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Environmental Policy and Technology Project

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NEW INDEPENDENT STATES FINAL WORK PLAN Sustainable Water Management in the Aral Sea Basin

July 1996
Delivery Order 12

Prepared for:
Central Asia Mission
U.S. Agency for International Development

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Environmental Policy and Technology Project
For the New Independent States of the former Soviet Union
A USAID Project Consortium Led by CH2M HILL

Contents

Section	Page
1	Introduction and Summary 1-1
1.1	Background and Problem Statement 1-1
1.2	Goals and Objective 1-2
1.2.1	Goals 1-2
1.2.2	Program Objective and Strategic Assistance Area 1-2
1.2.3	Proposed Performance Indicators and Targets 1-2
1.2.4	Sustainability 1-5
1.3	Scope of Activities 1-7
1.3.1	Geographic Focus of Program 1-7
1.3.2	Relationship of DO 12 to Other CAR DOs 1-7
1.3.3	Significant Changes from DO 12 to Work Plan 1-7
1.4	Implementation 1-15
1.4.1	Project Management 1-15
1.4.2	Coordination with Host Country Agencies 1-16
1.4.3	Coordination with Other Implementors and Donors 1-17
1.4.4	Constraints to Project Implementation 1-17
1.4.5	Policy Impacts 1-19
2	Task Descriptions 2-1
2.1	Task 1: Work Plans and Reports 2-1
2.2	Task 2: Environmental Health and Clean Water 2-1
2.2.1	Kazakstan Activities 2-1
	Subtask 2A1: Survey of Ground Water 2-1
	Subtask 2A2: Rehabilitation of Well Fields 2-2
	Subtask 2A3: Health and Sanitation 2-2
	Subtask 2A4: Rehabilitation of Transfer Pump Stations 2-5
2.2.2	Turkmenistan Activities 2-6
	Subtask 2B1: Expand Distribution of Water from RO Plant 2-6
	Subtask 2B2: Expand Operation and Maintenance Coverage 2-6
	Subtask 2B3: Health and Sanitation 2-7
2.2.3	Uzbekistan Activities 2-7
	Subtask 2C1: Water Transmission System Improvements 2-8
	Subtask 2C2: Chlorination System Improvements 2-8
	Subtask 2C3: Water Treatment Plant Operations 2-8
	Subtask 2C4: Health and Sanitation 2-9
2.2.4	Actions in All Three Countries 2-9
	Subtask 2D1: Water Quality Laboratory Assistance 2-9
	Subtask 2D2: Economic and Financing Evaluation 2-10
	Subtask 2D3: Additional Equipment and Supplies 2-11

Contents / continued

Section	Page
2	<ul style="list-style-type: none"> 2.3 Task 3: Drinking Water Quality Monitoring 2-12 2.4 Task 4: Data Management 2-12 2.5 Task 5: Enhancing Professional Capabilities 2-12 2.6 Task 6: Water Management Policies 2-12
3	<ul style="list-style-type: none"> Additional Funding Considerations 3-1 <ul style="list-style-type: none"> 3.1 Deferred Tasks 3-1 <ul style="list-style-type: none"> 3.1.1 Task 3: Drinking Water Quality Monitoring 3-1 <ul style="list-style-type: none"> Subtask 3.1: Regional Strategy for Monitoring Surface Water Quality Crossing International Boundaries 3-1 Subtask 3.2: Laboratory Equipment 3-2 3.1.2 Task 4: Water Quality Data Management System 3-3 3.2 Potential Future Funding 3-5 <ul style="list-style-type: none"> 3.2.1 Kazakstan Activities 3-5 3.2.2 Turkmenistan Activities 3-6 3.2.3 Uzbekistan Activities 3-6 3.2.4 Potential Future Funding in Regional Cooperation 3-7

Appendix A: DO 12 Deliverables

Appendix B: Summary of DO 12 LOE and Budget

Appendix C: DO 12 Equipment List

Appendix D: Delivery Order Schedule

Appendix E: Responses to USAID's May 1996 Comments on EPT's March 1996 DO 12 Draft Work Plan

List of Tables

Number	Page
1-1	DO 12 Performance Indicators and Targets 1-3
1-1a	Relationship of DO 12 to Other CAR DOs 1-9
1-2	Coordination in Aral Sea Basin Programs 1-18

List of Figures

Number	Page
1-1	DO 12 Geographic Focus 1-8

Section 1 Introduction and Summary

1.1 Background and Problem Statement

As a result of decades of neglect of environmental issues and pursuit of unsustainable economic policies of the former Soviet Union (FSU), the Central Asian Republics (CAR) suffer from some of the world's most serious environmental problems. These problems degrade critical ecosystems, damage human health, threaten political stability, and impair economic reform while contributing to declining productivity.

Inappropriate policies, for example, led to excessive application rates for fertilizers on irrigated lands and high concentrations of toxic substances in industrial wastes dumped into the CAR rivers with the Aral Sea being the ultimate depository for all runoff and discharges in a drainage basin that encompasses large areas of the countries of the CAR. As the World Bank noted: " ... as the [region's] surface water quality deteriorated due to upstream agricultural, industrial, and community activities, community water supplies became increasingly polluted with mineral, bacterial, and chemical constituents. Communities turned to groundwater sources but eventually found that groundwater also was contaminated because of hydraulic links to surface water."

As a consequence of the deteriorating environment, the situation is increasingly dangerous for humans, particularly in the Aral Sea Basin. High levels of enteric disease, high infant morbidity and mortality rates, high congenital deformation, and other genetic diseases are common. The incidence of typhoid in this zone increased by 29 times over the last 15 years, and viral hepatitis increased by seven times over the same period. About 70% of expectant mothers reportedly suffer from expressed anemia, and more than 50% of pregnant women have some extragenital pathology, especially diseases of the kidney and cardiovascular systems. These illnesses are linked directly to poor sanitation practices and severe shortages of clean drinking water.

The environmental problems of the Aral Sea Basin will continue to cause substantial illness among millions of its residents and could undermine larger efforts at economic reform, democratization, and enhanced cooperation among the five countries, unless action is taken quickly. The Aral Sea is a priority that demands and deserves immediate attention. This priority was recognized by the U.S. Government (USG) and through the U.S. Agency for International Development (USAID) has funded several delivery orders (DO) addressing the Aral Sea issues. The Environmental Policy and Technology (EPT) Project is implementing DOs in all five countries of Central Asia. This DO 12 draft work plan continues and reinforces these activities. It reflects the most recent status of relevant activity under the EPT Project in the CAR and is therefore intended to replace both previous draft work plan submissions.

1.2 Goals and Objective

1.2.1 Goals

The first goal of DO 12 is to bring about improvements in the environmental health of people in selected areas of Kazakstan, Turkmenistan and Uzbekistan through the purchase and installation of equipment to improve and monitor the quality of the region's drinking water, improvements to community health and sanitary practices, and improvements to governments' abilities to manage their water resources. The second goal is to draw attention to public policies in CAR which that can achieve ecological balance and reduce human health risks in the overall Aral Sea Basin.

Impact Indicator: Opportunities are provided to CAR on a regional level which promote adoption of agreements on effective water management policies.

1.2.2 Program Objective and Strategic Assistance Area

The program objective is to reduce environmental risk to public health and is part of the social sector restructuring strategic assistance area. According to USAID, this is to strengthen the capacity to manage the human dimension of the transition to democracy and a market economy, and help sustain the neediest sectors of the population during the transition period.

The activities included in DO 12 build on and continue ongoing efforts to address the significant environmental problems of the Aral Sea Basin. Thus far, USAID's resources have supported activities primarily in Kazakstan, Turkmenistan and Uzbekistan through four DOs (i.e., DOs 2, 6 and 7) being undertaken by the EPT Project. DO 8 applies to all five republics; however, efforts under DO 8 are regional in scope and provide support to all five republics. This DO will continue support for specific activities in Kazakstan, Turkmenistan and Uzbekistan and regional policy support for all five countries.

1.2.3. Proposed Targets and Impact Performance Indicators and Targets

Proposed impact performance indicators and targets for Tasks 2 and 6 are given below in Table 1-1, pages 1-3 and 1-4. (Tasks 3, 4 and 5 are proposed for deferral, as discussed in Section 1.3.3 below.) The performance indicators and targets shown in Table 1-1 are taken from USAID/Almaty's April 1996 "Central Asia: Results Review and Resource Request (R4) (Overview and Introductory Document)." Targets are being developed by USAID-Almaty. The targets will be discussed during the draft work plan presentation and incorporated in the work plan when they are available; the impact indicators will then be reviewed in light of those targets and adjusted if necessary. A "Summary of Program" table, including outputs, targets, means of verification and impact indicators will then be prepared.

~~Task 2: Environmental Health and Clean Water~~

~~Impact Indicator: Population receiving improved health materials is increased and the incidence of waterborne diseases is decreased.~~

**Table 1-1
DO 12 Performance Indicators and Targets**

Relevant DO 12 Task / Subtask	USAID R4 Level	Result Statement	Performance Indicator	Targets
2A, 2B, 2C, 2D	I.R.3.3.1.1	Reliability of water supply facilities improved.	Improved water wellfield, transmission and treatment facilities.	Three water treatment plants, seven pump stations and 24 wells are functioning effectively.
2D2	I.R.3.3.1.2	Water supply facilities managed on a sustainable basis.	Adequate recurrent budget for sustained O&M of water supply facilities.	One facility in each of the three countries adopts a cost recovery scheme on a 1-year trial basis.
2	I.R.3.3.1.3	Water supply improvement activities leveraging other donor support.	Other donors actively involved in making further investments into the water distribution system.	With contractor support, USAID has leverage \$5 million in other donor investments into the water distribution system.
2D1	I.R.3.3.2.1	Information on seasonal local water quality available and widely disseminated.	Water quality monitoring and reporting improved.	10 labs provided with adequate equipment, training and reagents issuing periodic reports to the public.
2A3, 2B3, 2C4	I.R.3.3.2.2	Adequate information disseminated on public health as it related to potable water.	SES use of health education programs increased.	Six rayons in Aral Sea disaster zone are receiving public health education as it relates to the public.

Table 1-1 / continued
DO 12 Performance Indicators and Targets

Relevant DO 12 Task / Subtask	USAID R4 Level	Result	Performance Indicator	Targets
2A3, 2B3, 2C4	I.R.3.3.2.3	Appropriate technologies and materials available for selected locally instigated water sanitation improvement programs.	Local public health demonstration projects generating needed health information.	20 public health demonstration projects are being implemented by USAID.
6	I.R.3.3.3.1	Policy reform efforts of selected private and public sector groups successful.	Advocacy efforts for regional water management reflected in new water trade arrangements.	Long-term water sharing agreement has a water pricing component.

~~Impact Indicator: Number of households with access to potable water is increased.~~

~~**Task 6: Water Management Policies**~~

~~Impact Indicator: Opportunities are provided to CAR on a regional level which promote adoption of agreements on effective water management policies.~~

1.2.4 Sustainability

A major objective of DO 12 is to achieve results that will be sustainable over the long-term and replicable in other geographic locations in the CAR when and where USAID is no longer providing assistance. The attributes of each task that will make its results sustainable are listed below.

Task 2: Environmental Health and Clean Water.

Subtask 2A: Kazakhstan.

- 1) The rehabilitation of wells and installation of new pumps will improve production at the wellfields and make the yield of fresh water more sustainable over the long-term. (These wellfields produce most of the potable water for the cities located just east of the Aral Sea.)
- 2) Training of wellfield personnel will improve and make more sustainable the operation and maintenance of the wellfields over the long-term.
- 3) Rehabilitation of suction and discharge piping and replacement of electrical equipment at the transfer pump stations (rehabilitated under DO 7) will protect the pumps and thereby make their operation more sustainable over the long-term.
- 4) The primary health care training of selected personnel at the local level will provide improvements in health and sanitation and link the engineering and policy activities for a sustainable program.

Subtask 2B: Turkmenistan.

- 1) Expanding the distribution of water from the reverse osmosis plant (developed under DO 7 2) will result in increasing the number of beneficiaries receiving clean drinking water from the treatment plant.
- 2) With the implementation of pricing by the Government of Turkmenistan (GOT), expanded distribution will help to pay for the operation and maintenance of the plant over the long-term.
- 3) Distributing the water in tanker trucks monitored and controlled by the GOT production facility will also help to sustain the positive results by minimizing contamination of the water once it leaves the plant.
- 4) Expanding operation and maintenance coverage of the treatment plant during 1996 will ensure a smooth transition to sustainable locally funded operation and maintenance through training of local supervisors, operators, mechanics and electricians.

- 5) The primary health care training of selected local personnel will provide improvements in health and sanitation and link the engineering and policy activities for a sustainable program.

Subtask 2C: Uzbekistan.

- 1) Alternative water transmission system improvements will be evaluated for technical and economic feasibility and for their ability to achieve sustainable public health benefits.
- 2) Replacement of chlorine storage and feed equipment at several locations will lead to long-term sustainability of the existing overall drinking water supply systems by regaining control of chlorine feed rates and provision of more reliable equipment.
- 3) Operator training and assistance at the treatment plants will improve plant performance in producing clean drinking water that will be sustainable over the long-term.
- 4) The primary health care training of selected personnel at the local level will provide improvements in health and sanitation and link the engineering and policy activities for a sustainable program.

Subtask 2D: All Three Countries.

- 1) Improving water quality laboratories for performance with selected analytical equipment and procedures, and training of local inspectors, will lead to long-term sustainable reliable performance by the laboratories.
- 2) Developing data management systems for the laboratories will allow them to provide quality analytical performance for larger throughputs of samples, thus expanding the possible number of sampling locations in the drinking water system.
- 3) Determining the operations and maintenance costs of drinking water facilities and preparing plans for local long-term financing for operation and maintenance, including cost recovery concepts, will facilitate the sustainability of these facilities.
- 4) Developing economic and financial evaluations of the installed facilities will provide financial incentives to cover the recurring costs of operation and maintenance and lead to sustainable operations.

Task 6: Water Management Policies.

- 1) Developing policy briefs will identify key issues and problems, justify need for change, and provide feasible policy recommendations to key stakeholders relative to the environmental and economic importance of sharing and protecting the critical water resources in the CAR.
- 2) Recommending strategies for implementation and suggesting indicators to measure success will help ensure long-term sustainability of water management policies.
- 3) Involvement in the ongoing process of working closely with CAR collaborators in developing policy issue papers, and in discussing findings and recommendations with senior host officials, will enhance the chances of achieving sustainable long-term water policy development and implementation in CAR.

