rosensweig

Technical Assistance in Planning the Rural Water Supply and Sanitation Component of a Health Sector Project-Belize USAID/Belize requested WASH

technical assistance in preparing project documentation for the improvement and expansion of rural water supply and sanitation (WS&S) facilities and the strengthening of institutional back-up as part of a proposed health sector project. As a member of a three-person planning team, the WASH consultant first assessed the current situation in terms of goals, plans, resource capabilities and availability, and potential locations of WS&S projects. Then, following discussion with local officials as to potential service areas, coverages, types of services, resource allocations, payment systems and schedules, the consultant prepared a preliminary WS&S project design. The physical design emphasized low costs, local materials, local operation and maintenance, and suitability for wide-spread replication. The project design also included institutional and human resource development activities to strengthen administrative and WS&S service delivery capabilities locally and nationally.

OTD #188 July 1984: Completed Hafner

Development of Rural Water Supply National Plan—Zaire USAID/Zaire requested WASH assistance in the development of a rural water supply (RWS) national plan. The government, private volunteer agencies and other donors in Zaire are committed to uniting efforts and developing a national plan. The scope of work for this initial effort included reviewing the situation, existing plans, projects, and proposals; contacting agencies, PVO's and institutions concerned with RWS; devising a strategy for developing the plan, including information requirements, the role of organizations participating in the planning process, financing requirements, schedules and an outline of the plan; and preparing scopes of work for planning actions by participants and follow-up WASH consultants. See WASH Field Report No. 135.

OTD #189 July 1984: Completed Isely

Technical Assistance in Searching for Alternative Water Supplies—Ghana/OFDA USAID/Ghana and the Office of Disaster Assistance requested WASH services to design a plan to search for and develop alternative water supplies. The drought in Ghana has reached disaster proportions and required expert appraisal of the situation and recommendations for appropriate action. The WASH consultant, an experienced geologist and water supply engineer, reviewed the water supply situation, visited critical sites, and identified emergency and short-term actions and programs, as well as longer term development options, actions and programs, that could be useful in alleviating potable water shortages. See WASH Field Report No. 132.

OTD #190 July 1984: Completed Rosensweig

Progress Evaluation of Rural Water Systems and Environmental Sanitation Project—Peru USAID/Peru requested WASH assistance in conducting a progress evaluation of the on-going rural water systems and environmental sanitation project. The project is intended to provide water supply and sanitation facilities and serv-

ices to 660 villages having populations under 500 people. The evaluation covered the following aspects of the project: operational status of recently organized regional environmental health offices; progress in construction of community water supply and sanitation systems in the 660 villages; state of development of operations and maintenance procedures for village water systems; level of training and effectiveness of community organization and participation activities; progress in decentralization; and management and administration of the project. See WASH Field Report No. 134.

OTD #191 September 1984: Completed Rosensweig

Planning Basic Village Services Overseas Training—Egypt USAID/Egypt requested WASH assistance in planning a five week component (three week workshop and two week field trip) of a ten week course for approximately fourteen Egyptian engineers responsible for design and maintenance of Basic Village Services projects. The WASH component of the course focused on the design of water supply systems, selection of sources and treatment, environmental problems related to water supply and sewerage, appropriate sewerage systems, groundwater pollution, and establishment of maintenance systems. The training program took place in Washington, DC from October 1–December 7, 1984 with the USDA Graduate School coordinating the program.

OTD #192 September 1984: Completed Hafner

Technical Assistance in Designing Water Supply and Sanitation Workshops—Sudan USAID/Sudan requested WASH to develop a plan for WASH assistance to the Juba Water and Sanitation Programme (JWASP) in the Equatoria Region. WASH developed a scope of work for WASH assistance, particularly in the area of training, and discussed with the AID Mission potential WASH assistance for fiscal year 1985. The training subjects include latrine design, installation and maintenance, health education, bore-well rehabilitation and shallow well construction.

OTD #193 September 1984: Completed Donaldson

Technical Assistance in the Engineering Applications of Microcomputer Techniques—Ecuador USAID/Ecuador requested WASH technical assistance to develop the capability of Ecuadorian engineers to use a microcomputer to evaluate design alternatives for water and sanitation projects. A WASH consultant adapted an existing program to the available computer, conducted a workshop in computer use, and made recommendations regarding future computer operations. See WASH Field Report No. 136.

Task Assignments in WASH II October 1984 — September 1985

RM #101 October 1984: Completed St. Michel

Prepare 1ST Annual Work Plan for WASH II—S&T/H This was an administrative Activity requested by the Office of Health to prepare, in close collaboration with the Office of Health and other AID offices, a WASH II Project Annual Work Plan covering the period October 22, 1984, through September 30, 1985. A pre-planning workshop for AID and CDM Associates' Staff was conducted as a basic part of this Activity.

RM #102 October 1984: Completed St. Michel

Administrative Start-Up of WASH II—S&T/H This was an administrative Activity requested by the Office of Health to develop, install and operate a management information system (MIS) for WASH II. It also included the performance of other necessary initial administrative, financial, contracting, leasing, hiring, and organizational tasks to start-up the WASH II Project.

RM #103 October 1984: Completed St. Michel

Technical Start-Up of WASH II—S&T/H This was an administrative Activity requested by the Office of Health to start-up WASH II technical assistance activities in support of AID Missions, Bureaus, offices and other AID clients and collaborators.

RM #104 October 1984: Completed Warner

Bolivia: Simple Low-Cost Water and Sanitation Measures for Rural Programs An evaluation of development projects in the San Julian colonization area indicated major problems in the water supply and sanitation (WS&S) sector and the need for WASH technical assistance services. The scope of work for this activity included review of WS&S data on water supply in San Julian area, evaluation of needs and possible WS&S solutions, and preparation of design recommendations appropriate to the income and lifestyle of colonists. See WASH Field Report No. 140 (in Spanish only).

