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EVALUATION

Mid-Term Evaluation of the Water Reuse and Environmental Conservation (WREC) Project

[December 2013]

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MID-TERM EVALUATION OF THE WATER REUSE AND ENVIRONMENTAL CONSERVATION (WREC) PROJECT

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DISCLAIMER

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ACRONYMS

ACI	Amman Chamber of Industry
ADC	Aqaba Development Company
ASEZA	Aqaba Special Economic Zone Authority
AWC	Aqaba Water Company
BMEP	Best Management Environmental Practice
BPEM	Best Practice Environmental Management
CBIWDM	Community Based Initiative for Water Demand Management
CMC	Construction Management Consultant
CSP	USAID Civil Society Project
DEC	Development Experience Clearinghouse
DFZC	Development and Free Zones Commission
ECD	Environment Compliance Database
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMS	Environmental Management System
EPL	Environmental Protection Law
ERC	Environmental Research Center
EU	European Union
GAM	Greater Amman Municipality
GIS	Geographic Information System
GoJ	Government of Jordan
HFDB	Hashemite Fund for the Development of Jordan Badia
HR	Human Resources
ICC	Industrial Chemistry Center
IDARA	USAID Water Management Project
IEC	International Electrotechnical Commission
IKC	Industrial Knowledge Center
IQC	Indefinite Quantity Contract
IR	Intermediate Results
ISO	International Organization for Standardization
ISSP	USAID Institutional Support and Strengthening Program
IT	Information Technology
IWRM	Integrated Water Resources Management Plan
IWTP	Industrial Wastewater Treatment Plant
IWW	Industrial Wastewater
IWWTP	Industrial Wastewater Treatment Plant
JAS	Jordanian Accreditation Society
JCI	Jordan Chamber of Industry
JD	Jordanian Dinar
JEDCO	Jordan Enterprise Development Corporation
JIEC	Jordan Industrial Estates Corporation
JoDRA	Jordan Desalination and Reuse Association
JSMO	Jordan Standards and Meteorological Organization
JUMP	Jordan Upgrading and Modernization Program

JVA	Jordan Valley Authority
KACE	King Abdullah II Center for Excellence
MBO	Management by Objective
MCC/MCA	Millennium Challenge Corporation/Millennium Challenge Account
ME&A	Mendez England & Associates
MoA	Ministry of Agriculture
MoEnv	Ministry of Environment
MoH	Ministry of Health
MoIT	Ministry of Industry and Trade
MOU	Memorandum of Understanding
MSW	Municipal Solid Waste
MU	Measurement Uncertainty
MWI	Ministry of Water and Irrigation
NCARE	National Center for Agricultural Research and Extension
Network	The Network for Jordanian Industrial Sustainability
NGO	Non-Governmental Organization
O&M	Operation and Management
P2	Pollution Prevention
PAP	USAID Public Action in Water, Energy, and Environment Project
PFC-DSEER	Prince Faisal Centre for the Dead Sea, Environmental and Energy Research
RFP	Request for Proposal
PMP	Performance Monitoring Plan
QA/QC	Quality Assurance/Quality Control
QIZ	Qualified Industrial Zone
RIAL	USAID Reuse for Industry, Agriculture, and Landscaping Project
RKC	Reuse Knowledge Center
RSS	Royal Scientific Society
SABEQ	USAID Jordan Economic Development Project
SEMP	Strategic Environmental Management Plan
SME	Small or Medium Enterprise
SO	Strategic Objective
SOP	Standard Operating Procedures
SOW	Scope of Work
USAID	United States Agency for International Development
USEPA	United States Environmental Protection Agency
WAJ	Water Authority of Jordan
WEARRC	Water, Environment, and Arid Regions Research Centre
WEEC	Water, Energy and Environment Center
WRE	Water Resources and Environment Office
WREC	Water Reuse and Environmental Conservation Program
WWTP	Wastewater Treatment Plant
ZCI	Zarqa Chamber of Industry

EXECUTIVE SUMMARY

EVALUATION PURPOSE

This is an independent external evaluation report of the Water Reuse and Environmental Conservation (WREC) project funded by the United States Agency for International Development (USAID) Mission in Jordan. The WREC project started on August 1, 2010 and will end on July 30, 2015. The project is being implemented by AECOM.

The evaluation of WREC was conducted during the period of October – November 2013, by a team of experts assembled by Mendez England & Associates (ME&A), located in Bethesda, Maryland. The team comprised one international and two Jordanian experts.

The main objective of the evaluation was to assess the performance of WREC, identify its successes and weaknesses, and make recommendations on successful project implementation strategies and approaches that could be replicated/utilized by USAID/Jordan in future programs, especially as related to the water sector.

PROJECT BACKGROUND

Water reuse and reduction of industrial pollution have the potential to enhance efficiencies, reduce water and energy consumption, and facilitate the advancement of best industrial environmental management practices, resulting in a better environment for Jordanians and efficient use of water and energy resources, and laying a solid foundation for the industrial sector and economic growth.

Previous USAID projects, such as the Reuse for Industry, Agriculture and Landscaping (RIAL) and the Manifest projects, worked to position Jordan as a recognized leader in water reuse and pollution prevention. Additionally, USAID aimed to promote a green, eco-efficient economy for sustainable industry in Jordan. These objectives resulted in the development of WREC, an efficiency project for both water and energy usage, that supports expanded industrial wastewater treatment and monitoring programs intended to foster better practices across the most important sector in Jordan's economy.