1.3 Scope of Activities

1.3.1 Geographic Focus of Program

The engineering activities under Task 2 will occur in three countries – Kazakstan, Turkmenistan and Uzbekistan. They concentrate on direct improvements to the potable water systems and community sanitation at the local and sub-regional level. This includes water quality, water supply, water treatment and water distribution, water quality data management, community sanitation and public health education. The financial and economic evaluation under Task 2D2 and water management policies activities under Task 6 will also be addressed on a regional basis. Figure 1-1 (page 1-8) shows the specific locations of the construction and other major activities to be carried out under DO 12.

1.3.2 Relationship of DO 12 to Other CAR DOs

Many of the engineering activities under Task 2 and policy activities under Task 6 originate under or relate to tasks under other CAR DOs, as shown in Table 1-1a (pages 1-9 through 1-13).

1.3.3 Significant Changes from DO 12 to Work Plan

The most significant change in this work plan relative to the original DO 12 is the deferral of Tasks 3, 4 and 5. These tasks are being deferred in order to free funds to cover the CAR portion of the FY96 EPT core costs. These are the tasks that can be most easily delayed. There are several other significant changes in the scopes of some of the individual tasks or subtasks which that are not deferred. These two categories of changes are discussed separately below.

Figure 1-1
DO 12 Geographic Focus

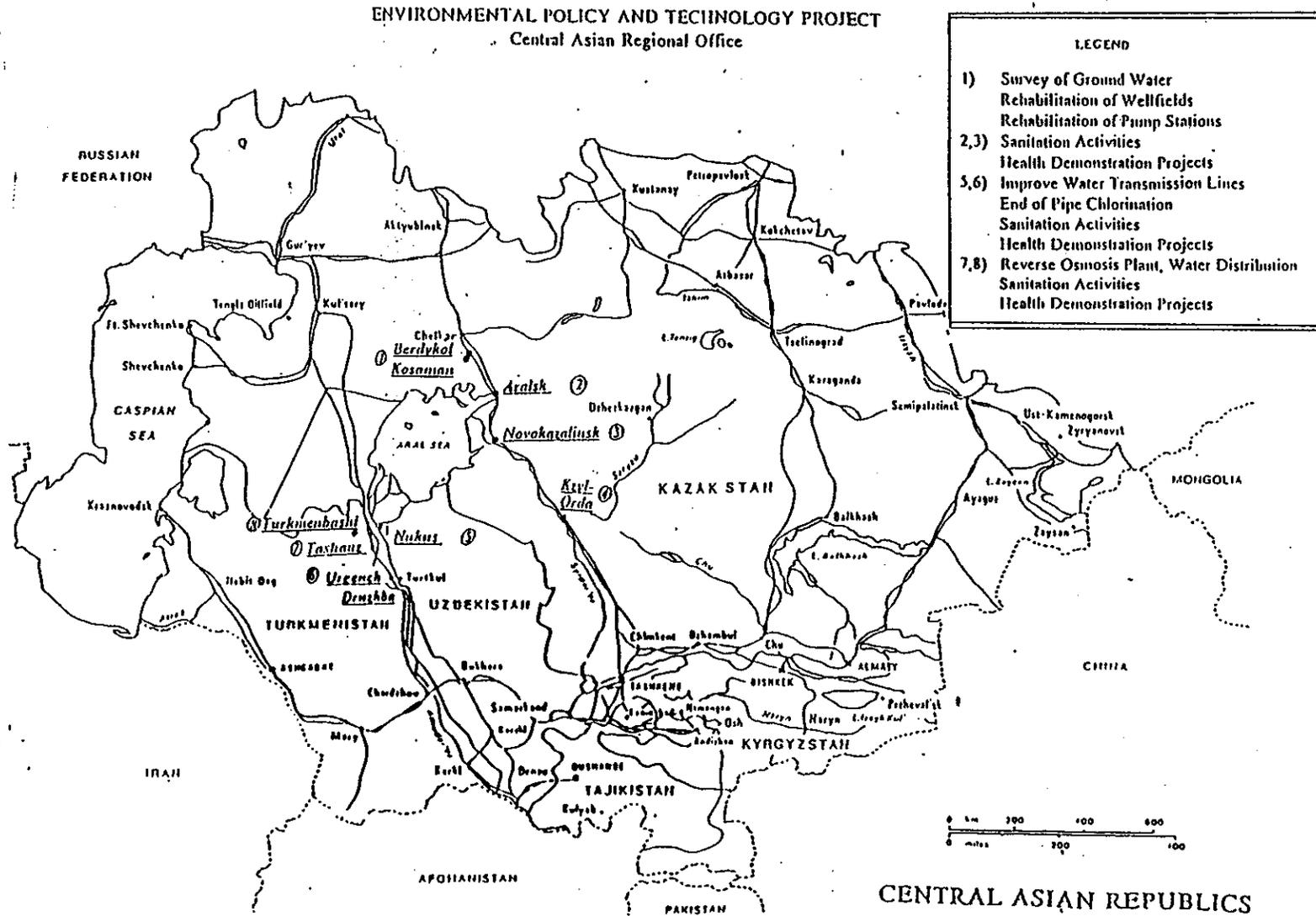


Table 1-1a
Relationship of DO 12 to Other CAR DOs

DO 12 Task No.: Title	DO 12 Task Description	Related DO / Task No.: Title Task Number	Task Description Relationship of DO 12 to Other DO Work
2A1: Survey of Groundwater	Analyze data collected under DO 7 wellfield investigation	DO 7 / Task 1A&B: Wellfield Investigation and Hydrogeologic Characterization	Conduct hydrogeologic characterization The data collected under DO 7 Tasks 1A and 1B have been reviewed and analyzed and a numeric hydrogeologic model has been developed under DO 12 Task 2A1; a report will also be prepared under DO 12 Task 2A1
2A2: Rehabilitation of Wellfields	Rehabilitate wells and install new pumps and motors in 30 wells	DO 7 / Task 1C: Wellfield Investigation Pilot Rehabilitation	Determine status and operations of existing wellfields The full-scale wellfield rehabilitation program has been developed based on the experience gained under the pilot rehabilitation work conducted under DO 7 Task 1C

Table 1-1a
Relationship of DO 12 to Other CAR DOs

DO 12 Task No.: Title	DO 12 Task Description	Related DO / Task No.: Title Task Number	Task Description Relationship of DO 12 to Other DO Work
2A3: Health and Sanitation	Conduct health demonstration projects, provide training for health education professionals, provide policy support	DO 7 / Task 4: Public Health Education and Materials Development	Strengthen public health education and training at the local level Under DO 7 Task 4, trained local health and municipal services officials on public participation and importance of creating conditional changes to improve personal hygiene and environmental health; and designed and implemented health demonstration projects. This task will follow up with equipment procurement and limited technical oversight; additional tasks include more training of public health officials, data development and management activities and health policy activities.
2A4: Rehabilitation of Pump Stations	Install pumps, rehabilitate piping and replace electrical equipment	DO 7 / Task 2: Distribution System Improvement	Rehabilitate and repair key pump stations and chlorination systems New work for six pump stations includes electrical and partial piping work only.
2B1: Expanded Distribution of Water from Plant	Expand the distribution system for the water produced at the RO Plant	2-1- Install Reverse Osmosis Unit DO 2 / Task 4: Project Development Procurement	Install potable water treatment and dispersing system DO 12 Task 2B1 expands the number of tanker trucks provided for drinking water distribution.
2B2: Expand O&M Coverage	Provide extended operations and maintenance (O&M) coverage at the facilities	2-1- Install Reverse Osmosis Unit DO 2 / Task 4: Project Development Procurement	DO 2 Task 2 provides on-site O&M training; DO 12 Task 2B2 provides 1 year of O&M.

Table 1-1a
Relationship of DO 12 to Other CAR DOs

DO 12 Task No.: Title	DO 12 Task Description	Related DO / Task No.: Title Task Number	Task Description Relationship of DO 12 to Other DO Work
2B3: Health and Sanitation	Conduct health demonstration projects, provide training for health education professionals, provide policy support	7.4: Public Health Education and Materials Development DO 2 / Task 3: Public Health Seminars and Training	Strengthen public health education and training at the local level Under DO 7 Task 4, trained local health and municipal services officials on public participation and importance of creating conditional changes to improve personal hygiene and environmental health; and designed and implemented health demonstration projects. This task will follow up with equipment procurement and limited technical oversight; additional tasks include more training of public health officials, data development and management activities and health policy activities.
2C1: Identify Improvements to Water Transmission Line	Evaluate feasibility of proposed improvements to water transmission systems	6.1: Water Treatment Plant Improvements None.	Water treatment plant investigations conducted Not applicable.
2C2: End-of-Pipeline Chlorination	Improve chlorination systems at water storage facilities	DO 6 / Task 1: Water Treatment Plant Improvements	Supply chlorination equipment Under DO 6 Task 1, chlorination systems were installed at the two plants to provide primary disinfection; under DO 12 Task 2C2, additional chlorination systems will be installed at the terminus of the transmission pipelines to maintain a disinfectant residual.

Table 1-1a
Relationship of DO 12 to Other CAR DOs

DO 12 Task No.: Title	DO 12 Task Description	Related DO/Task No.: Title Task Number	Task Description Relationship of DO 12 to Other DO Work
2C3: Extend Operational Services	Improve water treatment plant operations through operations management internship and operations assistance.	DO 6/Task 1: Water Treatment Plant Improvements	Train the staff of the water plants to modify operations to improve treatment performance Several physical modifications were made to the two water treatment plants under DO 6 Task 1; DO 12 Task 2C3 builds on those improvements by providing extensive operations training
2C4: Health and Sanitation	Conduct health demonstration projects, provide training for health education professionals	DO 6/Task 3: Public health Education and Materials Development	Strengthen public health education and training at the local level Under DO 7 Task 4, trained local health and municipal services officials on public participation and importance of creating conditional changes to improve personal hygiene and environmental health; and designed and implemented health demonstration projects. This task will follow up with equipment procurement and limited technical oversight; additional tasks include more training of public health officials, data development and management activities and health policy activities.

Table 1-1a
Relationship of DO 12 to Other CAR DOs

DO 12 Task No.: Title	DO 12 Task Description	Related DO / Task No.: Title Task-Number	Task-Description Relationship of DO 12 to Other DO Work
2D1: Water Quality Laboratory Follow-on	Evaluate effectiveness of equipment installed and provide reagents	DOs 2, 6, 7: Laboratory Activities	Delivery of laboratories for water quality testing, training of techs. Lab equipment was installed under DOs 2, 6 and 7. Task 2D1 will provide evaluation of equipment effectiveness, reagents for additional analytical methods, additional training and revised laboratory manuals.
2D2: Economic and Financing Evaluation	Cost recovery options to be presented to local government officials	2, 6, 7 and 8: RO Plant, Water Plant, other None.	Assistance provided in supplying potable water in CAR Not applicable.
2D3: Additional Equipment, Supplies	Provide support and assistance to ongoing activities in the region	DOs 2, 6 and 7: Equipment procure- ment for all three DOs.	See text of Task 2D3.
6: Water Management Policies	Issue papers on regional health, environmental, and economic costs of the Aral Sea crisis	DO 8 / Tasks 3 and 4: Regional Cooperation Activities	Applied demonstration project activities, partnerships and conferences DO 12 Task 6 involves preparing issue papers utilizing DO 8 regional water policy activities, organizations and fora as inputs; the papers themselves are then cycled back into the DO 8 effort.

Deferral of Tasks 3, 4 and 5 Due to Using DO 12 to Fund FY96 EPT Core Costs. The third year EPT core costs were not budgeted by USAID in FY96 and at the request of USAID an allowance has been made to cover the CAR portion of these costs from DO 12 funds by deferring certain activities. It is anticipated that the funding for the deferred tasks will be replenished from the FY97 budget and the deferred DO 12 activities will be implemented at a later date before the end of the DO.

The EPT Project has made a concerted effort to reduce the core costs of the project by reducing expenses and allocating actual costs in support of DO activities to the specific accounts. These costs have been reduced by 25 percent to date and are estimated to be \$3.0 million for FY96. No allowance has been made for FY97 core costs.

The estimated cost for the CAR portion of FY96 core costs is based on a ratio of CAR DO funding to total project funds remaining for the DOs in all regions. At the present time this ratio is about 45 percent, and the CAR allocation of core costs is estimated at \$1.35 million.

In order to temporarily cover these costs, the activities in the DO 12 Work Plan were reviewed and, where possible, complete activities will be deferred since partial activities may not be implementable on a staged basis. Activities deferred are listed below and proposed task descriptions for them are presented in Section 3 for future considerations when the funding is available:

- 1) Task 3, Drinking Water Monitoring – This activity anticipated the development of a “key” laboratory in three countries to monitor overall water quality in the Aral Sea area. Recently, several bilateral and multilateral donors have provided laboratory equipment in the area and extensive coordination is required. Also, there is significant interest of the World Bank to develop a water quality monitoring program and a comprehensive program strategy should be developed prior to making decisions on the equipment to be provided.
- 2) Task 4, Data Management – This activity includes the development of a comprehensive database for the region. The World Bank and EU TACIS programs are attempting to address this issue on a larger scale. Also, the DO 8 partnership program will adapt the DEMDESS model to the Syr Darya basin which may provide valuable information to this activity at a later date.
- 3) Task 5, Enhancing Professional Capabilities - This activity was not fully developed and some of the items are included in Task 2D for all three countries. Therefore, it is suggested that this task be deferred. Short-term training will be included in Task 2D and efforts will be made to collaborate with the NET in-country training.

Significant Changes to Scopes of Remaining Individual Tasks.

- 1) Subtask 2A4 - Rehabilitation of the transfer pump stations is proposed. This work was begun under DO 7, but the investigations conducted under that DO revealed

the additional need for rehabilitation of piping and replacement of electrical equipment at the pump stations.

- 2) Subtask 2B2 - It has become apparent that the GOT will be unable to take over operation and maintenance of the reverse osmosis plants originally envisioned for FY96. Therefore, this subtask has been expanded to provide EPT funding for full operation and maintenance this year. The funding will be used to hire, train and work with a fully local staff that will take over plant operation and maintenance next year. By that time, Subtask 2D2 will complete and the GOT will have developed some viable options for long-term financing of the plant's operation and maintenance. 100K
at
- 3) Subtask 2B3 - A comparative health risk assessment is proposed to be conducted in Uzbekistan and the results used in other areas in the Aral Sea Basin. Status?
- 4) Subtask 2C3 - Operations and maintenance equipment can be funded under DO 6; however, it is proposed that necessary chemicals be purchased for 1 year under DO 12 to facilitate the success of the operations assistance program-; however, the GOU has already purchased the required chemicals, so the funds allocated for chemicals under DO 12 are available for suitable alternate activities that are under review.
- 5) Task 6 - Rather than begin with a synthesis paper, write up to 20 issues papers and end with a forum in the US, it is proposed that we begin with an organizational meeting of issue paper authors with CAR counterparts at the DO 8 Applied Demonstration Projects Retreat in CAR (July 1996), write six issue papers on critical subjects, present those papers at the DO 8 Executive Policy Retreat in CAR (October 1996), and end with a synthesis paper based on the results of the issue papers and retreats. In addition to the above changes, all DO 12 activities were reviewed to provide realistic costs and schedules for the remaining work given the current status of work complete and the EPT Project's current understanding of the conditions affecting those activities. Status?