RM #105 October 1984: Completed Rosensweig

Visit to UNICEF and International Development Research Centre (IDRC)—S&T/H Associate Director/HRD visited IDRC in Canada to discuss the development of support materials for the film "Prescriptions for Health," interviewed appropriate people at CIDA to assess to what extent HRD is an integral part of projects, and discuss collaboration with UNICEF in New York City.

RM #106 November 1984: Completed Jordan

Dominican Republic: Evaluation of Modified AID Type Handpump The USAID supported handpump manufacturing program, which had been underway for

several years in the Dominican Republic, was considering making a handpump from steel pipe rather than cast iron and requested WASH technical assistance. The scope of work included reviewing the AID handpump situation, the ongoing manufacturing/test activities, and the protocol developed by the Georgia Institute of Technology for the modified AID handpump being tested in the Dominican Republic. Recommendations for appropriate next steps to assure quality production were made. See WASH Field Report No. 139.

RM #107 November 1984: Completed Rosensweig

Chile: Coordinating Working Groups with Pan American Health Organization (PAHO) Symposium The Associate Director for Human Resource Development conducted a two-day training session in Santiago, Chile to prepare working group leaders for symposium responsibilities, acted as coordinator for working group leaders during symposium, and wrote a brief report summarizing WASH involvement in the symposium.

RM #108 October 1984: Completed Rosensweig

U.S. Training for Egyptian Basic Village Service Engineers—S&T/H The USAID/Egypt Basic Village Services (BVS) Project had arranged a training program in the United States for fourteen BVS engineers and requested WASH training assistance in the areas of water supply, sewerage, groundwater and maintenance. The scope of work included designing and conducting a three week workshop on the topics above, coordinating the workshop with the United States Department of Agriculture Graduate School, which gave related training, and preparing a summary report and recommendations. See WASH Field Report No. 141.

RM #109 October 1984: Completed Rosensweig

Develop Scope of Work and Prepare Guidelines for Assessing Institutional Effectiveness—S&T/H Institutional development is a major concern of AID and the Office of Health recognizes specific institutional needs in the water and sanitation sector in developing countries. As an initial step in this area, the Office of Health requested WASH to prepare a scope of work to later develop guidelines for assessing institutional effectiveness. The work under this activity included reviewing available documents on assessment of institutional effectiveness, interviewing appropriate individuals to determine overall focus of guidelines and writing a scope of work that included the purpose of the document, steps needed to develop it and resources required. Activity 146 below is implementing and developing the guidelines.

RM #110 November 1984: Completed Rosensweig

Tunisia: Site Selection for Housing Projects The USAID Regional Housing Office (RHUDO) in Tunis has a project with the Tunisian National Sewerage Authority (ONAS) for financing the up-grading of sewerage and drainage systems in low-income neighborhoods

and towns. The World Bank and the Kuwait Development Fund are also involved in this project. RHUDO requested WASH assistance in selection of appropriate housing sites. The scope of work included visiting proposed sites to determine eligibility for AID financing, reviewing and evaluating construction costs, assisting ONAS in preparing information for the program delivery plan, and preparing the final report. See WASH Field Report No. 143.

RM #111 December 1984: Completed Hafner

Sudan: Training of Trainers—Latrine Construction

Workshop To support the JUBA area water and sanitation program, USAID/Sudan asked WASH for training assistance in latrine construction. The scope of work included preparing and conducting a two-week training-of-trainers workshop using WASH trainer's guide on latrine construction (WASH Technical Report No. 25) and providing technical and training assistance for two Sudanese trainers who will later conduct latrine construction workshops. This assignment was cancelled due to political problems in southern Sudan.

RM #112 December 1984: Completed Warner

Ethiopia: Technical Assistance to Office of Foreign Disaster Assistance (OFDA) Drought Relief Efforts—

Phase I The Office of Foreign Disaster Assistance of AID requested WASH technical support for water supply in the drought areas of Ethiopia. The scope of work included 1) assessment of current well-drilling equipment capability and hydrogeological potential for water supply to drought stricken areas and 2) assessing equipment rehabilitation requirements and assessment of costs and possible additional equipment needs. See WASH Field Report No. 138.

RM #113 November 1984: Completed Jordan

Belize: Preparation of Project Paper—Water Supply and Sanitation Component USAID/Belize was preparing a Project Paper for the Increased Productivity Through Health Project and requested WASH technical assistance. The WASH consultant provided necessary inputs on tubewells, handpumps, simple water systems, latrines, and maintenance requirements.

RM #114 November 1984: Completed Hafner

Zaire: National Rural Water and Sanitation

Planning The planning work on this task was a continuation of O/D #188 of July 1984 in WASH I (See WASH Field Report No. 135). Its scope of work included the review of prior WS&S efforts, identification of existing policies, plans and programs, determination of possible future WS&S directions, and formulation of recommended WS&S strategies. A seminar on National Planning was designed and conducted in May 1985. See WASH Field Reports Nos. 142 and 150.

ACT #115 December 1984: On-Going Rosensweig

Development of Team Planning Model for WASH

Consultants—S&T/H To improve the performance of WASH consultants, the Office of Health requested that a more comprehensive orientation of consultants be provided prior to their field work. The scope of work includes development of a team planning model to prepare WASH consultant teams for assignments, development of a strategy for the institutionalization of the team planning model within WASH and training WASH activity managers to use the model. The model has been in use since March 1985.