The purpose of the WREC project is to help ensure that Jordan's water and wastewater sectors are operating to minimize resource usage and maximize reuse and recycling potentials. The project provides capacity building, technical assistance, and training to support key institutions, such as the Ministry of Environment (MoEnv) and national laboratories for improved environmental analysis and governance; engineering feasibility studies for industrial waste management, hazardous site remediation, and landfill rehabilitation; industrial wastewater treatment system designs; reclaimed water reuse pilot projects; and other pollution prevention initiatives. WREC is unusual since USAID has the MoEnv as its Government of Jordan (GoJ) implementation partner. This was partly due to capacity building needed at the Ministry but also due to industrial monitoring and site remediation tasks that fall under MoEnv's responsibilities.

WREC has four major tasks:

Task 1: Institutional and Regulatory Strengthening
Task 2: Pollution Prevention and Industrial Waste Management
Task 3: Disposal Site Rehabilitation and Feasibility Studies
Task 4: Water Reuse for Community Livelihood Enhancement

EVALUATION QUESTIONS, METHODS AND LIMITATIONS

Per the Scope of Work (SOW), the main evaluation questions include:

1. What have been the achievements of the WREC project? What is the success of the various tasks and sub-tasks implemented by WREC? What worked, what did not work and why? Which tasks are fully instituted and which are critical and require further investment?
2. Did the project's strategy enhance or weaken achievement of the anticipated tasks? Did the project's management approach enhance or weaken achievement of the anticipated tasks? Did the project's implementation approach enhance or weaken achievement of the anticipated tasks? Define the approaches – from strategy, management and implementation – that enhanced the project and identify the ones that can be replicated in the future. Also, identify lessons learned that weakened the program and how these can be alleviated in future programs.
3. Determine the level of satisfaction of the counterpart institutions and the stakeholders with the program. Specify what satisfied them and what did not and why.
4. Are the processes, innovations, institutions, partnerships, and linkages introduced sustainable?

Evaluation Methodology

The evaluation of WREC was conducted over two phases. Phase I consisted of an in-depth review of key documents, reports, and data related to the program activities, including annual work plans, progress reports, monitoring and evaluation reports, and deliverables. Data collected during Phase I formed the basis for the development of detailed evaluation questions and tools, which were used by the Evaluation Team to conduct key informant interviews and focus group discussions.

Phase 2 comprised the field component of the evaluation. The purpose was to collect data and information from key stakeholders and beneficiaries and visit a range of locations to get an overview of water sector activities throughout Jordan.

The evaluation team collected both qualitative and quantitative data to assess program performance and achievements. However, given the nature of the project, the information collected was mainly qualitative.

The team's approach was to identify, locate, and meet with a representative segment of stakeholders and beneficiaries with direct or indirect knowledge and experience of the project throughout its lifetime (see Annex 4 for a list of interviewees). There was less concern here as to whether or not a particular action has been implemented (verifiable or not from WREC's records) than whether the results of that action meet the needs and aspirations of the intended recipients and national conservation efforts.

Data was collected from the following sources of evidence:

- **Critical Desktop Review of Materials** related to WREC such as the SOW, work plans, quarterly reports, surveys, mid-term review reports, WREC progress reports, annual work plans, annual training plans, baseline assessment, action plans, project modifications, etc. (The full list of reviewed documents can be found in Annex 5).
- **Secondary Data** from reports such as Eco-efficiency of the Industrial Sector in Jordan published by GIZ, and Al Akeder Feasibility Study published by KfW.
- **Direct Observations from the Field Visits** to the covered sites such as Wadi Musa reuse pilot, industrial estates or zones, factories, Russeifa Remediation sites, Aqaba Landfill, etc.
- **Key Informant Interviews,** including open-ended and semi-structured interviews with USAID staff and WREC implementers, program beneficiaries and stakeholders, MoEnv, Ministry of Water and Irrigation (MWI), Jordan Industrial Estates Corporation, Amman Chamber of

Industry (ACI), Zarqa Chamber of Industry (ZCI), Aqaba Special Economic Zone Authority (ASEZA), Aqaba Development Company (ADC), Aqaba Water Company (AWC), etc. (See Annex 4 for a full list).
- **Project Outputs** against objectives and performance indicators.
- **Focus Group Discussions** with 20 grantees and sub-grantees.

Quantitative data was sourced from WREC annual work plans, performance management plans (PMPs), and other project-related periodic reports.

Limitations

1. Given the recent contract modification in June 2013 and the fact that the modified SOW of the project has changed from the original, the Evaluation Team will comment on the achievements, Intermediate Results (IRs), and indicator targets of the first three years, as per the SOW. Recommendations on any new tasks starting on June 2013 will be limited.

2. Given that environmental degradation is a very sensitive and political issue in Jordan, cultural norms may have prohibited some respondents from speaking candidly.

3. GoJ's review and acceptance of feasibility studies and technical reports may be cursory and/or limited to MoEnv staff only, instead of the final end-users. This has been especially true for site remediation that should fall under the authority of individual municipalities. Municipalities and the Ministry of Municipalities have been uninvolved in technical reviews.

FINDINGS, CONCLUSIONS, RECOMMENDATIONS AND KEY LESSONS

Findings

Task 1 – Institutional and Regulatory Strengthening

Enhanced regulatory capacity is completed and the MoEnv now recognizes its deficiencies and is improving its regulatory management. This is an improvement over its previous inability to manage the Environmental Impact Assessment (EIA) process, licensing and monitoring. This task was primarily focused on EIA guidelines and processes along with issuing licenses. Consensus has been reached on a long-term action plan for training and institutional strengthening. Training across directorates and technical levels was comprehensive and policy guidelines were revised and adopted. Stakeholder complaints were addressed by improving guidance, decision logs, member qualifications, and appeals procedures for licensing. EIAs were improved to cover approval requirements, inspection of new facilities, EIA licenses, information availability, membership qualifications, appeals, and staffing requirements. Overall, the MoEnv was pleased with the training provided by WREC and the end results.