1.4 Implementation

1.4.1 Project Management

This project will be managed in the EPT office in Almaty with support from the EPT team in Washington. Additional cooperating country nationals will be added to the staff in the EPT-Almaty office to assist the Project Manager in carrying out the work in the region. Procurement of major equipment will be done through the staff in the EPT-Washington Office. Locally available equipment and arrangements for workshops, conferences, etc., will be handled in the EPT Almaty office. Key staff assignments:

Regional Director	P. Dreyer (Almaty)
Project Manager	P. Shaikh (Almaty)
Task 1 Manager (Work Plan)	P. Shaikh (Almaty)
Task 2a Manager (Kazakstan Engineering)	S. Mahmood (USA)
Task 2b Manager (Turkmenistan Engineering)	P. Shaikh (Almaty)
Task 2c Manager (Uzbekistan Engineering)	R. Hoffman (USA)
Task 2d Manager (Continuing Activities)	P. Dreyer (Almaty)
Task 6 Manager (Regional Policy)	B. Britton (Almaty)
Contracting - USA	M. Brown (USA)
Procurement - USA	J. Monnacio (USA)
Contracting & Procurement - CAR	G. Lassiter (Almaty)

Local participation is very important to the success of the project and efforts are being made to maximize the hiring of local professional staff.

1.4.2 Coordination with Host Country Agencies

The host country agents that EPT has been working with in Kazakstan, Turkmenistan and Uzbekistan are as follows:

- Kazakstan: State Committee on Water Resources; Tolegen T. Sarsembekov, Chairman
- Turkmenistan: Turkmengeologia South Aral Hydrogeological Trust; Arnold Yakovelvich Sadosky, Trust Manager. Dashhouwz Velayat; Sergei Kirovsky, Department Head
- Uzbekistan: Tuyamyun-Nukus Interregional Water System; Anatoly Yakushin, General Director. Tuyamin-Urgench Interregional Water System; Madiar Kalandarov, General Director.

The U.S. Government has signed the amendment and extension of its Memorandum of Understanding (MOU) with the Government of Turkmenistan (GOT) and is in the process of negotiating amendments and extensions to the Memoranda of Understanding (MOUs) with the Governments of Kazakstan and Uzbekistan and Turkmenistan (GOK, GOU and GOT, respectively). These agreements outline the responsibilities and commitments made by each party to ensure the installation and timely completion of EPT Project activities. The GOK, GOU and GOT will provide support which may include skilled and unskilled work crews, transportation, storage and security, operation of heavy equipment, installation, testing and, in certain instances, training. The GOT has agreed to meet the recurring costs of the RO plant, finalize the water distribution plan, and help develop and participate in the management training program for the RO plant. The GOU will develop pricing policies for drinking water and conduct investigations of potential energy savings at drinking water facilities.

The DO Budgets do not include any contingencies to allow for subcontracting of services that

these arrangements would otherwise have provided. It is essential, therefore, that GOK, GOT and GOU commitments are fulfilled according to schedule to coincide with the arrival of EPT equipment and consultants. Failure to meet these criteria schedules will severely impact the ability of EPT to complete the project tasks in a timely, safe and professional manner. In this regard, we have had several planning and implementation review meetings with GOT, GOU and GOK agencies at the federal and local level in the past and we intend to do the same as the project progresses. This is done to ensure that CAR government commitments are carried out to avoid any delay in project implementation. In case they do not keep their commitments, USAID will be informed immediately to take appropriate action.

1.4.3 Coordination with Other Implementors and Donors

Coordination with other U.S. Government-funded implementors and other USAID-funded implementors is presently being conducted through weekly meetings to ensure collaboration on all activities. An example of collaboration with other U.S. Government-funded implementors on DO 12 includes working with the Centers for Disease Control (CDC) on developing regional health impact scenarios for policy level discussions. Examples of collaboration with other USAID implementors include working with the Harvard Institute for International Development (HIID) on water pricing and economic damage evaluations for water resources and with Hagler, Bailly/Burns & Roe on development of a hydroelectric power export markets study.

EPT continues to work to identify activities which provide tasks that contribute to the larger international donor level of effort. To this end, EPT-CAR has established a regional working group that includes members from the World Bank, UNDP, EU/TACIS (WARMAP), local representatives from each of the five countries, and a representative from the Interstate Council on the Problems of the Aral Sea. Through working with this group, much of the work in CAR is carefully structured to complement other activities and avoid any duplication of effort. In particular, it is crucial in the implementation of DO 12 that the EPT team coordinate its activities with the work of the World Bank. An example of collaboration with the World Bank is that the Bank recently agreed to provide 32 tanker trucks for water distribution from the RO plant. Table 1-2 (page 1-18) shows the relationship of EPT DO 12 tasks to World Bank tasks.

In addition, because many of the EPT activities in the Aral Sea are similar to those of the ~~European Union's TACIS program in the region, called WARMAP~~, EPT will coordinate closely with WARMAP on the water quantity component of the Bank's database and proposes to take lead on the water quality portion of the Bank's database. Other donors will be responsible for developing components related to other environmental media. Coordination will be achieved by scheduling regular meetings in Tashkent with both the World Bank and WARMAP. Other donors (such as JIMA, GTZ and other bilateral donors) are working on similar projects in the area and coordination will be continued to ensure collaboration of these efforts.

1.4.4 Constraints to Project Implementation

The EPT Project has been addressing many of the constraints to project implementation during the last 2 years; however, it is worth noting how these constraints are being dealt with. Some of these constraints are as follows:

**Table 1-2
Coordination in Aral Sea Basin Programs**

World Bank Aral Sea program (Program No.)	Delivery Order 12 Sustainable Water Management (Task No.)
(1.1.) Regional Water Resources Management Strategy	(6) Water Management Policies
(2.2.) Regional Environmental Information System	(4) Data Management (Deferred)
(3.1.a.) Water Quality Management	(1) Work Plans & Reports (2) Environmental Health & Clean Water (2d) Water Quality Lab - Economic Evaluation/Financial Plan - Additional Equipment/Supplies (3) Drinking Water Quality Monitoring (Deferred) (6) Water Management Policies
(5.1.) Clean Water Sanitation/Health - Uzbekistan	(2) Environmental Health & Clean Water Uzbekistan (2c) - Improve Water Transmission Lines - End-of-pipeline Chlorination - Extend Operations Service - Health and Sanitation
(5.2.) Clean Water, Sanitation/Health - Turkmenistan	(2) Environmental Health & Clean Water Turkmenistan (2b) - Expand Distribution from RO Plant - Expand O&M Coverage - Health and Sanitation
(5.3.) Clean Water, Sanitation/Health - Kazakstan	(2) Environmental Health & Clean Water Kazakstan (2a) - Rehabilitation of Wellfields - Rehabilitation of Pump Stations - Health and Sanitation
(8.2) Project WARMAP	(6) Coordination of Water Management Policies
(8.3) Capacity Development	(5) Enhance Professional Capabilities (Deferred)

- 1) The program was conceived based on a rapid assessment with limited site evaluation: EPT field modifications are constantly being made to insure a sustainable project that requires significant adjustment for field conditions.
- 2) The program is the first technical assistance program in the region: The EPT activities are being developed and implemented for the first time in these areas, areas where there is no historical basis for cooperation by local representatives with the international donor community.
- 3) There is sometimes a lack of unanimity of focus or priority on the part of the local representatives: The EPT program requires the development of relationships of confidence and commitment to implement a prioritized program with local representatives on a national, regional and local level.
- 4) The program is being implemented in an extremely remote region near the Aral Sea: The EPT field teams are adjusting to operating under hardships of limited facilities of accommodation and availability of food and water, and the seasonal weather conditions that limit field work from April to October.
- 5) The nature of the technical assistance is oriented toward engineering activities: The implementation activities require a staged program with detailed technical input from the local personnel, and concurrence that the activities are acceptable to and in cases approved by the local authorities prior to execution.
- 6) The MOU between the U.S. Government (USG) and the local host country governments are, in effect, a joint ventures: The EPT field teams have limited control over the timeliness and quality of personnel and equipment being provided, while exerting technical control of the installation of all equipment and materials. Further, the DO budgets do not include any contingencies to allow for subcontracting of services that these governments would otherwise have provided.
- 7) The sustainability of the projects is dependent on local budgetary support: The continued budgetary support to operate and maintain the facilities provided is a key issue that includes extensive training in operation and maintenance of local personnel and the supply of the expendable materials for continued operation.
- 8) The policy interventions are dependent on the local participants for implementation: The regional cooperation in water management program is dependent on the willingness of the local government officials to address the critical issues and collaborate on a regional basis in order to have a sustainable effect.

1.4.5 Policy Impacts

As described above in Section 1.2.4, Sustainability, the engineering and construction activities proposed in Task 2 for Kazakstan, Turkmenistan and Uzbekistan will be made sustainable by a number of implementing and complimenting activities, including expansion of distribution systems, assistance with operation and maintenance services, provision of health and sanitation ser-

vices and facilities, and building of laboratory analytical capabilities for drinking water quality monitoring. Each of these activities, in turn, has a policy dimension that will be addressed in the DO 12 work, as follows:

- 1) Expansion of Distribution Systems (Subtask 2B1) - The use of tanker trucks and involvement of water users in collecting water from the trucks will be evaluated for adoption and application throughout the remote, un piped areas of the Aral Sea Basin and a section of the Subtask 2B1 report will be prepared addressing this possibly.
- 2) Assistance with Operation and Maintenance Services (Subtasks 2B2, 2C3, 2D2) - Sections of the Subtasks 2B2 and 2C3 reports will be devoted to the need for and proposed content of policies relating to drinking water facilities operations and maintenance, including staffing and training. In addition, work under Subtask 2D2 will involve developing water pricing options for recovery of costs associated with drinking water facilities that can be adopted and applied throughout the Aral Sea Basin (see Section 2.2.4 for more details).
- 3) Provision of Health and Sanitation Services (Subtasks 2A3, 2B3, 2C4) - EPT will work with health and other agency officials to help shape health policies in these countries. Policy areas to be addressed include health education; influence of cost-free water on consumption patterns and its impact on public health; media use for the promotion of beneficial health habits; multi-sectoral responsibility for water and sanitation problem resolution; and inclusion of existing NGOs and the development of new community groups dedicated to local health, water and sanitation problem solving.
- 4) Building of Laboratory Analytical Capabilities - A section of the Subtask 2D1 report will address the need for and proposed content of policies relating to drinking water laboratory analytical equipment, procedures, data management, training and inspection/certification for adoption and application throughout the Aral Sea Basin.

Task 6, Water Management Policies, will support and expand the regional water cooperation policies activities of DO 8. Under DO 8, significant policy initiatives have been identified through meetings, workshops and applied projects. Efforts of Task 6 will support closure on those initiatives. Examples include working with local officials to: 1) support development of a long-term agreement on the operating regime of a major hydropower dam along the Syr Darya, possibly establishing the first-ever water rights allocation for Central Asia; and 2) initiate an environmental damage assessment to use as the basis for regional water charges that take into account degradation in water quality to downstream users. These activities could support broad-scale application of water pricing in Central Asia and help CAR economies plan for expanded growth and development. Policy analysts in the areas of institution development, environmental and human risk characterization, water resources management, and environmental economics will attend the DO 8 Applied Demonstration Project Retreat in CAR in July 1996. While there, they will work

How
are
these
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together?

with host country counterparts to identify specific policy issues needing to be addressed.

The policy analysts will then prepare five issue papers addressing regional health impacts of poor water use and management practices, regional environmental impacts, economic costs of those health and environmental impacts, options for policy change to improve water quality and supplies, and economically-driven methods of reducing water consumption and improving water quality. These papers will then be presented at the DO 8 Executive Policy Retreat in CAR in ~~October~~ ~~December~~ 1996 and a synthesis paper will be prepared and presented in Washington, D.C., in ~~December 1996~~ ~~January 1997~~.

The DO 12 final report will contain a section addressing the impacts of all DO 12 activities on policy matters, including whether EPT actions or recommendations conform to existing policy, set the framework for policy development, are impeded by lack of policy, etc. Where new or revised policy is recommended, the proposed content of that policy will be outlined.

Section 2 Task Descriptions

2.1 Task 1: Work Plans and Reports

A draft work plan will be submitted to the USAID/Washington and USAID/Almaty for review. The work plan's contents and organization will be equivalent to that required by DO 12. Minor changes include that the background section in the DO has been renamed Introduction and Summary and addresses some additional topics that help to elucidate some of the complexity of DO 12 and address USAID's comments on the draft work plan dated November 1, 1995. Monthly progress reports and a final report will also be prepared under Task 1. The final report will include a section on the policy impacts of DO 12 activities and how they should be addressed.

2.2 Task 2: Environmental Health and Clean Water

2.2.1 *Kazakstan Activities*

The project area is located in Kzyl Orda Oblast near the eastern shore of the Aral Sea and includes the cities of Aralsk, Novokazalinsk and Kazalinsk. Approximately 150,000 people live in this area. Living conditions in the area are very poor. The use of contaminated water is believed to contribute to the high rates of typhoid, paratyphoid, hepatitis, and dysentery in the region. Water is supplied to the area from the wellfields located in Kosaman and Berdykol via a 240-kilometer long federal water transmission pipeline. There are six transfer pump stations on the transmission pipeline.

Several EPT field team visits were made to the project area to assess the conditions and to develop a program for improvements under previous DOs. Major elements of the program developed for the project area include: improvements to wellfields, improvements to the pump stations on the transmission system, monitoring water quality, and public health education. Several tasks developed under the program have been completed, including provision of water quality monitoring equipment to five laboratories, installation of new chlorination systems for disinfection in the six transfer pump stations and the pump stations in the cities of Aralsk and Novokazalinsk. The activities specified in Task 2A either continue or build on the work completed under DO 7. GOK involvement is outlined in the Agreed Meeting Minutes which have been submitted to USAID under separate cover.

Subtask 2A1: Survey of Ground Water. The data collected under the wellfields investigation task of DO 7 will be reviewed and analyzed under this task. A conceptual numeric model of the aquifer will be developed to assess the life of the groundwater resource under the current and proposed operating conditions. The modeling results will provide a rough order-of-magnitude estimate of the long-term safe yield of the aquifer.

A combined report on groundwater survey and hydrogeological characterization of the Kosaman and Berdykol wellfields will be prepared in January 1996. This report will be used to determine which wells to rehabilitate, what their yield and service life will be, and what size and capability the pumps and motors should be. It will also be used by the GOK for future water supply planning activities.