ACT #116 January 1985: On-Going Rosensweig

Development of Training Guide on Well Improve-

ment—S&T/H This Activity continues the series of WASH workshop designs in water supply and sanitation. Earlier guides were on latrine construction, handpump installation and maintenance, rainwater roof catchment systems and spring capping (see WASH Technical Reports Nos. 25, 26, 27 and 28 and Activity 124 below). The scope of work includes review of the use of existing well improvement materials and future training needs, identification of potential trainees, required tasks and workshop elements, design of the training guide, and planning of field tests.

ACT #117 December 1984: On-Going Jordan

Belize: Baseline Survey for CARE USAID/Belize requested WASH to assist CARE in its AID supported Village Health Sanitation Project. The scope of work includes the development and execution of a baseline survey to gather information on water usage and excreta disposal in villages in the Orange Walk and Corozal Districts of Belize.

ACT #118 December 1984: Completed St. Michel

Egypt: Water/Wastewater Program

Assessment USAID and the Government of Egypt have made substantial water and wastewater investments having a significant effect on the rehabilitation, upgrading, and expanding of physical facilities throughout Egypt. USAID/Egypt requested a selective review and assessment of these projects and the agencies and organizations responsible for implementation and operation. A WASH team assisted the Mission in preparing a report presenting findings and recommendations in the areas of management capability and institutional development; training and human resources development; financing project completion and sustainability; system design, construction, and operation; estimating beneficiaries served; assessing ability to pay; and systems impact.

ACT #119 December 1984: On-Going St. Michel

General Administration—S&T/H This is the basic administrative Activity for WASH II operations as requested by the Office of Health.

ACT #120 January 1985: On-Going St. Michel

General Technical Management—S&T/H This is the

basic technical management Activity for WASH II as requested by the Office of Health.

ACT #121 January 1985: Completed Warner

Ethiopia: Assistance to Office of Foreign Disaster Assistance (OFDA) Drought Relief Efforts—Phase II

This Activity was a continuation of related work done under RM 112 above. The scope of work included assisting OFDA and the Africa Task Force to develop a scope of work to implement recommendations in WASH consultants report (WASH Field Report No. 138) and those approved by USAID for funding. It also required the identification of other sources of support and provision of requested technical services.

ACT #122 February 1985: On-Going Isely

Cameroon: Development of an Evaluation Plan for CARE Northern Wells Project USAID/Cameroon requested WASH assistance in preparing an evaluation plan for the on-going CARE well installation and health education project in Northern Cameroon. The scope of work includes review of the wells project and its health education component, identification of process and outcome evaluation variables, and development of prototype evaluation protocols for use by CARE in the health education component.

ACT #123 January 1985: On-Going St. Michel

Preliminary Activity Development—S&T/H This is a basic administrative Activity that will continue for the duration of WASH II. Under it, WASH Operations Center staff, subcontractor staff and consultants will prepare Activity Sheets, draft Activity Implementation Plans and develop scopes of work for future WASH Activities.

ACT #124 January 1985: On-Going Rosensweig

Development of a Training Guide on Community Participation—S&T/H This is another Activity continuing the WASH workshop design series as mentioned under Activity 116 above. The scope of work includes the review of existing materials on community participation, clarification of purposes of guide and identification of its user and trainee characteristics. The consultant will also perform a task analysis, formulate workshop goals and design the training guide.

ACT #125 January 1985: Completed Hafner

Africa Bureau: WASH Initiatives This was a coordinating Activity to develop and reinforce existing contacts between WASH and the Africa Bureau and Missions, to develop new contacts between WASH and the Africa Bureau and Missions, and to target high priority Missions where WASH has not provided assistance. This Activity will be continued in WASH Fiscal Year 1986 as Activity #201.

ACT #126 January 1985: Completed Isely

Asia Bureau: WASH Initiatives This was a coordinating Activity to develop and reinforce existing contacts between WASH and the Asia Bureau and Missions, to develop new contacts between WASH and the Asia Bureau and Missions, and to target high priority Missions where WASH has not provided assistance. This activity will be continued in WASH Fiscal Year 1986 as Activity #202. Note that the Asia Bureau has been combined by AID with the Near East Bureau as ANE.

ACT #127 January 1985: Completed LSM/Warner

LAC Bureau: WASH Initiatives This was a coordinating activity to develop and reinforce existing contacts between WASH and the Latin America and Caribbean Bureau and Missions, to develop new contacts between WASH and the LAC Bureau and Missions, and to target high priority missions where WASH has not provided assistance. This Activity will be continued in WASH Fiscal Year 1986 as Activity #203.

ACT #128 January 1985: Completed Rosensweig

Near East Bureau: WASH Initiatives This was a coordinating Activity to develop and reinforce existing contacts between WASH and the Near East Bureau and Missions, to develop new contacts between WASH and the Near East Bureau and Missions, and to target high priority missions where WASH has not provided assistance. This Activity will be continued in WASH Fiscal Year 1986 as Activity #202. Note that the Near East Bureau has been combined with the Asia Bureau as ANE.

ACT #129 January 1985: On-Going Beverly

Provision of Information Services to AID and AID-Related Organizations—S&T/H This is a basic Activity required by the WASH II contract and will continue for the duration of WASH II. Its purpose is to provide AID and AID-assisted organizations with relevant information on all aspects of the water supply, sanitation and environmental health sector, WASH project activities, and other topics as requested by AID. It also provides for the operation and maintenance of the WASH library and information center and collaboration and information exchange with the international WS&S community.