Independent water laboratories were needed to provide quality control for MWI and Ministry of Health (MoH) laboratories in addition to the Royal Scientific Society (RSS), which was the MoEnv's primary laboratory. WREC located three interested university laboratories and performed training and capacity building exercises to enable them to undergo future International Organization for Standardization (ISO). Laboratory capacity building was satisfactorily completed.

Network (an industrial information website) was established to stakeholders' satisfaction. WREC established a community of experts comprised of the MoEnv, JCI, Development and Free Zones Commission (DFZC), Jordan Standards and Meteorological Organization (JSMO) and RSS to cooperatively manage the Network. The community of experts is proactively adding meetings, events, and resources to the website, indicating good prospects for future collaboration. RSS has agreed to

host the site permanently and will sign a memorandum of understanding (MOU) to formalize the agreement in December 2013.

An industry environmental recognition award is to be awarded along with other awards as part of the King Abdullah Center for Excellence annual process. Columbia University will train MoEnv staff to support the selection and award processes. There are high levels of sustainability for work with the laboratories, Network, and award.

Although the reporting database for industrial discharge monitoring has just begun at the MoEnv, its reporting strategy, management, and implementation is poor. Furthermore, the database's sustainability is uncertain, as the MoEnv has not shown interest in using or maintaining it to date. This activity has failed to show progress over the last three years.

Task 2 – Pollution Prevention and Industrial Waste Management

A comprehensive survey on Jordanian industries is completed and, while industries remained anonymous in the report, its results were helpful to stakeholders. Following completion of the survey, 150 priority industries were selected and trained on environmental management system/pollution prevention (EMS/P2) principles and of those, 32 out of a target of 40, signed MOUs and underwent detailed assessments for EMS/P2 improvements to their existing operations. The Evaluation Team visited one satisfied industry that had implemented the necessary plant renovations and was awaiting a final operations assessment. The sustainability of this program is dependent upon demand, financing, and a facilitator to assist the various industries. DFZC, the proposed facilitator organization, is currently unable to handle its responsibilities for the role.

WREC's contract called for three industrial wastewater treatment plant (WWTP) designs. At the time of this evaluation, one industrial wastewater treatment plant (IWWTP) had been designed, a second IWWTP feasibility study was completed, and the third IWWTP had been canceled. The Sahab and Zarqa Industrial Zones considered costs to be too high to construct their plants and mentioned that forward momentum was dependent on grant money being made available. Aqaba had previous integrated water resources management (IWRM) studies for reference, and Sahab's report was requested by DFZC. MoEnv's industry monitoring training program is completed but enforcement has not made significant progress. Royal Rangers had been envisioned as a strong enforcement partners but all parties now believe that theirs is not a workable partnership. GoJ and MoEnv must recognize the importance of pollution prevention in the industrial sector and that government leadership is necessary. MoEnv has been given the responsibility to protect the environment but lacks the ambition to fulfill this important role. An example of WREC's responsiveness to GoJ stakeholders comes in the form of the Strategic Environmental Management Plan (SEMP). WREC was able to add this activity at the request of DFZC to complement its already planned work at the Sahab Industrial Estate. DFZC wished to turn the suite of activities at Sahab into an example that could be replicated across Jordan's industrial estates as they redefine their regulatory relationship with Master Developers.

Task 3 – Disposal Site Rehabilitation

Feasibility studies and design and tender documents have been completed for the Al Akeder liquid waste disposal site. The feasibility study and design for the Aqaba solid waste disposal sites (old and new) are planned for completion in 2014. Feasibility studies for four of six areas in Russeifa municipality have been completed with the remaining two scheduled for December 2013.

The Al Akeder site remediation would be a relatively straightforward activity if the flow of industrial liquid waste could be diverted. Unfortunately, in order for that to happen many significant steps need to occur. There are many unorganized stakeholders including the municipality, WAJ, MWI, all the northern industries that truck waste, and truckers, in addition to high tariff rates, a truck manifest system, policies, laws, rules and regulations, and new industrial WWTPs with inefficient management. Although the European Union (EU) is involved, it will require a major, long-term effort by donors and

GoJ to carry this site remediation to a successful conclusion. The GoJ will need to make remediation at Al Akeder a top priority and follow through with funding and attention to associated political, technical and social issues.

The old and new Aqaba solid waste disposal sites are being re-designed. It is expected that ADC and ASEZA will successfully implement this remediation on their own.

Four feasibility studies have been completed, and two more will be finalized by December 2013, for six areas in the Russeifa municipality on Amman's eastern border (mostly old mining operations). Remediation efforts on these sites will be subject to political will, funding availability, and public awareness. MoEnv has submitted a request for funding to the cabinet for 49 million Jordanian dinars (JD) to perform site remediation on Task 1 (landfill) and Task 2 (mining pit). WREC's documentation of the serious health risks from Task 3 (phosphate pile) highlights its need for immediate attention due to known public health hazards from radioactive phosphate dust. Russeifa's environmental degradation has been obvious to GoJ and most Jordanians for decades. The United States Environmental Protection Agency (USEPA) and GTZ highlighted the dangers of phosphate dust in a national campaign 10 years ago.