Subtask 2A2: Rehabilitation of Wellfields. The overall objective of this subtask is to improve reliability and increase water production capacity from the Kosaman and Berdykol wellfields. There are 30 wells in the Kosaman wellfield and eight in Berdykol. In fall of 1995, three new pumps and motors were installed in Kosaman. Wells will be rehabilitated and new pumps and motors installed in spring/summer 1996.

Based on field observations, it is assumed that up to 29 wells will be fitted with new pumps and motors (no new wells will be drilled). It is expected that the overall average target well capacity will be about 20 l/s; the new pumps to be installed will be selected to cover a range from 9.5 l/s to 31.5 l/s.

During the previous field investigations, a sanding problem was observed in some wells. Attempts to address this problem through well redevelopment or reconstruction will be made. In addition, desanders will be procured for installation in wells where moderate sanding may be present.

The pumps, motors and other ancillary equipment will be procured in the United States and shipped for installation in spring/summer of 1996. An advance team will arrive in Kazakstan from the United States in early spring of 1996 to meet with GOK representatives to make final arrangements and inspect the equipment to be provided by the GOK. The advance team will be joined later by other teams who will supervise the installation of the equipment and conduct training. It is anticipated that the field activities will be completed in about 4 months. A trip report and a final wellfield evaluation report will be prepared at the conclusion of field activities.

It is assumed that the construction equipment and materials (such as cement, sand, gravel, wood, paint, etc.) for the wellfield rehabilitation will be provided by the GOK in accordance with the MOU. It will include two drilling rigs, two cranes, two air compressors and other necessary construction tools. The GOK will also provide a competent work crew for operating the construction equipment and the necessary labor for installation. The wellfield operators will be involved in the wellfield construction and rehabilitation, which serves as on-the-job training, as well as in the formal classroom training.

Subtask 2A3: Health and Sanitation.

Health Demonstration Project Equipment Procurement and Assistance. Under the auspices of the EPT Water and Sanitation Health Education Program, a series of seminars were conducted in Kazakstan, Uzbekistan and Turkmenistan. The seminars introduced participants, most of whom hold positions in local health and municipal services, to the concept of public participation and the importance of creating conditional changes for the improvement of personal hygiene and en-

vironmental health.

In order to put these concepts into practice, participants worked together with members of local communities to develop and implement health demonstration projects within the Aral Sea region. The projects were designed to be high impact, low cost activities aimed at creating appropriate sanitary conditions. Local participation in the health demonstration projects sought to provide an opportunity to "learn by doing"; encourage multi-sectoral involvement for the resolution of local problems; instill a sense of shared responsibility for supplying resources and meeting goals; create demonstration projects that will be geographically replicable; and create opportunities for children to educate their parents on appropriate health behaviors.

The locations of the health demonstration project sites in Kazakstan are the following:

- Aralsk Rayon
School No. 62
School No. 57 at the Farm "Aralsky"
Kindergarten "Karligash"
School No. 13
- Novokazalinsk Rayon
School No. 165
Kindergarten "Shigula"
School at farm "Zhalantoz batyr"
Out patient clinic at the farm "Zhalantoz batyr"
Kindergarten at the farm "Zhalantoz batyr"

reward on page 2.3.

The health demonstration projects primarily address the need to supply potable water and remove solid waste from the designated sites (privies and septic tanks) through the extension and repair of water and sewerage pipelines. DO 12 commitment to the health demonstration projects involves follow-up work in the form of equipment procurement and limited technical oversight which should use adapted technology and be rapidly achievable, be relatively low cost and require modest maintenance, have little or no negative environmental impact, and have potential for local population to take part in its realization.

Primary Public Health Training for Professionals. The long-term goal of the Water and Sanitation Health Education Project is to improve the health status of the population living in the target areas of the Aral Sea region of Kazakstan. In order to accomplish these goals, the health, water, and sanitation education strategy is to develop highly skilled personnel who will be able to:

- impart knowledge on appropriate health and sanitary practices to the communities they work in and help to foster healthy behaviors among target groups
- collaborate with other sectors, including NGOs, to create satisfactory sanitary conditions for given target groups

- provide training and support for and collaborate with national, regional and local health and other personnel responsible for public health education
- develop education programs on efficient water use for officials and consumers;
- develop, implement and evaluate programs that promote health behaviors focused, but not limited to, water and sanitation issues
- collaborate with other Aral Sea region countries in the development and implementation of regional health and sanitation programs

Public health and medical personnel are the first in line to bridge the gap between knowledge and basic sanitary and water utilization practices. EPT proposes that a group of about eight health professionals presently operating at the rayon, oblast and national levels undergo health communication training. These candidates will be chosen according to criteria to be developed in cooperation with the Ministry of Health (MOH) and they will become a training team able to improve health and sanitation practices in Kazakstan.

The 4-week training program to take place in Tashkent will include but will not be limited to:

- health education and promotion, theory and practice
- information, education and communication
- social marketing, focus group methodology
- organizational development and multi-sectoral collaboration
- community participation
- program management: conducting a needs assessment, planning, pre-testing, monitoring, supervision, evaluation and budgeting
- advanced training of trainers: needs assessments, adult training techniques, training technology, adaptation of innovation, behavioral change, performance evaluation and budgeting

The technical work on existing health demonstration projects will be synchronized with the return and availability of the participants in order that they may coordinate work.

Data Development and Management Activities. ~~A comparative health risk assessment will be conducted with CDC in Uzbekistan and the results will apply to other areas within the basin which share many of the same characteristics. EPT will work jointly with CDC to conduct a health evaluation in Uzbekistan relative to water supply related diseases. The study will help answer the questions of the relative contributions of the Aral Sea crisis and generally poor public health and sanitation practices to the observed health problems in the region. Uzbekistan was~~

CDC program?

chosen for the study because it has some of the worst health problems and EPT has had good success there with both engineering and health activities. The lessons learned as a result of the Uzbekistan study will be applied throughout the region. Significant differences in water use and sanitary behavior among the three nations' populations has not been observed by the EPT public health team. EPT's contributions will include technical support (e.g., assistance to laboratories) and logistical support (e.g., provision of interpreters). The study will begin in early June and the report is expected by late August. They study will leverage World Bank work, provide input to CDC's fall training program, and show good collaboration among U.S. implementors in Central Asia.

Health Policy Activities. The health reforms enunciated by the Governments of Kazakstan, Turkmenistan and Uzbekistan are being developed to provide direction in health education and health promotion. EPT can play a leading role in helping these countries to shape its health policy. This distinction is justified as it finds itself to be the lead collaborating organization in the integration of primary health care principles and practices for the improvement of water and sanitation services and health education.

Other policy areas may include:

- influence of cost free water on consumption patterns and its impact on public health
- media use for the promotion of beneficial health habits
- multi-sectoral responsibility for water and sanitation problem resolution
- inclusion of existing NGOs and the development of new community groups dedicated to local health, water and sanitation problem solving

In the policy area, EPT will work with health officials and other agency representatives to coordinate its efforts with other bilateral and multilateral organizations which provide orientation of the country's health services at the community level. EPT's work with local health officials in Kazakstan has already borne specific actions, including providing the impetus for a national health seminar in Kazakstan and state-level health programs in Turkmenistan.

Subtask 2A4: Rehabilitation of Transfer Pump Stations. This proposed subtask is an extension of the rehabilitation work being conducted under DO 7. The initial rehabilitation work contemplated under DO 7 did not include rehabilitation of piping and the replacement of the electrical equipment at the pump stations. New electrical equipment is needed for protection of the new pumps which are being procured under DO 7. This subtask includes design and procurement of the necessary electrical equipment and selected piping for the pump stations and supervision by an electrical engineer during installation. The equipment installation labor will be provided by GOK who will work under the supervision of the EPT electrical engineer.

2.2.2 Turkmenistan Activities

The Dashhovuz Velayat is the only designated part of the country lying within the Aral Sea Disaster Zone. Both the city of Dashhovuz (population, 120,000) and the Turkmenbashi Etrap (population, 100,000) are located in the Dashhovuz Velayat. Since the collapse of the Soviet Union, there have been worsening economic conditions in Turkmenistan and the government has regularly failed to meet its payroll. Most of the laborers who worked at the reverse osmosis (RO) plant were several months behind in compensation.

Infrastructure systems, i.e., water, sewer, electricity, and transportation are in poor states of repair. Although water and electricity are subsidized by the Government, they are not available for days at a time due to system breakdowns and lack of repair parts. Most people use pit privies which are poorly maintained and likely sources of disease and certainly odors. Water has to be bucketed from cisterns, street standpipes or from canals.

Historically, water used for domestic purposes in Dashhovuz and throughout Turkmenbashi Etrap has come from government-operated regional water systems consisting of wellfields, storage reservoirs, pumping stations, and either piped distribution systems or truck loading stations. In those systems which have water distribution pipes, the systems are subject to recurrent mechanical failures and planned shut downs. This situation results in unsafe drinking water. Nowhere in the city is water safe to drink from plumbing fixtures without boiling prior to consumption.

Subtask 2B1: Expand Distribution of Water from Reverse Osmosis Plant. The purpose of this task is to "expand the distribution system for the water produced at the reverse osmosis treatment plant, up to the limits of the plant's capacity." Both the MOU and DO 2 assumed that the water from the RO plant would be distributed to users via water tanker trucks. Observations and conclusions made during construction of the plant during the last 16 months confirm that the only practical way to get the water from the plant to the people living in scattered small villages throughout the etrap is to deliver it in tanker trucks. This is also the best way to prevent contamination of the water once it leaves the plant.

The expansion of water distribution under DO 12 will be to supplement the three tanker trucks being procured under DO 2 with an additional two trucks. The remaining trucks will have to be provided by the GOT as outlined in the MOU. Considerations will be given to providing two 5-gallon plastic water canisters for each household in the etrap for use in collecting water from the tankers. A section of the Subtask 2B1 final report will cover the social, economic and institutional factors needing to be addressed to ensure the appropriateness of these alternatives for water distribution in Turkmenistan and throughout the Aral Sea Basin.

Subtask 2B2: Expand Operation and Maintenance Coverage. In Turkmenistan, there were two problems to overcome. First, the GOT staff working with us were already not being paid by the GOT and there was little likelihood they would be paid in the coming year. Second, the O&M training being conducted to date had not been sufficiently effective due to erratic attendance of the trainees and other reasons and the GOT representative refused to take over the plant

unless EPT staff were there with them for the first year. EPT then evaluated whether there was any other group prepared to take over O&M of the plant and determined there was none. Therefore, even if there had been sufficient pay, at least at this point in time there appeared to be no other options. An approach to studying longer-term options for financing the RO plant (beginning a year from now) are currently being discussed with USAID.

Due to the apparent inability of the GOT to provide adequate operation and maintenance of the plant, it is proposed to operate the plant for the duration of calendar year 1996. The plan is for us to hire a plant/office superintendent to be trained by the equipment manufacturer. Additional local hires would include a) a translator, b) three contract supervisors able to function as lead operators/mechanics/electricians, c) up to 10 locally hired trainee operators with the total number hired based on the number of hours per day that the plant will operate, d) a driver, e) a cook, and f) some custodial workers for our office/living quarters. After approval by USAID, this proposed operations plan will be reviewed with the GOT. Section 2D2 outlines an approach for working with the GOT to develop options for long-term financing of drinking water facilities.

Subtask 2B3: Health and Sanitation. Please refer to Section 2A3 for descriptions of sanitation activities. Identical tasks will take place in all three countries with the exception of the health demonstration projects which will vary depending on site location. The sites in Dashhovuz City and Turkmenbashi Etrap are: School No. 13, Carpet Factory, Sewing Factory "Cheper," Velayat, Children's Hospital, Kindergarten No. 15, Auto park No. 3013, Residential Building, and Farm "Noubakhor."

2.2.3 Uzbekistan Activities

The Khorezm Oblast of Uzbekistan whose capital city is Urgench and the City of Nukus in the Republic of Karakalpakstan lie in the disaster zone of the Aral Sea. Approximately 2,300,000 people live in the Uzbekistan portion of the Amu Darya delta.

Uzbekistan's Khorezm Oblast is a very large area with approximately 600 settlements. About 300 of these are provided with water from pipelines; 20 settlements are provided with water extracted from relatively shallow wells constructed adjacent to irrigation canals; and the remaining 280 settlements have only surface water in the irrigation canals as a source of water. The Tuyamuyun reservoir and associated pipeline were constructed to provide water to a very large area south of the Aral Sea and extensions are being considered by the GOU. The water provided by this project is only marginally acceptable as a healthy source of drinking water.

The situation in Nukus is analogous. There are 800 settlements and only 250 receive drinking water from pipeline sources; 50 are provided with water from ground water wells constructed adjacent to canals; and the remaining 500 settlements have no water source other than Amu Darya canals. As with Urgench, the Nukus system provides water that is only marginally acceptable as a healthy source of drinking water.

Health authorities in both cities advise the water customers to settle the water and then boil it prior to drinking. In both cities, the measured levels of TDS were significantly high and boiling

these waters to render them bacteriologically safe concentrates the mineral salts making them unpalatable. This acts as a deterrent to the boil water advisories.

The activities included in Task 2C build on and continue efforts ongoing under DO 6.

Subtask 2C1: Water Transmission System Improvements. The water tors and equipment inadequacies. The operator situation will be addressed in this task while the equipment inadequacies will be addressed in DO 6. The Subtask 2C3 final report will address the institutional changes needed to support the operations and maintenance of the treatment plant. This task is divided into three subtasks:

Operations Management Improvement. An EPT operations specialist will be placed at each s candidates for funding. The focus of this task will be to consider these planned improvements and evaluate the feasibility of some or all of them with respect to achieving sus-tainable improvements in public health. Work will be coordinated with similar work being contemplated by the World Bank.

Subtask 2C2: Chlorination System Improvements. The water treatment plants serving Urgench and Nukus are located 90 km and 240 km, respectively, to the south of the cities. Each city receives its treated water through 1,000 mm diameter pipelines into a ground storage reservoir. At this point the water is rechlorinated and then pumped into the distribution system. The Nukus system also delivers water to several communities further north; similar storage/pumping facilities exist in Kageili and Chimbai.

The existing chlorination systems at these storage/pumping facilities are in such a serious state of disrepair that it is virtually impossible to control the feed rate of chlorine to any part of the process. In addition, the equipment is based on older technology which is not as reliable as technology now available from U.S. manufacturers. The focus of this subtask is to replace the chlorine storage and feed equipment at four locations (Urgench, Nukus, Kageili, and Chimbai) with new systems. The Subtask 2C2 final report will address the institutional changes needed to support the chlorination systems.