ACT #130 January 1985: Completed Rosensweig

Near East Water/Wastewater Workshop The Near East Bureau Water Resources Committee (WRC) requested WASH assistance in planning and supervising a workshop for USAID staff in its Near East Missions. The scope of work included a reconnaissance trip to Near East Missions and planning a workshop on water supply and sanitation project design, implementation and evaluation. The workshop was held in Tunis, April 15-18, 1985. See WASH Field Report No. 149.

ACT #131 January 1985: Completed Warner

Ethiopia: Technical Assistance to Office of Foreign Disaster Assistance (OFDA) Drought Relief Efforts—Phase III This activity followed work under Activity 121 above. Its scope of work included assisting the mission in coordinating activities in water sector relief efforts, identifying current and future activities/problems at relief camps, reviewing OFDA efforts to provide water and developing recommendations for future strategies/actions for USAID relief efforts. See WASH Field Report Nos. 145 and 146.

ACT #132 January 1985: Completed Jordan

Oman: Capital Region Water Resources Project USAID/Oman requested WASH assistance in developing part of the Third Five Year Plan in conjunction with the Omani-American Joint Commission. The scope of work included developing an action plan for preparation of master plans, preparing a five-year water/wastewater investment program, evaluating the Brown and Root report on water resources, and developing an implementation plan that identifies top priority projects.

ACT #133 January 1985: On-going Hafner

CARE Africa Field Staff Training Workshop—S&T/H The Office of Health requested that WASH continue its collaboration with CARE by assisting in a training workshop for CARE Africa staff. The scope of work included conducting a needs assessment of CARE staff on water supply and sanitation project design, implementation and management, and designing and implementing a training workshop on WS&S to satisfy CARE management requirements. The workshop was held in Sierra Leone, July 1-8, 1985.

ACT #134 January 1985: Completed Hafner

Chad: Emergency Health Assessment As part of its efforts in the drought areas of Africa, the Office of Foreign Disaster Assistance requested support from the Communicable Disease Centers (CDC) in Atlanta. CDC in turn asked WASH to provide a water and sanitation consultant to carry out an emergency health needs assessment as part of CDC-led health reconnaissance team.

ACT #135 January 1985: Completed Beverly

Prepare New WASH Brochure—S&T/H Since the WASH Brochure had not been revised since 1980 and did not reflect the WASH II contract nor include the new WASH Associates, a new brochure describing WASH services and how to obtain them was prepared and distributed to AID and to WASH related organizations throughout the world.

ACT #136 January 1985: Completed Jordan

Dominican Republic: Development of Steel Handpump for Rural Water Supply Program This

Activity is a follow-on to ACT #106 and included building a model of the pump that had been tested in the Dominican Republic. Upon approval of the model by the Office of Health, four prototype models were built for delivery to USAID/DR with bidding documents. Gage kits and quality assurance recommendations for local manufacturing were also included.

ACT #137 January 1985: Completed Warner

Honduras: Technical Assistance in Well Drilling for Non-Governmental Organization Program The Rotary Club of San Pedro Sula, Honduras, was working on a well drilling project in cooperation with the Rotary Club of Columbus, Ohio, and requested assistance from USAID/Honduras. WASH sent a consultant to Honduras in October to work with a Honduran well driller and provide on-site practical training in well/groundwater hydraulics and hydrology, locating wells, well drilling techniques and handpump installation.

ACT #138 January 1985: On-going Isely

Sanitary Survey Manual for Village Workers—S&T/H Under WASH I, WASH consultants had been developing the content of a sanitary survey manual. The Office of Health requested WASH to continue the work and develop a field testable sanitary survey manual for village workers. The approach taken uses a problem identification/potential solutions/required resources/possible activities methodology.

ACT #139 February 1985: On-going Isely

Assistance to CARE in Developing Guidelines for Water Supply and Sanitation Projects—S&T/H To assist CARE's ongoing activities in the water supply and sanitation sector, the Office of Health requested WASH to collaborate with CARE in developing guidelines for project preparation. The work includes reviewing existing documentation, interviewing key CARE personnel and preparing draft guidelines for the design, implementation and evaluation of domestic water supply and environmental sanitation projects in developing countries.

ACT #140 February 1985: On-going Isely

Targeting Rural Water Supply and Sanitation Programs in Guinea Worm Endemic Areas—S&T/H This Activity follows-up work done in WASH I in collaboration with the Communicable Disease Centers in Atlanta. This task includes reviewing results from WASH I on intervention modalities, developing cost estimates, combining interventions into programmatically meaningful packages, and selecting trial countries for field work.

ACT #141 February 1985: On-going Isely

Assistance in Developing Rationale for Including Water Supply and Sanitation in Primary Health Care for Asia/Near East Bureau—ANE The Asia/Near East Bu-

reau is exploring the role of water supply and sanitation (WS&S) in primary health care (PHC) and requested WASH assistance in reviewing relevant strategies. The work includes summarizing known relationships between water supply and sanitation and primary health care, identifying cost-effective WS&S strategies for reducing morbidity and mortality, comparing these with PHC strategies, reviewing findings with expert panel and determining the role of WS&S in primary health care for the Bureau.

ACT #142 February 1985: Completed Isely

Issues Paper on Water Supply and Sanitation in Relation to Oral Rehydration Therapy-S&T/H This activity expanded on material prepared in WASH I. The work consisted of revising the earlier draft and preparing a full issues paper aimed at health and WS&S program administrators in AID and the host countries. It also included preparing an executive summary of the paper for the "educated" general public. See WASH Technical Report No. 31.

ACT #143 February 1985: Completed Warner

Burkina Faso: Emergency Assistance to Water Supply Sector in Ouagadougou The impact of the African drought situation in Burkina Faso led the USAID Mission to request WASH technical services in the capital city area. The work consisted of assisting the government to develop short-term measures for more effective use of water/sanitation resources in Ouagadougou and nearby urban areas caused by the drought and by high internal migration rates. A pre-PID survey of the Ziga dams site was also conducted. See WASH Field Report No. 144.