Task 4 – Agricultural Water Reuse

This task faced a troublesome start. According to the SOW, the Contractor was to identify locations for the "water reuse income generating pilot program" and prepare detailed design and tender documents that would be implemented by non-governmental organizations (NGOs) through USAID-offered grants. By the time the project commenced in 2010, USAID no longer had funds available for these grants, resulting in an extended period of uncertainty. During the first three years of the project, the WREC team advanced the work to the extent practicable. The contract modification in June 2013 made some funds available for implementation and the WREC team has been working to take advantage of the remainder of the project's duration to achieve as much of the original goal as possible.

Wadi Mousa is the only ongoing USAID reuse site from the RIAL project and farmers say that the system's operation has been deteriorating since 2006. Notably, this deterioration began approximately around the time when USAID's support of the pilot ended and responsibility was handed over the Hashemite Fund for Development of Jordan Badia (HFDB). However, WREC's technical assistance for the development of a Wadi Mousa co-op, along with marketing plans, looks promising for increasing farmer income. The project's plans are focusing more on sustainability and it appears that, when fully in place, there will be a greater chance for the Wadi Mousa Pilot to continue on its own. The Ma'an reuse site has been on hold due to security concerns. Currently, three to four farmers use approximately 50% of the effluent flow and DFZC requested the remaining water for industrial use. Two other sites have been canceled and creating any other new sites at this point would not be sensible. The reuse knowledge center has made no progress during the past three years. Reuse in Jordan should be organized, monitored, and supported and requires either a public or private organization to take charge of a sustainable national program. The project should select and assist either GoJ or another organization in assuming overall responsibility for beneficial water sector reuse activities.

Conclusions

- MoEnv improvement in regulatory capacity: environmental impact assessments (EIA's) and licensing.
- MoEnv has a strategic plan for capacity building and institutional strengthening.
- Three independent labs have been established for enhancing MoEnv's enforcement activities, as well as private industry compliance.
- Industrial Recognition Award looks promising with King Abdullah Center for Excellence (KACE).
- Knowledge Center Network is off to a good start.
- MoEnv is a weak and ineffective agency.
- Environmental issues lack high-level political interest and need public pressure for funding and

remediation.

- Industry Survey is complete and 32 industries have signed MOUs for EMS/P2 assistance.
- Industries in general are interested in water, energy savings, and pollution prevention programs, provided that the associated cost with them is low.
- New industrial zones appear to manage industrial solid and liquid waste properly; however, older industrial zones are struggling.
- All sites will have feasibility studies by the end of 2013.
- Remediation efforts require high-level political support and funding.
- It should be recognized that feasibility studies are only the first step. Al Akeder is an example of environmental degradation that requires a multi-faceted approach.
- Wadi Musa Farmers Association is weak and has no technical capacity in operation and maintenance.
- Responsibilities of operation and maintenance are distributed between AWC, WAJ, HFDB and Farmers Association, which negatively affected the pilot project.
- Wadi Musa Pilot project made good progress from 2006 to 2009/2010. After that, the situation started to deteriorate, mainly due to inadequate operation and maintenance.
- Reuse pilot projects have made little progress. The only pilot, Wadi Musa, still suffers from problems such as irrigation efficiency, non-working filters, and low pressure at farm level. In addition, farms' expansion by farmers and HFBD over the years has been random and not based on hydraulic design, which affected the quantity and quality of the crops.
- The reuse knowledge center requires additional attention. After the deletion of the original contract plans by USAID, the contractor tried several options for host institutions. The WREC project and USAID continue to work in identifying a sustainable approach to the Reuse Knowledge Center (RKC).

Recommendations

- Highest priority projects are Al Akeder and Russeifa Site 3 (Phosphate Pile).
- MoEnv should lead legal, regulatory, monitoring, and enforcement of industries.
- Industry reporting needs to be organized from beginning to end.
- Monitoring and enforcement needs high-level attention from GoJ.
- MoEnv's monitoring and enforcement is critical for sustainability.
- The industrial sector needs awareness and support to embrace EMS/P2 activities.
- The proposed alternatives for water, energy savings, and wastewater treatment need to consider the industrial sector's affordability and applicability.
- Industrial zones and estates require strengthening their technical capacity in water, energy savings and pollution prevention management.
- Public awareness is critical to support environmental causes.
- The country needs an organization responsible for reuse activities whose responsibilities can include: information dissemination to farmers, monitoring, technical advice, and planning.
- The responsibility of operation and maintenance of the water supply system should be given to one qualified operator, as the Farmers' Association does not have technical capacity in operation and maintenance.
- When looking at assessment and planning phases, all potential reuse sites need to be considered.
- WREC needs to involve counterparts from MoEnv and other stakeholders during the remainder of the project.
- The mechanism of project deliverables approval should be clarified to all.
- The implementation of each task needs to be clarified.

Key Lessons

- Using the MoEnv as the GoJ counterpart was problematic.

- Three remediation areas are unique: Al Akeder is complex and difficult; Aqaba will move to implement landfill design; and Russeifa's priorities should be based upon technical, financial, social and political factors.
- When building on an old USAID project, try to collect complete history prior to starting activities.
- The highest level of GoJ should prioritize monitoring and enforcement responsibilities at MoEnv.
- A step-by-step process for industrial P2/EMS is realistic and necessary. Sustainability will hinge upon dynamics of the network, DFZC facilitation, industry demand, and funding availability.

1.0 EVALUATION PURPOSE & EVALUATION QUESTIONS

1.1 EVALUATION PURPOSE

This is a report on the mid-term evaluation of the Water Reuse and Environmental Conservation (WREC) project funded by the United States Agency for International Development (USAID) Mission in Jordan. The WREC project started on August 1, 2010 and will end on July 31, 2015. The project is implemented by AECOM. Total funding for the project is $27,912,783. This amount was amended to $32,676,016 in June 2013 after the original Scope of Work (SOW) was revised.