Subtask 2C3: Water Treatment Plant Operations Improvements. The treatment process at both plants relies on two-stage clarification to remove suspended and colloidal material followed by filtration. The first stage uses four circular, radial flow clarifiers operating in parallel. At times, aluminum sulfate, a coagulant, is introduced into a flow splitting structure upstream of the clarifiers. The second stage consists of six rectangular, horizontal flow clarifiers operating in parallel. Electrolytic polymer, a coagulant aid, is introduced into a mixing facility upstream of these clarifiers.

This process configuration is similar to systems used successfully in the United States and Europe. Performance is, however, unsatisfactory leading highly turbid, poorly treated drinking water. The reason for poor performance is attributable to a combination of untrained operators and equipment inadequacies. The operator situation will be addressed in this task while the equipment inadequacies will be addressed in DO 6. The Subtask 2C3 final report will address the in-

stitutional changes needed to support the operations and maintenance of the treatment plant. This task is divided into three subtasks:

Operations Management Improvement. An EPT operations specialist will be placed at each plant to conduct an intensive 2-week operations training. Sessions will be conducted both separately and jointly with the two staffs. The intent is to introduce the managers to process management techniques such as process optimization, staff scheduling, integration of plant functions, etc. Then the EPT operations specialists will assist the Uzbekistan managers to develop an operations plan for their plant.

Operations Assistance. Four EPT operating experts will be placed in each plant for a 6-week period to assist the Uzbekistan operations managers in the implementation of the operations plans. Each team will consist of a senior operations specialist, two senior operators, and a senior maintenance specialist. Two follow-up visits by the team members will be scheduled to evaluate progress and results.

Chemical Purchase Assistance. The current budgetary situation in Uzbekistan places a strain on the operations of the two plants. There are often insufficient funds to pay salaries, pay power bills, and purchase necessary chemicals. In order to ensure success of the operations assistance program, EPT ~~will has proposed to procure aluminum sulfate, polymer, and chlorine for up to a 12-month period. However, the GOU has already purchased the required chemicals, so the funds allocated here for chemicals are available for suitable alternate activities that are under review.~~

Task 2C4: Health and Sanitation. Please refer to section 2A3 for descriptions of sanitation activities. Identical tasks will take place in all three countries with the exception of the health demonstration projects which will vary depending on site location. The sites in Uzbekistan are the following:

<p>Khorezm Oblast</p> <p>Cotton Processing Factory in Urgench R. Ahdurahimov Sch. at Ahunbabaev Farm Kindergarten "Lola" at Ahunbabaev Farm Garage at Ahunbabaev Farm</p>	<p>Karakalpakstan, Beruniy Rayon</p> <p>Kindergarten "Lola" No. 9 Cotton Oil Factory Rahimov School Eschanov School</p>
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2.2.4 Task 2D: Actions in All Three Countries

Subtask 2D1: Water Quality Laboratory Assistance. ~~Under DOs 2, 6 and 7, EPT provided equipment to the existing laboratories serving the drinking water treatment plants being addressed by those DOs.~~ Comparative testing of the installed equipment under the previous DOs is being conducted by the laboratory personnel in all three countries. This task will evaluate the effectiveness of the use of the installed equipment and provide reagents to conduct additional testing for parameters required by the Sanitary and Epidemiological Services (SES). Additional training and revised laboratory manuals will be provided to ensure proper long-term operation of

the equipment. The specific assistance in each country is as follows:

Kazakstan. Instruments, reagents and supplies have been provided to Aralsk Water Authority laboratory, Aralsk SES Laboratory, Novokazalinsk Water Treatment Plant laboratory, Novokazalinsk SES laboratory, and Kzyl Orda SES Laboratory. The Russian translated version of the analytical procedures was provided to the laboratories which should improve the use of the instruments.

Turkmenistan. The reverse osmosis water treatment facility installed in Turkmenbashi requires some analytical support to monitor day-to-day operations and confirm compliance with drinking water standards. The operational requirements can be met with the use of portable instruments which provide reliable analytical information with ease of operation. The monitoring of compliance with drinking water standards requires the use of more difficult analytical procedures which should be completed in a more controlled environment.

Uzbekistan. Instruments, reagents and supplies have been provided to Nukus water treatment plant laboratory and Urgench water treatment plant laboratory. A spectrophotometer was provided to the Nukus SES laboratory. Preliminary indications are that the Nukus laboratory has fully been implemented with respect to instruments, despite the lack of Russian translated procedures and manuals. The Urgench laboratory was less successful in circumventing that obstacle. Recently, a translated version of the analytical procedures was provided to the laboratories, which should improve the use of the instruments.

Subtask 2D2: Economic and Financing Evaluation. We are presently discussing with USAID a more comprehensive process for identifying, prioritizing and analyzing sustainability issues relating to the various engineering, construction, health, sanitation and laboratory activities to be conducted under DO 12. The process will also provide for design and promotion (of adoption and implementation) of policy and other types of interventions to address the highest priority issues. Once this scope change and approach has been approved by USAID, this work plan will be revised to reflect it.

The objective of this subtask is to promote financial sustainability of safe drinking water supplies. Without adequate financing and cost-recovery schemes, the Central Asian population will continue to suffer from inadequate clean and safe drinking water supplies. The goal of this subtask is to develop water pricing options for recovery of funding drinking water supply facilities costs which can be adopted and applied on a regional basis. A wide range of funding options, including water pricing techniques, will be evaluated. Interim funding mechanisms that can be utilized until there is an ability and a willingness to collect user charges will also be evaluated. Three activities will be carried out under this subtask:

- 1) In conjunction with local authorities and ministry officials, cost recovery scenarios based on operation and maintenance costs for one of the EPT-enhanced water treatment plants in Uzbekistan will be developed. Cost recovery options will be presented to local government officials and a feasibility analysis of their adoption by the local community will be developed.

- 2) Presentation of cost recovery options developed for the RO plant in Turkmenbashi will be presented to local officials who can affect change and promote adoption of pricing options for long-term financial sustainability of the RO plant.
- 3) Based on the analysis of the financing plan of the RO plant and financing analysis for the selected water treatment facility in Uzbekistan, a financing model for general application will be developed.

Subtask 2D3: Additional Equipment and Supplies. This subtask is a flexible activity in order to provide support and assistance to the ongoing activities in the three countries. It is anticipated that specific assistance in each country is as follows:

Kazakstan. The field work being conducted in the wellfields and at the transfer pumping stations may require unanticipated assistance since there are a number of uncertainties in retrofitting these facilities. In addition, the GOK has been unable to provide the level of assistance anticipated in the Memorandum of Understanding. In addition, the GOK has requested assistance in the provision of materials and the salvaged equipment from the ongoing activities for the completion of the water pumping station serving the city of Novokazalinsk. This activity would provide this additional equipment and materials for completion of this facility by the GOK.

Turkmenistan. The most significant element of this activity is providing for the sustainability of the facilities installed at the Turkmenbashi water treatment facility. While the performance test has been completed, the GOT is responsible for the operation and maintenance of this facility. In addition, the AMEMB/Ashgabat is concerned about the continued support for the operations and maintenance of this facility. Additional training and materials may be required to improve the plant operations.

~~In addition, it is anticipated that during the operation of this facility efforts will be made to reduce the treatment costs of the facility which may require additional equipment. For example, the treated water contains a very low concentration of total dissolved solids which is much lower than the existing or proposed standards. Consideration will be given to the use of disinfected water direct from the wells which may be blended with the treated water to provide a satisfactory finished water at a reduced cost. This may also extend the life of the membranes. The implementation of these alternatives would require additional equipment, such as pumps and piping, which would be provided under this activity.~~

Uzbekistan. The work being conducted at the two water treatment plants and at the storage reservoirs in the cities of Nukus and Urgench includes retrofitting of the existing equipment. Additional materials and equipment may be required to enhance the completion of these activities. For example, assistance may be required to ensure the availability and reliability of chlorine supply to continue the disinfection of the treated water. Also, operator training is dependent on the capabilities of the staff provided by the GOU which may require additional costs for satisfactory training.

2.3 Task 3: Drinking Water Quality Monitoring

[This is a deferred task, but a proposal for its implementation once funding becomes available has been prepared and included in Section 3.]

2.4 Task 4: Data Management

[This is a deferred task, but a proposal for its implementation once funding becomes available has been prepared and included in Section 3.]

2.5 Task 5: Enhancing Professional Capabilities

[This is a deferred task. A scope of work will be proposed later, as the DO 12 program evolves. Activities similar to those envisioned for Task 5 are currently planned under Task 2D.]

2.6 Task 6: Water Management Policies

The overall objective of this task is to draw attention to public policies in Central Asia which can achieve ecological balance and reduce human health risks in the Aral Sea disaster zone. The purpose of the work under this task is to highlight the health, environmental and economic consequences of poorly-planned industrial and agricultural intensification and problems of unrestrained extraction of water from the region's major rivers.

Developing policy briefs will identify key issues and problems, justify need for change, and provide feasible policy recommendations to key stakeholders. In addition, it will recommend strategies for implementation and suggest targets and indicators by which success can be measured. EPT will work closely with CAR collaborators in developing policy issue papers and in discussing findings and recommendations with senior host officials.

*water quality - April '95 info mgt. Feb 95
water quality - Aug. '95 pricing - Nov. 95*

Work under this task builds upon the regional cooperation activities of DO 8. Under DO 8, the EPT Project sponsored four major workshops on water management issues where priorities were identified for further investigation and collaboration. Demonstration projects which investigate management of and solutions for water problems of the Aral Sea basin are underway. Further, the project is providing technical assistance through three U.S.-CAR partnerships in the area of water allocation, decision support and water pricing.

no retreat yet, when?

Under DO 8, the project plans for an applied demonstration project retreat in late July and October 1996 to frame policy issues evolving from project work. Issues identified during this retreat will be further refined between July and September-December for presentation in October-December-January to high-ranking policy officials from the five Central Asian Republics. This executive policy retreat will be the opportunity to clearly delineate consequences of poor management practices, advocate policy reform on issues where a consensus is within reach, and enlist support for further work in changing outmoded policies.

working group - link to Nat'l gov't

support

support

For the work to be carried out under DO 12, Task 6 will support DO 8 efforts outlined above. The project tasks policy analysts in the areas of institutional development, environmental and human health risk characterization, water resources management, and environmental economics to work with project consultants and host country nationals. They will define problems, delineate associated economic costs and present policy solutions which mitigate those costs. Work under this task will generate five policy briefs and a synthesis paper. The policy briefs could include the following topics:

ADP -

Universities / Researchers doing this

Issue Papers

- 1) Regional health impacts of poor water management and use practices in the Aral Sea Basin (ASB).
- 2) Regional environmental impacts of poor water management and use practices in the ASB.
- 3) Economic costs of health and environmental impacts associated with poor water management practices in the ASB.
- 4) Analysis of options for policy change to improve water quality and water supplies.
- 5) Analysis of economically-driven methods of reducing water consumption and improving water quality.

The synthesis paper will summarize providing analysis of a) predominant Aral Sea issues, b) progress made toward resolving regional problems, c) what remains to be done, d) how the EPT-led effort has assisted the CAR in addressing and resolving problems, and e) and recommendations upon which to build future activities.

~~The policy analysts tasked with the health, environment, management and economic policy issue papers will work together as a team. Once identified, this team will work together to determine the best schedule for completing work in preparation for the executive policy retreat. Their roles will be to work with local principals to develop issue papers and develop a strategy for formulating policy changes.~~

As an outcome of recent regional-level meetings sponsored under DO 8, new opportunities for assisting CAR officials with water management agreements have presented themselves. Issue papers will evolve in support of these efforts.

The regional policy coordinator will prepare the synthesis paper based on the work of the policy analysts and the results of the executive retreat. The synthesis paper will serve as the basis for an executive debriefing on EPT policy activities, progress, results, and remaining issues to be held in Washington, D.C., in December 1996.

Section 3 Additional Funding Considerations

3.1 Deferred Tasks

Note: The following task descriptions are preliminary concepts of how these tasks could be implemented should additional funding become available. While the scopes are intended to be roughly achievable within the funding levels and time frames set out in the original DO for these tasks, there are many variables that may affect these estimates, including the outcomes of other tasks they are linked to, and these estimates will need to be revised as part of a formal modification.

3.1.1 Task 3: Drinking Water Quality Monitoring

Subtask 3.1: Regional Strategy for Monitoring Surface Water Quality Crossing International Boundaries. Paragraph 2 of Task 3 refers to water quality monitoring of surface and groundwater supplies to evaluate sources of drinking water with respect to pesticides, fertilizers, and human and industrial wastes. Rather than developing a strategy for monitoring drinking water facilities, suggested in the first paragraph, this section shifts the focus to strategy building upon which to base placement of regional monitoring facilities. This subtask provides technical assistance to the CARs in developing a regional surface water quality monitoring strategy of waters that cross international borders. This strategy will be used for future regional laboratory capacity development prioritizing sample selection sites, monitoring parameters, optimal placement of regional sample collection and facility placement, and identifying equipment needs to support parameters identified for monitoring. In addition, the regional water quality strategy would identify data parameters to be included under Task 4, data management strategy.

Under this task, an expert in the area of water quality monitoring stratentiated which will focus on the short-term monitoring of drinking water quality and subsequent evaluation of the collected data. An assessment of the drinking water standards and the need for additional instrumentation above those provided under DOs 2, 6 and 7 will be examined. An assessment of the sample points and screening parameters will also be done.

Develop Water Sampling and Analysis Plans. A complete sampling andy and prioritize monitoring objectives and develop sampling designs which yield monitoring results useful to water quality managers of Central Asia.

In conjunction with local researchers, the U.S. expert will draft a regional water quality monitoring strategy for Central Asia. Results and recommendations of this strategy will be presented to high-level regional officials perhaps during the USAID/EPT sponsored Executive Policy Retreat for Water Resources Management in Central Asia in the Fall of 1996. Recommendations of policy makers provided during this retreat will be incorporated into the final strategy.

Subtask 3.2: Laboratory Equipment.

Subtask 3.2.1: Additional Equipment. For each laboratory visited, additional reagents and supplies will be recommended. Additionally, equipment and budgetary concerns will be addressed.

Subtask 3.2.2: Regional Laboratory Assessment.

- Uzbekistan – Further assessment and definition of Nukus SES lab's role as regional laboratory will be completed. The Water Quality Data Management Program (WQDMP) will also be initiated during that visit. The instrument certification issue will be pursued with the appropriate Uzbek standards group(s).
- Kazakhstan – Further assessment and definition of Kzyl Orda SES lab's role as regional laboratory will be completed. The WQDMP will also be initiated during that visit. The instrument certification issue will be pursued with the appropriate Kazak standards group(s).
- Turkmenistan – Assessment and definition of the regional laboratory will be made. The groundwork for the WQDMP can also be initiated during that visit. The instrument certification issue will be pursued with the appropriate Turkmen standards group(s).