ACT #144 February 1985: On-going Jordan

Botswana: Economic Comparison of Latrine vs. Waterborne Sewer Systems USAID/Botswana requested WASH to assist the Ministry of Local Lands and Government in the evaluation of alternative sanitation systems for current and proposed housing projects. The work includes reviewing documentation, interviewing AID and government officials, coordinating the task with the health engineer, and documenting per capita costs of on-site latrine systems and waterborne sewerage collection systems.

ACT #145 February 1985: Cancelled Jordan

Lesotho: Rural Water Supply and Sanitation Project Evaluation Mission cancelled request.

ACT #146 February 1985: On-going Rosensweig

Development of Guidelines for Assessing Institutional Effectiveness in Water Supply and Sanitation Sector-S&T/H As part of AID's general policy to encourage institutional development, the Office of Health asked WASH to prepare a set of sector specific guidelines for institutional assessment. The work includes re-

viewing existing literature on institutional development, conducting a field survey of two successful institutions to develop profile, and developing draft of guidelines. Field test guidelines in two overseas institutions are also included.

ACT #147 February 1985: Completed Warner

Developing Water Supply Strategy for Drought Affected Areas in Africa-OFDA This Activity is in support of the Office of Foreign Disaster Assistance's ongoing program in Africa. The work had two major tasks: 1) to summarize knowledge on populations at risk to drought and water supply scarcity in Mauritania, Mali, Niger, Burkina Faso, Chad, Ghana, Sudan, Somalia, Kenya, Mozambique, and 2) to develop a short-term action plan plus projections for each country.

ACT #148 March 1985: Completed Beverly

Collaboration with Non-AID Water Supply and Sanitation Related Organizations in the U.S. and Overseas-S&T/H This is a basic activity required by the WASH II contract to supply coordination and information services to interface with the U.N. and other bilateral donor systems. The task includes establishing and maintaining working relationships, collaborative efforts and information exchange with non-AID organizations in the WS&S sector, private voluntary organizations, multi-lateral and bilateral organizations, international organizations, LDC agencies, private sector organizations, etc. This work will be continued during WASH Fiscal year 1986 as Activity #204.

ACT #149 March 1985: On-going Jordan

Project Assessment for Operations and Maintenance-S&T/H Many water supply and sanitation projects in developing countries have failed due to inadequate provisions for operating and maintaining the system after construction or installation. This Activity is developing guidelines that will enable project designers and managers to assess the merit of the operations and maintenance component of projects prior to and during the project planning cycle.

ACT #150 February 1985: Completed Jordan

Benin: Rural Water Project Redesign The Benin Rural Water Supply Project, which had been suspended in 1981, was re-authorized in October 1984 and required revision in view of the delay. The WASH consultant provided water supply and sanitation inputs to the project re-design.

ACT #151 March 1985: Completed Rosensweig

Sri-Lanka: Project Pre-Implementation Workshop USAID/Sri Lanka requested WASH assistance during the start-up of a new water supply and sanitation (WS&S) project. WASH consultants planned and conducted a pre-implementation workshop for key contractor, AID and government staff who are involved in the new WS&S project. The workshop emphasized

team-building and approaches to problem solving. See WASH Field Report No. 151.

ACT #152 January 1985: Completed Rosensweig

Planning for Community Water Supply in Developing Countries—S&T/H WASH was requested by the Office of Health to plan and conduct a workshop in conjunction with the American Water Works Association(AWWA) conference for U.S. consulting engineers and consultants who are interested in learning more about current practices and approaches in the water sector of the developing countries. The workshop was held June 28-29, 1985 in Arlington, Virginia, with fifty-six participants.

ACT #153 April 1985: Cancelled Isely

Tunisia: Design Team for Rural Potable Water Project Cancelled by Mission.

ACT #154 March 1985: On-going Jordan

Reducing Water Losses in Small Urban and Rural Water Systems—S&T/H Water losses in water supply systems is a continuing problem. The purpose of this Activity is to develop guidelines that will assist managers of small urban and rural water systems to establish priorities for measures aimed at reducing water losses.

ACT #155 January 1985: Completed Beverly

WASH Staff Conference Participation—S&T/H This is a basic communications Activity of the WASH professional staff. WASH staff will attend selected conferences, seminars and briefings as presenters or participants in order to foster understanding, collaboration and information exchange in the water supply and sanitation sector for AID and WASH. This Activity will be continued in WASH Fiscal Year 1986 as Activity #205.

ACT #156 April 1985: Completed Hafner

Central African Republic: Water Decade Planning This Activity is a continuation of work begun under OTD #106 above and documented in WASH Field Reports Nos. 53, 72, 97 and 137. The scope of work consisted of assisting the CAR Government agencies to prepare a water supply and sanitation sectoral plan and proposals for an international donors meeting.

ACT #157 April 1985: On-going Beverly

Evaluation of WASH Information Services—S&T/H The purpose of this Activity is to review and assess the appropriateness, effectiveness, and costs of information products and services provided by WASH to serve as a basis for improving WASH information center operations. The consultants will interview selected AID staff, WASH personnel, and users of WASH information, review relevant records and reports, and prepare an evaluation report and recommendations.

ACT #158 June 1985: Completed Jordan

Egypt: Assessment of Operations and Maintenance Training of Basic Village Service Engineers This Activity was a follow-up field visit on the training received by Egyptian engineers in the U.S. under RM #108 above. The work included determining usage of operations and maintenance techniques learned at the U.S. workshop, and assessing current and future O&M improvement strategies for the new USAID decentralization program.