The evaluation of WREC was carried out by a team of experts assembled by Mendez England & Associates (ME&A), located in Bethesda, Maryland. The team consisted of one international and two Jordanian experts. The evaluation was conducted during the period October – November 2013.

The purpose of the evaluation was to assess the process, methodologies, and outcomes of the WREC project on improving industrial environmental practices with a focus on water and energy savings, and to measure the sustainability of the achievements on project beneficiaries and of the methodologies used.

The information derived from the evaluation will help the Mission assess the extent of its investments in improving governance and decision-making in the water sector.

1.2 EVALUATION QUESTIONS

The evaluation was guided by specific questions contained in the SOW, found in Annex 1 of this report. These questions include:

1. What have been the achievements of the WREC project? What is the success of the various tasks and sub-tasks implemented by WREC? What worked, what did not work and why? Which are fully instituted and which are critical and require further investment?
2. Did the project's strategy enhance or weaken achievement of the anticipated tasks? Did the project's management approach enhance or weaken achievement of the anticipated tasks? Did the project's implementation approach enhance or weaken achievement of the anticipated tasks? Define the approaches – from strategy, management and implementation – that enhanced the project and identify the ones that can be replicated in the future. Also, identify lessons learned that weakened the program and how these can be alleviated in future programs.
3. Determine the level of satisfaction of the counterpart institutions and the stakeholders with the program. Specify what satisfied them and what did not and why.
4. Are the processes, innovations, institutions, partnerships, and linkages introduced sustainable?

2.0 PROJECT BACKGROUND

Water reuse and reduction of industrial pollution have the potential to enhance efficiencies, reduce water and energy consumption, and facilitate the advancement of best industrial environmental management practices, resulting in a better environment for Jordanians, efficient use of water and energy resources, and a solid foundation for the industrial sector and economic growth.

Previous USAID projects, such as the Reuse for Industry, Agriculture and Landscaping (RIAL) and the Manifest projects, worked to position Jordan as a recognized leader in water reuse and pollution prevention. Additionally, USAID aimed to promote a green, eco-efficient economy for sustainable industry in Jordan. These objectives resulted in the development of WREC, an efficiency project for both water and energy usage, that supports expanded industrial wastewater treatment and monitoring programs intended to foster better practices across the most important sector in Jordan's economy.

The purpose of WREC is to help ensure that Jordan's water and wastewater sectors are operating to minimize resource usage and maximize reuse and recycling potentials. The project provides capacity building, technical assistance, and training to support key institutions, such as the Ministry of Environment (MoEnv) and national laboratories for improved environmental analysis and governance; engineering feasibility studies for industrial waste management, hazardous site remediation, and landfill rehabilitation; industrial wastewater treatment system designs; reclaimed water reuse pilot projects; and other pollution prevention initiatives. The project is unusual since USAID has the MoEnv as its Government of Jordan (GoJ) implementation partner. This was partly due to capacity building needs at the Ministry but also to the fact that industrial monitoring and site remediation tasks fall under MoEnv responsibilities.

Left: Old Landfill Site; Right: New Landfill Site South of Town

The project has four major tasks:

1. Task 1: Institutional and Regulatory Strengthening
2. Task 2: Pollution Prevention and Industrial Waste Management
3. Task 3: Disposal Site Rehabilitation and Feasibility Studies
4. Task 4: Water Reuse for Community Livelihood Enhancement

Task 1: Institutional and Regulatory Strengthening

The project is developing technical assistance and training plans to enhance the enforcement capability of the MoEnv and to emphasize priorities identified during the assessment. Task 1 activities maximize coordination with other USAID projects and other donors to provide training and mentoring to MoEnv and Environmental Rangers staff. Task 1 also supports the technical abilities of the MoEnv on the abatement of industrial pollution through enhanced access to industrial wastewater laboratory analyses. It will further promote compliance assistance efforts for the regulated community through information sharing and data management, as well as through expanding and promoting the services of the information knowledge center (IKC). To better manage, utilize, and enhance the sustainability of the IKC, it was split into the Environment Compliance Database (ECD) within the MoEnv and Network components within the industrial community (i.e. the Jordan Chamber of Industry (JCI)).

Task 2: Pollution Prevention and Industrial Waste Management

The project surveyed 400 industries and will work closely with up to 40 selected industrial facilities to survey pollution sources, gauge interest in pollution prevention activities, and instill good environmental practices through environmental management systems/pollution prevention (EMS/P2) initiatives. Task 2

also includes preparing the conceptual designs, cost estimates, and technical specifications for three Industrial Wastewater Treatment Plants (IWTPs).

Task 3: Disposal Site Rehabilitation and Feasibility Studies
WREC works with local team members, on-site workers, and the MoEnv to investigate disposal sites, identify potential improvements, and, at certain sites, implement improvements in a cost-effective and environmentally and socially responsible manner. Findings from site investigations are the basis for evaluating the feasibility of alternatives for remedial actions and site closures. Alternatives may include replacing existing active facilities with new proposed facilities, or simple low-cost, high–return management changes, such as reducing the landfill working face.