This task is divided into five subtasks:

- 1) Develop and Implement Water Quality Monitoring Strategy – A strategy will be initiated which will focus on the short-term monitoring of drinking water quality and subsequent evaluation of the collected data. An assessment of the drinking water standards and the need for additional instrumentation above those provided under DOs 2, 6 and 7 will be examined. An assessment of the sample points and screening parameters will also be done.
- 2) Develop Water Sampling and Analysis Plans – A complete sampling and analysis plan will be developed. This will include assessment of present capabilities at the laboratories and need for external laboratories outside the region. The procurement of additional instrumentation will be recommended based on the assessment of DO 12 Subtask 2D3a. Training and inspection of the new instrumentation at the laboratories will be initiated.

A final assessment of the laboratories will be made to ensure that the sample plan, frequency, sample points and analysis of data will impact the drinking water quality. Protocols for sample collection, statistical survey for samples, laboratory quality control, detection limits and methods will be addressed.

- 3) Train Chemists on Analytical Procedures and Protocols – Training for the chem-

ists at the laboratories will be initiated. The staff will be trained on the following: sampling, analysis, laboratory and data management, and quality control.

- 4) Implement Method for Data Acquisition by Primary Groups – A method for accessing the data collected by the laboratories will be examined.
- 5) Final Report – A final assessment of the overall Drinking Water Quality Monitoring task will be performed.

3.1.2 Task 4: Water Quality Data Management System

Background. On August 9, 1995, the World Bank proposed to take a very "grass roots," consensus building approach to designing the data management system, including analysis of data needs, identification of critical data, and cost-benefit analysis of using particular data, as well as establishment of regional data centers, communications and connectivity facilities, and information dissemination systems. Such a project could take several years and a large budget to accomplish. Since that time, however, the World Bank has found that many relevant databases are already being built in the region and that several ongoing bilateral aid projects were funding the needed improvements in telecommunications and data links within the region. Consequently, now the World Bank is also flexible as to what approach is taken to the design.

The World Bank remains very concerned, however, that the environmental ministries and related professional community are included in, or otherwise benefit by, the design effort, since this sector has not been significantly involved to date in the EU TACIS' WARMIS design effort which is more focussed on non-quality water resources parameters.

More recently, however, contacts with the World Bank have revealed that there is renewed interest by the Bank in moving ahead with designing and building a comprehensive environmental data management system. The project would involve using bilateral aid to design the system, or portions of the system, and GEF funds to implement it. The Bank approached USAID and EPT staff at a World Bank-USAID Aral Sea Basin coordination meeting on January 29, 1996, about using the EPT Project to design the data management system.

Scope of Work. Given the Bank's flexibility on the scope of our work and the constraints of the original budget and schedule it will be feasible to design and implement portions of the Bank's proposed data management system as follows:

- 1) Only the water quality portion of the Bank's system would be designed. This would include quality data on surface water and ground water, as well as drinking water. It would not address other environmental parameters, such as air quality or soil contamination. It would also not address water resources parameters other than water quality, since these are being addressed by the EU TACIS' WARMIS.
- 2) Only the drinking water quality portion of the data management system would be implemented (loaded) and that implementation would be on a demonstration basis

for the portions of the region served by the three water quality laboratories established under Task 3.

- 3) A single database component would be developed for the three laboratories, not a different database for each laboratory. The design process would be a top-down approach. An effort will be made to determine the scope, structure, parameters, etc., of existing water quality databases in the region in order to design a regional database sufficiently robust to embrace or harmonize and interact with them. In addition, key members of the region's environmental sector will be kept informed and involved as the system is designed and demonstrated. However, the design process will proceed quickly, without extensive attempts at consensus building, with the results being offered as a model for designing and using other individual databases that could become components of the Bank's comprehensive data management system.

The EPT Project role would therefore be to promote the concept of information sharing, train the regional environmental sector in the database building process, provide guidelines for building the individual component databases consistently, and provide a structure for linking the component databases. Since the various existing database building efforts are moving at very different rates, they can be harmonized only in a piecemeal fashion. Therefore, EPT will harmonize with those efforts that it can, given its limited budget and schedule and provide the training, guidelines and structure for others to use when they come on-line later.

- 4) The design would retain the simplifying assumptions and approaches proposed in the September 27, 1995, draft work plan including use of IBM-compatible machines, Access (can be upgraded to Oracle), data downloadable in ASCII format, and a statistics package.

Approach. A regional technical working group on regional water quality monitoring will be convened. Members will include a subset of the World Bank Program local participants, EPT selected local participants, EPT, WB and EU/TACIS representatives. U.S. technical assistance will be provided and consultants with expertise will be recruited to develop the database design in conjunction with local experts and the working group. The group and consultants will be responsible for:

- 1) Determine the database parameters, structure, etc. based on the regional water quality monitoring strategy and plan to be developed under Task 3. Issues that will need to be resolved include what parameters will be sampled and analyzed for, who will use the data and for what, how will the data be recorded (electronic vs. manual).
- 2) Collect and evaluate information on water quality databases that are existing or under development in the Aral Sea Basin, including the databases being developed under DO 8 partnership and ADP programs, the EU TACIS'

WARMIS, and any other donor or locally funded databases. Identify the universe of data parameters, software and hardware compatibility issues, information sharing and data communication protocol issues, and database building and use training needs.

- 3) Identify and organize a team of three to five local environmental data management specialists to work directly with the EPT team in building the database.
- 4) Prepare a conceptual design of the database.
- 5) Meet with the World Bank and EU TACIS WARMAP staff in Tashkent to coordinate activities and obtain their comments on the conceptual design.
- 6) Revise the conceptual design according to the comments received from the Bank and WARMAP and prepare a beta test level database.
- 7) Beta test the drinking water quality portion of the database by loading data from the three laboratories to be established under Task 3.
- 8) Revise and complete the final database design.
- 9) Train regional environmental sector professionals on use of the completed database using the drinking water component as a demonstration model, as well as on information sharing and data communications protocols.
- 10) Prepare a final report including the overall structure of the database, guidelines on how to build other database components and link them to the World Bank's overall database, information sharing and data communication protocols, and materials for training local professionals on building, linking and using databases.

3.2 Potential Future Funding

3.2.1 Kazakstan Activities

If the estimated costs of future funding in Kazakstan are between \$1.75 and \$2.0 million, the following activities could be considered:

Operation and Maintenance Services. The element would provide assistance to the federal pipeline in the operation of the main transmission system to insure the proper use of the facilities installed as part of this program and improve the efficiency of operations, as well as project USAID investment in these facilities.

Commercialization. The wellfield and pump station improvements will require the consideration of their operation as a private utility to insure the budgetary support for the recurring costs to continue the improved operation of these facilities. This element will introduce the policy concept of water pricing and the resulting financial support for these facilities.

Urban Distribution System. This element would the required improvements to the distribution systems in Aralsk and Novokazalinsk to reduce the leakage and improve the reliability of these systems, as recommended in the Evaluation Report.

Rural Distribution System. This element would address the settlement pump network in the rural distribution system providing an increased reliability and quality of service, as well as increasing the number of beneficiaries.

3.2.2 Turkmenistan Activities

If the estimated costs of future funding are between \$0.8 and \$1.0 million, the following activities could be considered:

Operation and Maintenance Services. The water treatment plant provided as part of this program is relatively difficult to operate and maintain and the additional services will insure the proper operation until the local operators are more confident of their ability to operate and maintain the facility. This will insure the continued operation and protection of this investment by USAID.

Commercialization. The water plant will require budgetary support to continue plant operations even if normal charges are levied. This element will introduce the policy concept of water pricing and the resulting financial support to insure the long term viability of the facilities.

Distribution System. The number of beneficiaries for the facilities provided can be increased with the development with the GOT of a detailed water distribution plan. This may include additional vehicles, and local storage facilities at health centers for a wider distribution of treated water.

Blending Treated Water. The water treated from this facility has very low total dissolved solids (TDS). This element would investigate the option of filtering and disinfecting the raw water from wells to increase the amount of water produced at the plant and extend the life of the membranes, as well as providing a lower unit cost for producing the water.

3.2.3 Uzbekistan Activities

If the estimated costs of future funding for Uzbekistan are between \$0.75 and \$ 1.0 million, the following activities could be considered:

Operational Assistance. The plant operators at the two water treatment plants where equipment provided by the EPT project is being installed will require additional training in the efficient op-

eration of these facilities. This will greatly improve the quality of water produced and maximize the operation of the new equipment provided, as well as protect the USAID investment.

Flow Metering. The installation of water meters will not only assist in the efficient operation of the two water treatment plants and the reservoirs in two cities, but also provide the basis for the commercial operation of these facilities.

Commercialization. The treatment plants will require consideration for the development of the operation as a private utility to insure the budgetary support to continue the improved operation and treatment of these facilities. This element will introduce the policy concept of water pricing and the resulting financial support for the facilities.

3.2.4 Potential Future Funding in Regional Cooperation

The estimated costs are between \$0.75 and \$1.0 million for the following activities:

Partnerships. The present program is developing the partnering arrangement between the local agencies and U.S.-based organizations. These activities are expected to provide dramatic examples of cooperation on critical policy issues. Funding should be provided to continue this cooperation.

Advocacy. The Regional Cooperation Working Committee and the Water Pricing working group have been particularly effective in promoting a forum for dialogue on water management issues. They are currently focusing on technical issues to support policy. Their work could be continued, to advocate policy changes. Continued funding and support are critical to these groups.

Strategic Support. The strategic support in providing training and equipment to help foster regional cooperation on water management issues should be continued. The early efforts of this program are now resulting in significant cooperation and discussion of critical issues that should be continued.

Appendixes

Appendix A
DO 12 Deliverables

(3 pages follow)

**Appendix A:
DO 12 Deliverables
(Due Dates in Appendix D)**

Task	Deliverables Specified
Task 1	Work Plan and Reports
1.A	Draft work plan
1.A	Oral presentation of the draft work plan
1.A	Final work plan
1.A	Revised work plan
1.B	Monthly status reports
1.C	End-of-project report
Task 2.A	Environmental Health and Clean Water: Kazakstan Activities
2.A.1	Report on survey of groundwater resources
2.A.2	Report on rehabilitation plan for well fields
2.A.2	Report on fall 1995 work on the well field rehabilitation pilot program
2.A.2	Report on implementing full rehabilitation plan (including costs)
2.A.2	Report on training for operators of well field
2.A.2	Report on the 1996 well field rehabilitation activities
2.A.3	Report on the design of sanitation program
2.A.3	Report on the implementation of sanitation program (accomplishments)
Task 2.B	Environmental Health and Clean Water: Turkmenistan Activities
2.B.1	Report on options to expand the distribution system for RO plant
2.B.1	Report on the implementation of the expansion of water distribution
2.B.1	Report summarizing the operation of the new distribution system
2.B.2	Report on the inspections of the RO plant - 1st visit
2.B.2	Report on the inspections of the RO plant - 2nd visit
2.B.2	Report on lessons learned on expanded O&M coverage
2.B.3	Report on the design of sanitation program
2.B.3	Report on the implementation of sanitation program (accomplishments)
Task 2.C	Environmental Health and Clean Water: Uzbekistan Activities
2.C.1	Report on the engineering evaluation of the transmission lines
2.C.2	Report on the design of end-of-pipeline chlorination
2.C.2	Report on the training for operators of chlorination equipment
2.C.2	Report on the procurement and installation of chlorination equipment
2.C.3	Report on equipment and expanded operational services
2.C.4	Report on the design of sanitation program
2.C.4	Report on the implementation of sanitation program (Accomplishments)
Task 2.D	Actions in All Three Countries
2.D.1	Report on status of equipment use at each laboratory provided with equipment
2.D.1	Revised laboratory operational manual
2.D.1	Report on the recommendations for additional reagents and equipment

44

**Appendix A:
DO 12 Deliverables
(Due Dates in Appendix D)**

Task	Deliverables Specified
Task 2.D	Actions in All Three Countries (continued)
2.D.1	Training on the use of the additional reagents and equipment
2.D.2	Report on cost recovery at the two water treatment plants in Uzbekistan
2.D.2	Report on cost recovery at the Turkmenistan treatment plant using actual operational data
2.D.2	Report on the development of a generic financing model for general application
2.D.3	Report recommending additional assistance at the wellfields and transmission system in Kazakstan
2.D.3	Report recommending training and materials based on actual GOT experience for improved plant operations in Turkmenistan
2.D.3	Report recommending operational changes and additional equipment for reduced cost of operations in Turkmenistan
2.D.3	Report recommending additional training and materials based on actual GOU experience for improved plant operations in Uzbekistan
Task 6	Water Policy Management Activities
6	Issue Paper No. 1 on priority topic to be determined
6	Issue Paper No. 2 on priority topic to be determined
6	Issue Paper No. 3 on priority topic to be determined
6	Issue Paper No. 4 on priority topic to be determined
6	Issue Paper No. 5 on priority topic to be determined
6	Synthesis Report

45

Appendix B
Summary of DO 12 LOE and Budget

(1 page follows)

**Appendix B:
Summary of DO 12 LOE and Budget**

	<u>Task 1</u>	<u>Task 2</u>	<u>Task 3*</u>	<u>Task 4*</u>	<u>Task 5*</u>	<u>Task 6</u>	<u>Total</u>
USA (days)	157	3,506	262	220	240	489	4,810
CCN (days)	105	8,837	85	200	300	434	9,935
Total (days)	262	12,343	347	420	540	923	14,745
Labor	\$105,927	\$2,638,025	\$190,180	\$130,000	\$150,000	\$326,918	\$3,541,084
Travel	\$4,186	\$650,957	\$60,000	\$35,000	\$145,000	\$148,314	\$1,043,457
Equipment	\$2,283	\$3,554,276	\$250,000	\$60,000	\$30,000	\$32,912	\$3,929,471
ODCs	\$15,417	\$895,026	\$49,820	\$25,000	\$225,000	\$145,725	\$1,355,989
Total	\$127,813	\$7,738,284	\$550,000	\$250,000	\$550,000	\$653,869	\$9,870,000
* Tasks 3, 4 and 5 are deferred in order to cover the \$1.35 million CAR contribution to EPT/Washington Core costs.							
It is anticipated that these funds will be replenished in FY1997 to permit implementation of these tasks.							