ACT #159 May 1985: On-going Jordan

Oman: Water Distribution System Computer Model This Activity is an extension of work done under Activity #132 above. The work includes four tasks: 1) collecting data on the water supply system of the capital area of Oman, 2) developing a computer program to analyze the existing system and project future needs, 3) providing planning, design and operation information, and 4) training MEW personnel to use the program.

ACT #160 July 1985: Completed Isely

Thailand: Assessment of Current Status of Rural Water Supply and Sanitation Project USAID/Thailand requested WASH assistance for the Ministry of Health on possible future courses of action. The work consisted of assessing the current status of rural water supply and sanitation programs managed by the Ministry of Public Health; reviewing similar projects by other agencies; assisting the Ministry in formulating its next five year WS&S program; and advising on program coordination with other agencies and AID.

ACT #161 May 1985: Completed Hafner

Zaire: SANRU II (Rural Health) Project Paper USAID/Zaire requested WASH assistance to provide technical inputs to the SANRU II (Rural Health) Project Paper. The work consisted of preparing cost estimates for well drilling equipment and reviewing plans for other water technologies—spring capping, gravity flow systems, etc.

ACT #162 May 1985: On-going Hafner

Sierra Leone: CARE Water Program Evaluation Design CARE/Sierra Leone requested WASH, through the USAID Mission, to assist in developing an evaluation plan for its water and sanitation program. The work includes three tasks: 1) to assist CARE and the Ministry of Energy and Power in designing a water program evaluation and developing program indicators and goals; 2) to train U.S. and local staff in evaluation methods; and 3) to make recommendations on a health education and community based maintenance system.

ACT #163 June 1985: On-going Isely

Nepal: Assessment of Save the Children Rural Water Supply Systems and Training Field Staff The on-go-

ing water supply project of the Save the Children Foundation (SCF) has been having technical problems which led USAID/Kathmandu to request WASH assistance. The basic task is to assess the design, construction, maintenance, cost-effectiveness, and long-term viability of the gravity systems constructed by Save the Children. The consultants' report will be the basis for training-of-trainers and of SCF construction and maintenance personnel.

ACT #164 June 1985: On-going Isely

Philippines: Review Barangay Water Supply Project USAID/Philippines requested WASH assistance to assess the feasibility and mode of continuing its Barangay rural water program. The scope of work is divided into three phases: Phase I: assess feasibility of continuing project. Phase II: design continuation project if recommended or design close-out strategy. Phase III: finalize design as necessary.

ACT #165 July 1985: On-going Isely

Haiti: Design of Evaluation for CARE Community Water Supply Project USAID/Haiti requested WASH assistance in designing an evaluation plan for CARE's on-going water supply project that would specifically include indicators of change of health status. The work consists of designing a realistic scheme for evaluating health and related behavioral outcomes for presentation and review with CARE staff, assisting in developing baseline indicators, and suggesting appropriate project changes to enhance project impact on health status and health related behavior.

ACT #166 July 1985: On-going Warner

Investigation of Willingness to Pay for Water Supply-S&T/H The shortage of resources to finance water supply systems has placed renewed emphasis on suitable methods of cost-recovery. The Office of Health has asked WASH to investigate the determinates of willingness to pay for water. The scope of work includes identifying the factors which determine the willingness to pay for water by householders, including their sensitivity; developing guidelines based on these factors for use by planners; and locating projects where the guidelines could be tested.

ACT #167 July 1985: On-going Roark

Burkina Faso: Emergency Dam and Spillway Project This Activity is a follow-on to Activity 143 above which included a survey of Dam No. 2 near Ouagadougou (see WASH Field Report No. 144). The AID Mission requested WASH assistance to support rehabilitation of the dam. This work involves reviewing emergency repair plans, assisting in refining the repair proposal, and assisting the Government of Burkina Faso and USAID in reviewing final design and construction plans and in approval of construction bids.

ACT #168 August 1985: On-going Rosensweig

Bolivia: Evaluation of CARE Potable Water Project USAID/Bolivia requested WASH assistance in evaluating the CARE Potable Water/Irrigation Project. The work consists of designing and conducting the final evaluation of the technical, institutional and social aspects of the project, as well as assessing the operational strategy used in the project.

ACT #169 August 1985: Cancelled Rosensweig

Swaziland: Manpower Development Strategy Cancelled by Mission.

ACT #170 July 1985: On-going Isely

Swaziland: National Decade Planning The Government of Swaziland has established a National Action Group in support of the UN International Drinking Water Supply and Sanitation Decade and requested the USAID Mission to supply technical assistance in planning for the Decade. The first phase of work includes reviewing the status of water supply and sanitation projects and of the national planning process, outlining a process for developing water decade objectives, and assisting the National Action Committee in determining objectives and steps necessary to achieve them.

ACT #171 August 1985: Cancelled Isely

Burkina Faso: Preparation of Field Handbook on Community Participation in Health Education Cancelled by Mission.

ACT #172 June 1985: On-going Jordan

Dominican Republic: Rural Water Supply and Sanitation Project Evaluation USAID/Dominican Republic requested WASH technical assistance in planning the evaluation of the Health Sector II Project. The task includes reviewing, modifying, and simplifying the evaluation plan, and assisting USAID, SEPAS (the Secretariat of Health) and a local firm in collecting and analyzing evaluation data.