Task 4: Water Reuse for Community Livelihood Enhancement
WREC works with a wide range of stakeholders, primarily the Ministry of Water and Irrigation (MWI) and Water Authority of Jordan (WAJ), to identify and plan new water reuse pilot projects that will enhance community livelihoods for generating income from the reclaimed water irrigation of agricultural crops. In addition to the technical assistance provided to establish new pilot projects, WREC provides technical assistance to the previously established reuse pilot in Wadi Mousa. Sustainability is of utmost importance for these pilot projects, so WREC works closely with local communities, as well as stakeholder government institutions, to develop plans to support self-sustainable operation of the pilot projects. The plan for the Reuse Knowledge Center (RKC) has changed from a physical facility at Wadi Mousa to supporting a non-governmental organization (NGO), Jordan Desalination and Reuse Association (JoDRA), that has similar goals in terms of disseminating water reuse knowledge and expertise. The current approach is for the concept of a Wastewater RKC to be developed independently of the originally planned facility at the Wadi Mousa pilot site; however, identification of physical sites as interface points for the dissemination of knowledge is ongoing, including the Sustainability Center at the King Abdullah II Park and other sites.

3.0 EVALUATION METHODS & LIMITATIONS

3.1 EVALUATION METHODOLOGY

The evaluation of WREC was conducted over two phases. Phase 1 consisted of an in-depth review of key documents, reports, and data related to the program activities, including annual work plans, progress reports, monitoring and evaluation reports, and deliverables. Data collected during Phase 1 formed the basis for the development of detailed evaluation questions and tools, which were used by the Evaluation Team to conduct key informant interviews and focus group discussions. During this phase it became apparent to the Evaluation Team that the evaluation mission was going to address two separate, though inter-connected, issues: 1) what WREC was tasked with achieving from a quantitative point of view, e.g. number of assessments and recommendations, number of policy changes, number of remediation activities, etc.; and 2) the extent to which the accomplishment of these numeric parameters impacted water and energy conservation, industrial and rural community practices, and national waste streams.

Phase 2 comprised the field component of the evaluation. The purpose was to collect data and information from key stakeholders and beneficiaries and visit a range of locations to get an overview of water sector activities throughout Jordan.

The evaluation collected both qualitative and quantitative data to assess program performance and achievements. However, given the nature of the project, the information collected was mainly qualitative.

3.1.1 Qualitative Research and Analysis

The Team's approach was to identify, locate, and meet with a representative segment of stakeholders and beneficiaries with direct or indirect knowledge and experience of the project throughout its lifetime (see Annex 4 for a list of interviewees). There was less concern here as to whether or not a particular action had been implemented (verifiable or not from WREC's records) than whether the results of that action meet the needs and aspirations of the intended recipients and national conservation efforts.

Data was collected from the following sources of evidence:

- **Critical Desktop Review of Materials** related to WREC such as the SOW, work plans, quarterly reports, surveys, mid-term review reports, WREC progress reports, annual work plans, annual training plans, baseline assessment, action plans, project modifications, etc. (The full list of reviewed documents can be found in Annex 5).
- **Secondary Data** from reports such as Eco-efficiency of the Industrial Sector in Jordan published by GIZ, and Al Akeder Feasibility Study published by KfW.
- **Direct Observations from Field Visits** to the covered sites such as Wadi Musa reuse pilot, industrial estates or zones, factories, Russeifa Remediation sites, Aqaba Landfill, etc.
- **Key Informant Interviews,** including open-ended and semi-structured interviews with USAID staff and WREC implementers, program beneficiaries and stakeholders, MoEnv, MWI, Jordan Industrial Estates Corporation, Amman Chamber of Industry (ACI), Zarqa Chamber of Industry (ZCI), Aqaba Special Economic Zone Authority (ASEZA), Aqaba Development Company (ADC), Aqaba Water Company (AWC), etc. (See Annex 4 for a full list).
- **Project Outputs** against objectives and performance indicators.
- **Focus Group Discussions** with 20 grantees and sub-grantees.

3.1.2 Quantitative Research and Analysis

Quantitative data were sourced from WREC annual work plans, performance management plans (PMPs), and other project-related periodic reports.

As the project was tasked with accomplishing a significant number of target indicators (specified interim results and indicators in WREC's PMP), verification of performance from a statistical point of view was essentially focused only on the review of project records which, the Evaluation Team can only assume, accurately reflect whether a numeric indicator was achieved or not. The findings from this analysis were cross-referenced with those that resulted from the qualitative research, in order to determine the extent to which evidence gathered contributed to the understanding of WREC's impact on its intended beneficiaries.

3.2 LIMITATIONS

1. Given the recent contract modification in June 2013 and the fact that the modified SOW of the project has changed from the original, the Evaluation Team will comment on the achievements, Intermediate Results (IRs), and indicator targets of the first three years. Recommendations on any new tasks starting on June 2013 will be limited.
2. Since environmental degradation is a very sensitive and political issue in Jordan, cultural norms may have prohibited some respondents from speaking candidly.
3. GoJ review and acceptance of feasibility studies and technical reports may be cursory and/or limited to MoEnv staff instead of the final end users. This has been especially true for site remediation that should fall under the authority of individual municipalities. Municipalities and

the Ministry of Municipalities have been uninvolved in technical reviews; ASEZA and ADC have been the exception.

4.0 FINDINGS, CONCLUSIONS & RECOMMENDATIONS

This section is structured around WREC's core tasks, including:

- Task 1: Institutional and Regulatory Strengthening
- Task 2: Pollution Prevention and Industrial Waste Management
- Task 3: Disposal Site Rehabilitation and Feasibility Studies
- Task 4: Water Reuse for Community Livelihood Enhancement

4.1 TASK 1: INSTITUTIONAL AND REGULATORY STRENGTHENING

4.1.1 Findings

Task 1 was comprised of three sub-tasks, including:

- Task 1.1 Enhance the Regulatory Capacity of the MoEnv
- Task 1.2 Enhance National Laboratory Capacity for Analysis of Industrial Wastewater
- Task 1.3 MoEnv Information Knowledge Center (IKC) Capacity Building and Promotion for Compliance Building

According to the Year 3 work plan, WREC was expected to complete most of its Task 1 activities – in terms of technical assistance, design and analysis – by July 2013. However, while some activities are close to completion, including extensive MoEnv training, establishment of three QA/QC laboratories, Environmental Impact Assessment (EIA) guidelines and licensing, the Network, MoEnv strategic plan, ISO 4000, and Industrial Recognition Award, others are only at the preliminary stage, including monitoring/compliance, database, enforcement, and overlapping responsibilities with other agencies.