47

Appendix C
DO 12 Equipment List

(2 pages follow)

**Appendix C:
DO 12 Equipment List**

Task / Subtask	Equipment Items *	Estimated Cost **
Task 2A: Kazakstan Activities		
2A2. Rehabilitation of Wellfields	Pumps & Motors, Drop Cable, Control Panels, Sand Separators	\$265,000
	Redevelopment Chemicals	\$30,000
	Riser Pump	\$60,000
	Well Screens (Stainless Steel)	\$150,000
	Tremie Pipe	\$9,000
	Telephone	\$10,000
	Miscellaneous Materials	\$20,000
2A3. Sanitation Facilities	Pipes, Fittings	\$80,000
	Educational Materials	\$10,000
2A4. Rehabilitation of Pump Stations	Electrical Equipment at 8 Pump Stations	\$430,000
	Partial Piping	\$195,000
Task 2B: Turkmenistan Activities		
2B1. Expanded Distribution		\$200,000
2B2. Expanded O&M Coverage	Refrigerator	\$2,000
	TV/VCR	\$1,500
	Well & Tank	\$7,000
	Office Furniture	\$2,500
	Bedroom Furniture	\$500
	Dining Room Furniture	\$1,000
	Bathroom Appliances	\$3,500
	Window Repairs	\$1,000
	Air Conditioners	\$1,000
	Flooring	\$1,000
	Wallpaper/Paint	\$1,000
	Lighting	\$1,000
	Office Equipment	\$5,000
	Engineering Equipment	\$10,000
	Other Equipment	\$5,000
2B3. Sanitation Facilities	Pipes, Fittings, Etc.	\$80,000
	Educational Materials	\$10,000

**Appendix C:
DO 12 Equipment List**

Task / Subtask	Equipment Items *	Estimated Cost **
Task 2C: Uzbekistan Activities		
2C1. Transmission System Evaluation	Engineering Computer	\$10,000
2C2. Chlorine Booster System Improvement	Large Booster Chlorine Stations	\$300,000
	Small Booster Chlorine Stations	\$150,000
2C3. Plant Operations Improvements	Aluminum Sulphate	\$198,000
	Chlorine	\$330,000
	Polymer	\$90,000
	Miscellaneous Supplies	\$100,000
2C4. Sanitation Facilities	Pipes, Fittings, Etc.	\$80,000
	Educational Materials	\$10,000
Task 2D: Actions in All 3 Countries		
2D1. Water Quality Lab. Follow-on.		\$70,000
2D2. Economic & Financing Evaluation		\$7,500
2D3. Additional Equipment & Supplies	Wellfield Equipment	\$20,000
	Pump Station Equipment	\$30,000
	Treatment Plant Equipment	\$30,000
	Operations Equipment	\$20,000
	Other Equipment	\$10,000
Task 6: Water Management Policies	Computers and Office Equipment	\$30,000
* Does not include Almaty Engineering Unit or Almaty Regional Office Equipment.		
** Does not include contingency or shipping costs.		

Appendix D
Delivery Order Schedule

(3 pages follow)

**Appendix D:
Delivery Order Schedule**

Target Completion Date	Task	Delivery Order	Task / Subtask
	<u>Kazakstan Activities</u>	7 & 12	
	Wellfields Rehabilitation	12	
2/1/96	Report on Survey of Groundwater Resources	12	2A1
2/15/96	GOK Equipment Review/Coordination Visit	12	2A2
1/31/96	Receive Wellfield Equipment Bid	12	2A2
2/5/96	Bid Evaluation	12	2A2
2/23/96	Procurement Recommendation to USAID	12	2A2
2/28/96	Receive Procurement Approval from USAID	12	2A2
3/6/96	Negotiate Contract / Issue Purchase Order	12	2A2
3/29/96	Report on Proposed Rehabilitation Plan	12	2A2
4/12/96	Pre-Installation Meetings with GOK and USAID	12	2A2
4/29/96	Equipment Fabrication/Assembly	12	2A2
5/8/96	Prepare for Shipment	12	2A2
6/20/96	Surface Shipment	12	2A2
6/25/96	Site Preparation Activities	12	2A2
6/26/96	Customs Clearance/Transport to Site	12	2A2
10/4/96	Equipment Installation Activities	12	2A2
10/18/96	Meetings with GOK and USAID	12	2A2
11/19/96	Draft Report Preparation	12	2A2
12/19/96	Submit Report to USAID/AID Review	12	2A2
12/20/96	Report on Training of Operators of Wellfields	12	2A2
1/8/97	Incorporate USAID Comments	12	2A2
1/30/97	Translate Report into Russian	12	2A2
3/3/97	Submit Report to GOK/GOK Review	12	2A2
3/17/96	Incorporate GOK Comments	12	2A2
3/18/97	Report on Wellfields Rehabilitation Activities	12	2A2
	Pump Stations Rehabilitation		
Aug-95	Report on Implementation Status	7	2B
	Pump Procurement	7	2B
6/30/95	Prepare Pump Technical Specifications	7	2B
8/4/95	Verify Field Information	7	2B
8/31/95	Prepare Pump Bid Documents	7	2B
9/27/95	Pump Bidding Period	7	2B
9/27/95	Pump Bids Due	7	2B
10/9/95	Evaluate/Negotiate Pump Bids	7	2B
10/12/95	Pump Recommendation to USAID	7	2B
10/13/95	Initial Factory Visit	7	2B
10/24/95	USAID Review of Pump Package	7	2B
10/25/95	USAID Pump Approval	7	2B

52

**Appendix D:
Delivery Order Schedule**

Target Completion Date	Task	Delivery Order	Task / Subtask
10/29/95	Survey Team Field Measurements	7	2B
11/29/95	Award Pump Contract	7	2B
3/26/96	Fabricate and Assemble Pumps	7	2B
4/11/96	Final Factory Visit	7	2B
4/16/96	Pump Shipment to Port	7	2B
	Valves & Flow Meter Procurement	7	2B
12/11/95	Prepare Bid Documents	7	2B
1/22/96	Bidding Period	7	2B
1/31/96	Evaluate Bids/Recommend to USAID	7	2B
2/10/96	USAID Approval	7	2B
2/19/96	Negotiate Contract/Award-Butterfly Valve	7	2B
2/19/96	Negotiate Contract/Award-Check Valve	7	2B
2/23/96	Negotiate Contract/Award-Flow Meter	7	2B
4/11/96	Assembly/Fabrication-Check Valve	7	2B
4/14/96	Assembly/Fabrication-Butterfly Valve	7	2B
4/15/96	Assembly/Fabrication-Flow Meter	7	2B
5/2/96	Ready for Shipment-Flow Meter	7	2B
5/3/96	Ready for Shipment-Check Valve	7	2B
5/14/96	Ready for Shipment-Butterfly Valve	7	2B
	Pipe Procurement	7 & 12	2B & 2A4
12/11/95	Prepare Bid Documents	7 & 12	2B & 2A4
1/22/96	Bid Period	7 & 12	2B & 2A4
2/14/96	Evaluate Bids/Recommend to USAID	7 & 12	2B & 2A4
3/1/96	USAID Approval	7 & 12	2B & 2A4
3/13/96	Negotiate Contract/Award-P.S. #4,5,7, Aralsk	7 & 12	2B & 2A4
3/14/96	Negotiate Contract/Award-P.S. #1,2,3	7 & 12	2B & 2A4
5/13/96	Assembly/Fabrication-P.S. #1,2,3	7 & 12	2B & 2A4
5/22/96	Ready for Shipment-P.S. #1,2,3	7 & 12	2B & 2A4
6/11/96	Assembly/Fabrication-P.S. #4,5,7, Aralsk	7 & 12	2B & 2A4
6/12/96	Ready for Shipment-P.S. #4,5,7, Aralsk	7 & 12	2B & 2A4
	Electrical Procurement	12	2A4
12/11/95	Prepare Bid Documents	12	2A4
1/22/96	Bidding Period	12	2A4
2/14/96	Evaluate Bids/Recommend to USAID	12	2A4
3/7/96	USAID Approval	12	2A4
3/11/96	Negotiate Contract/Award-MCC & Transformer	12	2A4
3/14/96	Negotiate Contract/Award-Cable Tray	12	2A4
4/10/96	USAID Approval-Cable	12	2A4
4/15/96	Negotiate Contract/Award-Cable	12	2A4

**Appendix D:
Delivery Order Schedule**

Target Completion Date	Task	Delivery Order	Task / Subtask
4/23/96	Assembly/Fabrication-Cable Tray	12	2A4
4/25/96	Assembly/Fabrication-Cable	12	2A4
4/28/96	Ready for Shipment-Cable Tray	12	2A4
4/30/96	Ready for Shipment-Cable	12	2A4
5/9/96	Assembly/Fabrication-MCC & Transformer	12	2A4
5/10/96	Ready for Shipment-MCC & Transformer	12	2A4
	Miscellaneous Components, Tools & Supplies	7 & 12	2B & 2A4
3/8/96	Construction Planning Meeting	7 & 12	2B & 2A4
4/9/96	Complete List of Miscellaneous Items	7 & 12	2B & 2A4
5/14/96	Purchase Items	7 & 12	2B & 2A4
5/20/96	Miscellaneous Item Shipment to Port	7 & 12	2B & 2A4
	Shipping to Kazakstan	7 & 12	2B & 2A4
6/5/96	Consolidate Shipment	7 & 12	2B & 2A4
6/20/96	Consolidate 2nd Shipment	7 & 12	2B & 2A4
7/31/96	Surface Shipment to Aralsk-P.S.#1,2,3	7 & 12	2B & 2A4
8/8/96	Customs Clearance/Delivery-P.S. #1,2,3	7 & 12	2B & 2A4
8/15/96	Surface Shipment to Aralsk-P.S. #4,5,7,Aralsk	7 & 12	2B & 2A4
8/23/96	Customs Clearance/Delivery-P.S. #4,5,7,Aralsk	7 & 12	2B & 2A4
	Construction Activities in Kazakstan	7 & 12	2B & 2A4
9/11/96	Team A - Installation & Training at P.S. #1	7 & 12	2B & 2A4
9/11/96	Team B - Installation & Training at P.S. #2	7 & 12	2B & 2A4
9/25/96	Team B - City of Aralsk Settlement Pumps	7 & 12	2B & 2A4
10/15/96	Team A - Installation & Training at P.S. #3	7 & 12	2B & 2A4
10/23/96	Team B - Installation & Training at P.S. #4	7 & 12	2B & 2A4
11/12/96	Team A - Installation & Training at P.S. #5	7 & 12	2B & 2A4
11/20/96	Team B - Installation & Training at P.S. #7	7 & 12	2B & 2A4
12/20/96	Report on Pump Stations Rehabilitation	7 & 12	2B & 2A4
	Turkmenistan Activities		
1/10/96	Engineering Report		
2/12/96	Complete RO Plant Construction		
2/19/96	Complete Performance Test		
2/21/96	Negotiate O&M Contract with GOT		
2/21/96	Turn over Plant to GOT		
2/29/96	Plant Operated by EPT		
3/29/96	Prepare Final Designs		
4/10/96	Conduct Follow-up Visit to Health Demo. Sites		

54

**Appendix D:
Delivery Order Schedule**

Target Completion Date	Task	Delivery Order	Task / Subtask
6/3/96	Conclude Public Health Training in Tashkent		
7/10/96	Deliver Equipment and Materials to Health Demo. Sites		
7/15/96	Delivery of Waste Distribution Equipment		
7/19/96	Mid-way Report on RO Plant		
7/25/96	Final Report on Water Distribution		
8/10/96	Conduct 2nd Follow-up Visit to Health Demo. Sites		
12/27/96	Final Report on Sanitation Improvements		
12/27/96	Lessons Learned Report on RO Plant		
12/30/96	Construct Sanitation Projects		
	Uzbekistan Activities	6 and 12	
8/24/95	Install Plant Chlorination Systems	6	1
8/28/95	Perform Follow-up Laboratory Training	6	1
9/14/95	Design Evaporator System	6	1
2/22/96	Design Coagulant System Improvements	6	1
3/11/96	Train Filter System Operators	6	1
3/21/96	Order & Ship Filter Control Equipment	6	1
5/2/96	Install Plant Filter Control Systems	6	1
5/4/96	Turnover Filter Control O&M Manuals	6	1
8/30/96	Order & Ship Clarification Equipment	6	1
9/20/96	Install Plant Clarification Systems	6	1
9/23/96	Turnover Clarification O&M Manuals	6	1
9/27/96	Train Clarification System Operators	6	1
10/16/96	Turnover Evaporator O&M Manuals	6	1
10/19/96	Design Filter System Improvements	6	1
10/22/96	Order & Ship Evaporator Equipment	6	1
12/17/96	Install Plant Evaporator Systems	6	1
12/24/96	Train Evaporator System Operators	6	1
8/14/95	Deliver Training Reagents	6	2
5/30/96	Deliver Lab Equipment	6	2
6/27/96	Perform Lab Equipment Training	6	2
10/23/96	Deliver Lab Equipment O&M Manuals	6	2
4/25/96	Develop Transmission System Project Approach	12	2C1
8/20/96	Prepare Transmission System Study	12	2C1
10/1/96	Report: Transmission System Evaluation	12	2C1
2/2/96	Report: Booster Chlorine Concept Design	12	2C2
7/11/96	Order & Ship Booster Chlorine Systems	12	2C2
7/19/96	Turnover Booster Chlorination O&M Manuals	12	2C2
10/3/96	Install Booster Chlorination Systems	12	2C2

55

**Appendix D:
Delivery Order Schedule**

Target Completion Date	Task	Delivery Order	Task / Subtask
10/10/96	Train Booster Chlorine System Operators	12	2C2
11/22/96	Report: Booster Chlorine System Installation	12	2C2
12/1/96	Report: Booster Chlorine System Training	12	2C2
12/14/96	Design Chlorine Booster System Improvements	12	2C2
4/4/96	Develop Operator Training Program	12	2C3
9/6/96	Develop Operator Assistance Plan	12	2C3
9/13/96	Conduct On-site Operator Training	12	2C3
9/20/96	Develop Plant Operating Plan	12	2C3
11/1/96	Provide Operations Assistance	12	2C3
12/20/96	Operations Assistance Follow-up No. 1	12	2C3
1/1/97	Report: Expanded Operational Services	12	2C3
4/25/97	Operations Assistance Follow-up No. 2	12	2C3
4/15/96	Conduct 1st Health Demonstration Site Visits	12	2C4
5/30/96	Report: Design of Sanitation Program	12	2C4
7/15/96	Deliver Health Demonstration Equipment	12	2C4
8/15/96	Conduct 2nd Health Demonstration Site Visits	12	2C4
10/1/96	Report: Sanitation Program Implementation	12	2C4
	Activities in All Three Countries	12	2D
4/15/96	Report on status of equipment use at each laboratory provided with equipment	12	2.D.1
4/15/96	Revised laboratory operational manual	12	2.D.1
5/10/96	Report on the recommendations for additional reagents and equipment	12	2.D.1
9/20/96	Training on the use of the additional reagents and equipment	12	2.D.1
4/30/96	Report on cost recovery at the Turkmenistan treatment plant using actual operational data	12	2.D.2
9/10/96	Report on cost recovery at the two water treatment plants in Uzbekistan	12	2.D.2
11/5/96	Report on the development of a generic financing model for general application	12	2.D.2
7/10/96	Report recommending training and materials based on actual GOT experience for improved plant operations in Turkmenistan	12	2.D.3
8/1/96	Report recommending additional assistance at the wellfields and transmission system in Kazakstan	12	2.D.3
9/20/96	Report recommending operational changes and additional equipment for reduced cost of operations in Turkmenistan	12	2.D.3
10/26/96	Report recommending additional training and materials for improved plant operations in Uzbekistan	12	2.D.3

**Appendix D:
Delivery Order Schedule**

Target Completion Date	Task	Delivery Order	Task / Subtask
	Water Policy Management Activities	12	6
3/31/97	Issue Paper No. 1	12	6
3/31/97	Issue Paper No. 2	12	6
3/31/97	Issue Paper No. 3	12	6
3/31/97	Issue Paper No. 4	12	6
3/31/97	Issue Paper No. 5	12	6
3/31/97	Synthesis Report	12	6

59

Appendix E
Responses to USAID's May 1996 Comments
on EPT's March 1996 DO 12 Draft Work Plan

(6 pages follow)

Appendix E

**Responses to USAID's May 1996 Comments
on EPT's March 1996 DO 12 Draft Work Plan**

Revised July 25, 1996

Comment 1. The Work Plan indicates that additional work is being done by CH2 (and the Mission) in identifying the appropriate strategic objective for the project. The latest draft ENI Strategic Framework (February 8, 1996) now uses the term "social stabilization," which includes:

- Objective 3.1: Reduce human suffering and crisis impact
- Objective 3.2: Improve sustainability of social benefits and services
- Objective 3.3: Reduced environmental risk to public health

It would appear that objective 3.2 most closely mirrors the Aral Sea/DO 12 work. The impact indicators and targets proposed for task 2 under Section 1.2.3 of the Work Plan requires epidemiological information, including baseline information, which may not be available or appropriate given that the focus of this project is the reliable delivery of safe water. Task 6 needs specific policies as targets and something more substantive as an indicator of success.