ACT #173 August 1985: On-going Beverly

Prepare WASH Progress Report No. 9-S&T/H Periodic Progress Reports distributed to AID and others involved in water supply and sanitation in developing countries are a primary means of informing others of WASH accomplishments in specific subject areas and countries. The summaries of work done by WASH are also useful for identifying WASH-type tasks and defining proposed scopes of work. This task involves reviewing the scope, content and design of the Progress Report with WASH staff and the Office of Health, and writing, editing, printing, and distributing the report.

ACT #174 August 1985: On-going Jordan

Zaire: Village Based Maintenance System for SHABA Refugee Water Supply Project USAID/Zaire request-

ed WASH technical services to design a maintenance system for the water supply systems in refugee/returnee communities. The work includes the review of project documents, performance of a technical needs assessment, development of a maintenance system design, and preparation of a training needs assessment and of an initial training plan.

ACT #175 August 1985: On-going St. Michel

Yemen: Sana'a Basin Water Resources

Project USAID/Yemen requested WASH services in recognition of the severity of the water resources situation in the Sana'a basin. The objectives of this Activity are to provide a better understanding of the water resources situation, identify critical issues which must be resolved and present viable options for projects and/or programs related to these issues, present recommended interventions, and review previous planning efforts and ongoing sector projects. Several important constraints to effective planning and management have been identified and will be considered in developing recommended interventions.

ACT #176 August 1985: On-going Hafner

Togo: Training in Rainwater Harvesting USAID/Togo desired to expand the scope of its Rural Water Supply Project and requested WASH assistance in the use of rainwater harvesting techniques. The WASH consultant will review the WASH rainwater harvesting training guide, modify it in Togo as appropriate, conduct two two-week training sessions with Togolese co-trainers, and evaluate the training program and the trainers' performance.

ACT #177 August 1985: On-going Warner

Technical Assistance to Drought Stricken African Countries—OFDA This Activity extends the work done under Activity 147. A member of the WASH Operations Center Staff will provide technical advisory services to the Office of Foreign Disaster Assistance primarily in the development of a water and sanitation strategy for dealing with the drought. He will also serve as liaison between OFDA and WASH.

ACT #178 September 1985: On-going Rosensweig

Bolivia: Rainwater Catchment Development This work is a follow-on to Activity RM 104 above which recommended development of rainwater catchments (See WASH Field Report No. 140). This activity will be conducted in two phases, the first to prepare a scope of work for WASH to assist a local PVO (FIDES) in planning and implementing rainwater catchment systems, including training. The second phase will be to execute the scope of work.

ACT #179 September 1985: On-going Rosensweig

Togo: Training of Trainers USAID/Togo requested WASH assistance in furthering the training skills of the

social/sanitation agents working in the Rural Water Supply Project. The WASH consultants will 1) upgrade skills of project and non-project trainers in designing and conducting training-of-trainers workshops (TOT); 2) review and modify existing project TOT materials; and 3) conduct two one-week TOT workshops.

ACT #180 September 1985: On-going Isely

Water Supply Development as a Stimulus to Primary Health Care—S&T/H While potable water supply projects have a direct effect on health, other impacts may be as important. For example, if water supply projects are based on a community participation approach, they may also affect other health outcomes by stimulating the local population to make better use of other primary health care services, such as immunizations for tetanus, measles and diphtheria. The purpose of this Activity is to develop and apply a methodology for determining whether or not water supply projects based on community participation can have a positive effect on the use of other primary health care interventions such as immunizations.

ACT #181 September 1985: On-going Jordan

Lesotho: Rural Sanitation Project—Financial/Economic Analysis The Ministry of Health requested USAID/Lesotho to supply planning assistance for the Rural Sanitation Project. The WASH consultant will review and analyze financial and economic information to prepare recommendations for national policy on low cost sanitation in rural areas. He will also consider possible financial and resource commitments of the Government, donors and the private sector to subsidization programs.

ACT #182 September 1985: On-going Jordan

Oman: Assist in Preparation of Water Resources Project Paper As an extension of Activity 132 above, USAID/Oman and the Omani-Joint Commission requested WASH assistance in preparing a Project Paper for the Water Resources Development Project. WASH will provide technical support for the water/wastewater engineering, institutional development and economic components of the paper.

ACT #183 September 1985: On-going Beverly

WASH Audio-Visual Briefing Package—S&T/H WASH continually gives briefings on WASH operations to AID staff, consultants, private volunteer organizations, other donors, international organizations, etc. This 20-25 minute slide presentation with accompanying text will provide a more complete and effective briefing for all those interested in water supply, sanitation and environmental health, and on the role of AID and WASH in providing technical assistance to developing countries.

ACT #184 September 1985: On-going Beverly

Prepare WASH Communication Strategy Document—

S&T/H While WASH has been supplying a wide range of information to AID and the international community concerned with water supply, sanitation, environmental health and related matters, a more systematic communication approach could be more effective. Under this Activity WASH will develop a communications plan and identify key messages to be sent via selected media to appropriate individuals and groups in AID and elsewhere.

ACT #185 September 1985: On-going Turner

Distribution of Water by Vending—S&T/H Water vending is a common method of water supply and distribution in many developing countries yet has received very little formal study and evaluation. The purpose of this Activity is to: 1) design, test and apply an evaluation survey to existing water vending systems in urban and village settings; and 2) develop guidelines for governments to improve water quality and quantity at low costs to users.

ACT #186 September 1985: On-going St. Michel

Advisory Panel on AID Strategies for Water and Sanitation in the Child Survival Program S&T/H This Activity will provide inputs for revision of the AID water supply and sanitation strategy. The Advisory Panel will review relevant literature and formulate and discuss strategic options for supporting child survival efforts with appropriate water and sanitation interventions.