In February 2012, WREC conducted a baseline assessment of the MoEnv's strengths and weaknesses. The findings of the assessment illustrate the long way that the MoEnv must go to become a strong and effective environmental protection agency, capable of safeguarding Jordan's national water interests. Critical weaknesses highlighted in the assessment report included: the need for clear guidance on granting project licenses; no formal procedures for appealing licensing decisions; lack of standard terms of reference for EIA studies; lack of an archiving system; lack of qualified human resources (HR) and difficulty attracting new staff; absence of effective and suitable capacity building and training programs; overly general EIA approval requirements; lack of MoEnv inspection of new approved facilities; no environmental license systems (permits) for individual industrial operations; no formal written procedures for appealing technical review committee decisions on EIA's; centralized decision making; lack of awareness of environmental impacts of some projects; shortage of tools (geographic information system (GIS)) and software (EIA models); no MoEnv-wide inspection management database nor comprehensive database on regulated industries; lack of enforceable requirements; poor communication with regulated industries; shortage of MoEnv inspectors and lack of their access to sites; underutilization of inspectors in governorate directorates; lack of functioning information sharing system; lack of routine EIA follow-up; relationship with Development and Free Zones Commission (DFZC) authorities and ASEZA; limited communication with the public; and insufficient technical and administrative staff.

The baseline assessment examined MoEnv's regulatory responsibilities and identified opportunities in resources, organizational structure, management, tools, and technology and communications, which, if improved, will lead to better performance. It also evaluated the MoEnv's human capacity and identified training and skills needed to improve performance, and presented the current status at the MoEnv, challenges, issues, and recommendations for improvement. In addition, the baseline assessment analyzed the performance of the four main technical MoEnv Directorates: 1) Licensing and Environmental Impact Assessment; 2) Waste Management; 3) Inspection and Compliance; and 4) Environmental Monitoring and Assessment.

In December 2011, WREC organized two one-day workshops with MoEnv staff, the results of which were incorporated into the baseline assessment. During these workshops, MoEnv staff discussed challenges in two areas: 1) environmental licensing and EIAs; and 2) institutional performance and organizational development. A MoEnv retreat in February 2012 reviewed and finalized demand-driven recommendations focused upon 12 key issues (environmental policy and law, relationships, compliance monitoring, data information sharing, EIAs and licenses, inspections and penalties, and waste management). With this information, AECOM and MoEnv leadership, directors, and other staff, identified and prioritized items for the WREC assistance plan, which included recommended action items covering: core responsibilities, licensing and EIA, inspection, waste management, and monitoring. WREC prepared a MoEnv Action Plan in April 2012 that included key activities, roles, and a schedule to track progress, and provided a roadmap for results. It is important to note that the Action Plan presented a strategy to meet the vision of how the MoEnv should function in the future, not necessarily in July 2013, when most of WREC's Task 1 activities were expected to be completed.

One recurring comment made to the Evaluation Team throughout the interviews conducted was the difficulty that the MoEnv has had in executing its core responsibilities due to a lack of staff, poor morale, low salaries, and top management who turns a blind eye to performance issues, such as industries not submitting data and MoEnv staff not maintaining the database of sketchy industry records. The MoEnv does not aggressively pursue enforcement actions on either EIA licensing or industry waste streams. Furthermore, the MoEnv lacks high-level political support. These are substantiated by the facts that: 1) there have been nine Ministers at the MoEnv during WREC's three year project life; and 2) the GoJ attempted to eliminate the MoEnv during the project's last reporting period.

Task 1.1: Enhance Regulatory Capacity

The four subtasks under this task are as follows: 1) Baseline assessment that covers enforcement capacity and Royal Rangers; 2) MoEnv's enforcement with an organizational plan and approach; 3) Training and skills needs assessment; and 4) Training and exchange. WREC's SOW, however, lists only two tasks: 1) Develop enforcement capacity; and 2) Training and exchanges.

The baseline assessment and training needs, as well as the Action Plan, were completed and MoEnv feedback on the two reports and a variety of trainings received was positive (See Annex 7 for a list of trainings for each task with participants broken down by gender). MoEnv's technical staff thought that, overall, the training program was good, and mentioned that it was spread through the various offices at the appropriate level of technical skill. According to the three-year PMP indicator summary, trainings exceeded their targets. Staff from MoEnv commented that trainings and capacity building successfully covered drafting proposal guidelines; EIA program documents; and financial, technical, and strategic and policy planning. Additional MoEnv enforcement activities also appear under Task 2.

Task 1.2: National Laboratory Capacity

This task is supporting laboratory Quality Assurance/Quality Control (QA/QC) for industrial

wastewater treatment plants (IWWTPs) in addition to providing further resources to the MoEnv for its enforcement activities. WAJ laboratories monitor domestic wastewater treatment effluent and combined plants. WAJ is not responsible for IWWTPs, but the MWI monitors Qualified Industrial Zone (QIZ) wastewater treatment plants (WWTPs). The four subtasks under Task 1.2 are as follows: 1) assess national lab capacity; 2) design an implementation plan for three labs; 3) train staff for three labs; and 4) develop information materials to promote awareness. WREC's SOW simply mentions to enhance national laboratory capacity for analysis of industrial wastewater.