Response to 1. ~~USAID-Almaty is expected issue targets and indicators for EPT work in CAR in the very near future. When these have been provided to us by USAID-Almaty, we will address them in a single table for all EPT activities in CAR that will be organized by country/region and DO/task. New Table 1-1 has been added to Section 1.2.3 of the work plan listing relevant targets and indicators from "Central Asia: Results Review and Resource Request (R4) (Overview and Introductory Document).~~

Comment 2. Table 1-1 is helpful in understanding where there is a potential overlap between delivery orders for a specific task. However, the table does not provide an adequate understanding of where a task under a previous DO left off and this DO 12 task picks up. A one paragraph description of the prerequisite task to each DO 12 task described in section 2 would be very useful.

Response to 2. Table 1-1 has been revised (and renumbered as Table 1-1a) to show whether and how each DO 12 task and subtask relates to any precursor tasks or subtasks under DOs 2, 6 and 7.

Comment 3. Page 1-3 reference to DO 7 under Subtask 2B needs to be revised to refer to DO 2.

Response to 3. The text of the work plan ~~will be~~ has been revised to refer to DO 2 instead of DO 7.

Comment 4. There is a bit of inconsistency regarding the discussions about the World Bank and tasks 3 and 4. On page 1-8 regarding elimination of these tasks, the text implies that the Bank is interested in undertaking some of this work. On pages 3-1 and 3-4 there is discussion of what tasks 3 and 4 would entail and indicates that the Bank is specifically interested in us doing this work. Does the Bank have expectations of us regarding the laboratory activity and if so, can we generally meet those expectations in the context of the task 2 laboratory activities?

Response to 4. The World Bank has expressed interest in developing a water quality monitoring program and environmental MIS/database for the Aral Sea Basin, however they lack funding and are open to USAID taking on that portion of their program in cooperation with the Bank. As far as we know, the Bank does not have specific expectations of USAID regarding laboratory activity. The laboratory activity associated with Task 2 relates only to existing laboratories that directly serve the drinking water treatment facilities that we are providing engineering services to; Subtask 2D1 has been revised to clarify which laboratories are being assisted.

Comment 5. Rather than characterize tasks 3, 4 and 5 as being deferred until FY97 funding, these tasks need to be eliminated entirely from the Work Plan document. There is absolutely no basis of anticipating FY97 funding for these activities. A new delivery order should be issued if new funding becomes available.

Response to 5. In a meeting with USAID-Washington on March 28, we learned that FY97 funding for Tasks 3, 4 and 5 may still be found.

Comment 6. The Work Plan should identify the specific host country agents that the project is working with. (Section 1.4.2)

Response to 6. ~~An appendix Section 1.4.2 has been added to the work plan revised to include a~~ listing of the specific host country agents we are working with on each DO 12 task and subtask.

Comment 7. Section 1.4.5 on page 1-12 discusses policy impacts of the DO 12 tasks. The discussion implies that a number of policy issues will be identified and some level of action taken with regard to water distribution, operations and maintenance (including financial aspects), public health and sanitation, and laboratory services. However, the language is soft on specific actions and the lack of reference of policy impacts in Section 1.2.3 suggests that a very limited effort is being made to undertake policy change. The discussion should propose specific steps to be taken to implement the "policy dimension" of task 2 and properly focus those in task 6.

Response to 7. We are presently discussing with USAID a comprehensive process for identifying, prioritizing, and analyzing sustainability issues relating to the various engineering, construction, health, sanitation and laboratory activities to be conducted under DO 12. The process will also provide for design and promotion (of adoption and implementation) of policy and other types of interventions to address the highest priority issues. Once this scope change and approach has been approved by USAID, this work plan will be revised to reflect it.

Comment 8. What is the basis of the selection of the five issues papers proposed for task 6 (page 1-12)?

Response to 8. ~~The first three issue papers address the full range of health, environmental and related economic issues surrounding regional water policy cooperation. The fourth paper identifies and analyzes the policy options for addressing the issues identified in the first three papers. The fifth issue paper is a synthesis paper that summarizes all four preceding papers in the context of USAID's Aral Sea Basin program. As an outcome of recent regional level meetings sponsored under DO 8, new opportunities for assisting CAR officials with water management agreements have presented themselves. Issue papers will evolve in support of these efforts. The work plan has been revised to indicate that the issue paper topics will be determined later.~~

Comment 9. What kind of contingency has been devised regarding the construction projects if the host country counterparts are unable or unwilling to provide the in-kind contributions for which they committed?

Response to 9. We have had several planning and implementation review meetings with GOT, GOU and GOK agencies at the federal and local level in the past and we intend to do the same as the project progresses. This is done to ensure that CAR government commitments are carried out to avoid any delay in project implementation. The DO budgets do not include any contingencies to allow for subcontracting of services that these governments would otherwise have provided. In case they do not keep their commitments, USAID will be informed immediately to take appropriate action.

Comment 10. How will the ground water survey report of Subtask 2.A.1 be used (page 2-11)?

Response to 10. The groundwater survey and hydrogeologic characterization report will be used to determine which wells to rehabilitate, what their yield and service life will be, and what size and capacity the pumps and motors should be. It will also be used by the GOK for future water supply planning activities.

Comment 11. Are there any activities proposed for involving the well field operators and engineering support in Subtask 2.A.2 improvements (page 2-2)?

Response to 11. Yes, all of the wellfield operators will be involved in the construction and rehabilitation, which serves as on-the-job training, as well as in the formal training.

Comment 12. What is included in the reference to solid waste in the third paragraph of page 2-3?

Response to 12. The solid waste from cleaning out the privies and septic tanks.

Comment 13. What contributions by CH2 will be made to the CDC study referenced under Subtask 2.A.3? (Page 2-4). When is the CDC report expected to be completed? How will CH2 use the CDC report to better focus it's activities? How much will any of this information be applicable outside of Uzbekistan (why is this activity listed under Kazakstan)?

Response to 13. EPT will work jointly with CDC to conduct a health evaluation in Uzbekistan relative to water supply related diseases. The study will help answer the question of the relative contributions of the Aral Sea crisis and generally poor public health and sanitation practices to the observed health problems in the region. Uzbekistan was chosen for the study because it has some of the worst health problems and EPT has had good success there with both engineering and health activities. The lessons learned as a result of the Uzbekistan study will be applied throughout the region. EPT's contributions will include technical support (e.g., assistance to laboratories) and logistical support (e.g., provision of interpreters). The study will begin in early June and the report is expected to be completed by late August. The study will leverage World Bank work, provide input to CDC's fall training program, and show good collaboration among US implementors in Central Asia.

Comment 14. How does "work with" health officials on policy translate into specific actions (Section 2.A.3 on page 2-5 and inferred as applicable under 2.B.3 and 2.C.4)?

Response to 14. EPT's work with local health officials in Kazakstan has already borne specific actions, including providing the impetus for a national level health seminar in Kazakstan and state-level health programs in Turkmenistan.

Comment 15. Did CH2 look at any other alternative than give them a year's free operation of the Turkmenistan and Uzbek facilities? Does this significantly impact the ability to deliver critically needed spare parts for the RO system? Are there any cost share options whereby an operations fund might be established with some portion of the first years cost be set aside for future operations? (2.B.2 and 2.C.3.)

Response to 15. In Turkmenistan, there were two problems to overcome. First, the GOT staff working with us are already not being paid by the GOT and there was little likelihood they would be paid in the coming year. Second, the O&M training being conducted to date had not been sufficiently effective due to erratic attendance of the trainees and other reasons and the GOT representative refused to take over the plant unless EPT staff were there with them for the first year. EPT then evaluated whether there was any other group prepared to take over O&M of the plant and determined there was none. Therefore, even if there had been sufficient pay, at least at this point in time there appeared to be no other options. An approach to studying longer term options for financing the RO plant (beginning a year from now) are currently being discussed with USAID. In Uzbekistan, 2 weeks of intensive O&M training will be followed by 6 weeks of O&M assistance. In addition, recent developments in institutional arrangements in Uzbekistan should facilitate payment of O&M staff and procurement and delivery of the necessary spare parts and supplies.

Comment 16. Subtask 2.D.2 focuses on "cost recovery" options. The activity should focus on supporting the costs of operation of safe drinking water systems and examine various alternatives for funding those costs. Interim funding mechanisms will need to be established until there is an ability to willingness) to apply and collect appropriate user charges.

Response to 16. Task 2D2 will examine a wide range of funding options for operation and maintenance of the drinking water facilities for which we provided engineering support. The options will be evaluated relative to timing of application, beginning with the conclusion of EPT support of O&M and extending through the design life of the facility.

Comment 17. The text of Task 6 in the delivery order calls upon the contractor to conduct policy analysis and requires the contractor to engage in a dialogue with host country counterparts and other international organizations and implementors about the policy needs of the CAR republics. It is not evident from the discussion in the DO 12 Work Plan or other discussion in documents relating to DO 8 how much of this kind of analysis has taken place and how much is projected for the future. The issue paper activities of DO 12 appear to be an extension of activities already being undertaken in DO 8 and are very passive in nature.

Response to 17. The process of engaging in dialogue with host country counterparts, et al., and conducting policy analysis was begun under DO 8 with the series of workshops and the working committee. The outcomes of these DO 8 efforts will be crystallized in the Applied Demonstration Project Retreat and Executive Policy Retreat. ~~The two retreats, which are funded under DO 8, are the more active activities with respect to policy analysis and intervention design. As described in Task 6 of the DO 12 work plan, an outcome of recent regional-level meetings sponsored under DO 8 are new opportunities for assisting CAR officials with water management agreements. Issue papers will evolve in support of these efforts. The work plan has been revised to indicate that the issue paper topics will be determined later.~~

Comment 18. Appendix A. List of Major Deliverables. Target dates for the deliverables should be included on this table (Appendix D uses different labels for the schedule items). In addition, the list of deliverables should identify if a deliverable is a required element of another DO as well as DO 12. Finally, critical deliverables from other DOs might be included on the chart for informational purposes.

Response to 18. Appendix A, List of Major Deliverables, has been revised to include target submission dates match the official "EPT Deliverables" list which is based on Attachment A of the original delivery order. ~~The critical precursor deliverables from DOs 2, 6 and 7 have also been included in the list. The same deliverables and their due dates appear in bold in Appendix D, Schedule. The schedule lists all major DO 12 project activities and milestones, in addition to the deliverables listed in Appendix A. The schedule also shows some of the major activities and milestones for DOs 2, 6, and 7 (for Turkmenistan, Uzbekistan, and Kazakstan activities, respectively) where that information may help clarify the relationship of those activities and milestones to similar ones proposed under Subtasks 2B, 2C, and 2A, respectively, of DO 12. The approved~~

work plans for DOs 2, 6, and 7 clearly indicate the deliverables required under those DOs. Once the formal modifications are approved for DOs 2, 6 and 7, there will be no deliverables that we are aware of that are required under both DO 12 and some other. At present, there should be no deliverables that are required under both DO 12 and DOs 2, 6, or 7.

Comment 19. Appendix C, Equipment List. Why is the equipment component for well screens so high? Why is there \$130,000 for sanitation pipes and fittings for Turkmenistan and only \$80,000 each identified for Kazakstan and Uzbekistan? Why are we purchasing \$330,000 of chlorine for the Uzbekistan treatment plant if they have continuously been supply chlorine to the facility and as of March 8th, we had never verified the feed rate that they were using? (Comments by Randy Hoffman at USAID briefing). Why are 4 printers needed for the two computers identified in task 6. What kind of software is proposed?

Response to 19. The well screens are made of stainless steel and are therefore very expensive. The Turkmenistan sanitation project is a much larger project than those for Kazakstan and Uzbekistan. As indicated in Randy Hoffman's memo of March 27, due to development of a new institutional structure for the interregional drinking water supply systems in Uzbekistan has resulted in the allocation of adequate funding for GOU purchase of chemicals. Therefore, the money budgeted for chemical purchase under Task 2C3 can be reallocated and discussions are under way to determine where those funds should be redirected to. Once this scope change is approved by USAID, the work plan will be revised to reflect it. There currently is no specific proposal for procuring software under Task 6; however, it is anticipated that standard software packages will be similar to those provided under DO 8, including word processing, spreadsheet and database programs.

Comment 20. Appendix D, Schedule. It would be very helpful if the construction schedules used for DO 2, 6, and 7 were presented here with the identification of the DO 12 tasks in context with the rest of the project. In addition, such a schedule might identify points of opportunity to begin policy intervention work.

Response to 20. Appendix D of the work plan will be revised to include the construction schedules of DOs 2, 6 and 7 and show how they transition into DO 12 construction activities. See Response 18 above. In addition, formal Gantt charts for engineering and construction activities under DOs 2, 6, 7, and 12 will be presented to USAID upon request.