ACT #187 September 1985: On-going Rosensweig

Zaire: SANRU (Rural Health) Training

Plan USAID/Zaire requested WASH assistance for the Rural Water Supply and Sanitation Project. The WASH consultant will design a national training strategy for rural water supply and sanitation for the SANRU Project. He will also develop a plan for WASH to assist in implementing the strategy.

ACT #188 September 1985: On-going Warner

Kenya/RHUDO: Review of Alternatives to Conventional Sewerage for Small Towns The USAID Regional Housing Office in Kenya and the National Housing Corporation of Kenya requested WASH assistance. WASH will develop comparative costs of alternative methods for handling sewerage for facilities being constructed under the Kenya Small Towns Shelter Project.

ACT #189 September 1985: On-going Jordan

Botswana: Comparison of Energy Sources for Water Pumping USAID/Botswana requested WASH assistance in evaluating water lifting/pumping technologies being tested as part of the BRET Project (Botswana Renewable Energy Technology). WASH will design and implement a comparative test program for the technoeconomic evaluation of alternative energy sources for water pumping—wind, solar and diesel.

3. WASH Publications List

Subject Index to Publications

TR = WASH Technical Report

FR = WASH Field Report

- Bibliographies and Synthesis Documents**—TR: 4; 15; 18; 21; 24 FR: 26; 117; 118; 119 29; 30
- Community Education and Participation**—TR: 7; 11; 15; 18; 19 FR: 2; 6; 13; 37; 39; 42; 59; 62; 69; 75; 77; 78; 83; 90; 91; 92; 93; 99; 107; 115; 121; 127; 128; 129
- Community/Rural Water Supply and Sanitation**—TR: 3; 4; 7; 14; 17; FR: 1; 6; 11; 19; 21; 24; 26; 27; 28; 30; 35; 37; 38; 39; 40; 42; 43; 47; 51; 56; 67; 69; 71; 75; 77; 78; 82; 83; 88; 90; 95; 96; 99; 104; 105; 107; 112; 120; 121; 127; 129; 134; 135; 140; 141; 142; 150
- Computers**—FR: 63; 111; 136
- Dams**—FR: 11; 144
- Disaster Assistance**—FR: 25; 41; 66; 74; 79; 112; 132; 138; 145; 146
- Evaluation**—TR: 4; 5; 12; 14 FR: 1; 2; 5; 22; 27; 35; 44; 49; 57; 65; 71; 76; 82; 83; 84; 86; 96; 113; 116; 127; 129; 133; 134; 139
- Geology**—FR: 32; 40; 65; 116; 132; 138
- Handpumps**—TR: 23; FR: 3; 54; 80; 81; 89; 100; 110; 130
- Housing**—FR: 46; 109; 113; 133; 143
- Human Resources Development (HRD) (including training)**—TR: 3; 13; 15; 19; 20; FR: 7; 8; 16; 21; 28; 31; 34; 22; 24; 25; 26; 27; 28; 38; 39; 42; 43; 44; 45; 49; 30; 50; 51; 56; 58; 60; 61; 62; 67; 68; 69; 70; 73; 74; 87; 88; 91; 92; 93; 94; 95; 97; 99; 108; 110; 114; 115; 117; 118; 122; 124; 125; 126; 127; 128; 141; 149; 151
- Information**—TR: 24; 30; FR: 18; 26; 28; 48; 64; 80; 111; 117; 118
- Institutional Development**—TR: 3; 4; 5; 7; 8; 15; FR: 6; 8; 12; 13; 21; 22; 19; 23; 24; 27; 33; 34; 35; 38; 39; 47; 49; 67; 68; 69; 72; 94; 95; 105; 108; 109; 111; 117; 119; 126; 127; 129; 137; 140; 142; 149
- Latrines**—TR: 25; FR: 91; 93; 95; 104; 114
- Operations and Maintenance**—TR: 3; FR: 118; 129; 141; 146
- Planning**—TR: 9; 10; 14; 15; 19; FR: 5; 7; 8; 9; 11; 14; 18; 20; 24; 27; 33; 34; 35; 36; 40; 47; 52; 58; 80; 81; 86; 88; 89; 90; 95; 97; 105; 106; 109; 111; 113; 116; 121; 127; 129; 132; 135; 136; 137; 138; 140; 142; 149; 150
- Private Voluntary Organizations (PVOs)**—FR: 2; 9; 30; 37; 39; 40; 56; 59; 71; 75; 77; 83; 90; 96; 106; 107; 128; 129; 140
- Public Health**—TR: 1; 2; 4; 8; 12; 16; FR: 1; 7; 8; 11; 23; 29; 31; 17; 18; 19; 24; 31; 37; 39; 42; 44; 55; 66; 67; 69; 71; 72; 75; 77; 78; 79; 91; 99; 104; 110; 112; 120; 127
- Rainwater Harvesting**—TR: 27; FR: 87; 115
- Sanitation (see also latrine, waste disposal, wastewater treatment)**—TR: 11; 15; 16; 18; 19; FR: 9; 25; 33; 44; 45; 46; 53; 25; 31; 58; 60; 70; 72; 79; 86; 91; 92; 109; 113; 133; 136; 143; 145; 146
- Spring Capping**—TR: 28; FR: 24; 73; 87
- Technology Transfer (including local manufacturing and R&D)**—FR: 3; 5; 6; 16; 20; 26; 45; 54; 59; 60; 69; 76; 80; 85; 87; 89; 98; 100; 101; 102; 103; 110; 123; 124; 128; 130; 131; 139
- WASH Contributions to Conference, Seminars, etc.**—TR: 8; 13; 14; 16; 17 FR: 15; 48; 63; 64; 67; 77; 149; 150
- Waste Disposal**—FR: 52; 55; 66
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