Under Task 1.2, WREC developed a plan to use three universities (Jordan, Mu'tah and Al Bayt) for ready access to testing spot checks and compliance monitoring (QA/QC). The universities signed memorandums of understanding (MOUs) outlining the support to be provided. WAJ laboratories, along with those that the Royal Scientific Society (RSS) maintains for the MoEnv, are certified and well equipped under previous projects, and will provide the majority of testing in Jordan. This subtask appears to be an acceptable strategy, good management and good implementation. The training program is underway and is expected to allow for eventual certification (which is not part of WREC's SOW). MoEnv staff observed that trainings and certifications were proceeding as planned and understood that Task 2 would cover the required monitoring and enforcement activity.

Task 1.3: MoEnv Knowledge Center Capacity Building and Promotion for Compliance Building

According to the SOW, Task 1.3 subtasks include the following: sustainability of the IKC; promoting the IKC through strategy development; IT support to the IKC; communication and public outreach; tool-kit development; and industrial recognition award for environmental performance. It was determined that the IKC should be two separate activities: 1) industrial database – industry year-end reporting, industry application for license, information collection system, and MoEnv training for an annual data report; and 2) industrial network – baseline survey, strategy and implementation, user friendly tools and support, communication and public outreach, public outreach materials, environmental management and compliance toolkits, and national industry environmental award.

According to MoEnv staff, WREC has made good progress on the IKC Network. Technical staff at MoEnv also said that: 1) a community of experts – MoEnv, Jordan Chamber of Industry (JCI), DFZC, Jordan Standards and Meteorological Organization (JSMO) and RSS – have agreed to manage the Network cooperatively; 2) there have been many successful meetings and events to date; and 3) sharing data has started with the Network populated with more than 700 resources, including case studies, sourcebooks, web links and symposium sites. The only unresolved issue remaining is who will host the site when WREC terminates. The RSS has committed to assuming ownership and an MOU signing is planned for December 2013.

The industrial recognition award for environmental performance has made good progress. MoEnv staff believes that the decision to work through King Abdullah II Center for Excellence (KACE) will elevate the award's status by joining with Jordan's other annual awards. MoEnv will work in coordination with KACE, who will manage the award, and Columbia University, who will build the capacity of and train Ministry staff to support the selection and award processes.

The most problematic activity is the industrial database and enforcement. Since the Royal Rangers were envisioned as a capable inspection partner, the MoEnv's enforcement team granted them valuable site access. However, according to the MoEnv, the Royal Rangers did not work out, and, according to WREC staff, there were too many problems including police management, the logistics of partnering, small staff, low budget, lack of a mandate, and determining what exactly to enforce.

The database has experienced serious problems and the MoEnv's only explanation was that one employee failed to perform his job. This justification, however, fails to explain the industry monitoring system that seemed to be flawed from beginning to end. Even an old USAID manifest system to support a cradle to grave wastewater management system seems to have disappeared. During meetings and interviews, the Evaluation Team received many comments confirming the system's flaws, including "industries are not submitting data, submitted data is vague and incomplete, the budget is too small, the system requires priority status, and the database information is neither read nor utilized."

Currently, WREC proposed, and the MoEnv accepted, that project staff will scan and copy the 2007-2010 paper records stored in the basement at the MoEnv to organize selected industry reporting. However, based on the above comments, the value of these old records, even for establishing a baseline, seems to be limited.

Based on the above findings for Task 1, the Evaluation Team concluded the following in terms of the level of satisfaction, strategy/management/implementation, and sustainability.

Task	Sustainability	Level of Satisfaction	Strategy Management Implementation
Enhance Regulatory Capacity	Questionable	High - Medium	Good strategy: Baseline and Capacity Building Reports, Strong implementation: training program. Nascent enforcement activities.
National Laboratory Capacity	Sustainable, with MOU and Service Contracts in place	High	Good business plan and marketing strategy. Good management/implementation for QA/QC lab training
Industrial Knowledge Center Network	Sustainable	Medium	Strategy for coalition effort is good. Good management and implementation on website material and adding new members
Industrial Recognition Award	Sustainable	High	Shifting to KACE as lead organization is good strategy. Good implementation and management on the MoEnv training
Industrial Database	Questionable	Low	Poor strategy, management, and implementation. Low potential for success.
Industrial Toolkit	Questionable	Medium	Strategy for toolkit approach is good, but DFZC as future facilitator is troublesome.

4.1.2 Conclusions

1. MoEnv has shown improvement in regulatory capacity including EIAs and licensing.
2. MoEnv has a strategic plan for capacity building and institutional strengthening.
3. Three independent labs are established for enhancing MoEnv's enforcement activities as well as private industry compliance.
4. Industrial Recognition Award looks promising with KACE.
5. Knowledge Center Network is off to a good start.
6. MoEnv is a weak and ineffective agency.
7. Environmental issues lack high-level political interest and need public pressure for funding and remediation.

4.1.3 Recommendations

1. MoEnv should lead legal, regulatory, monitoring, and enforcement of industries.
2. Industry reporting needs to be organized from beginning to end.
3. Monitoring and enforcement needs high-level attention from the GoJ.
4. MoEnv's monitoring and enforcement is critical for sustainability.

4.2 TASK 2: POLLUTION PREVENTION AND INDUSTRIAL WASTE MANAGEMENT

4.2.1 Findings

Task 2 focused on the prevention of pollution from industrial waste through efficient treatment and monitoring. It was comprised of numerous sub-tasks, including:

- Task 2.1: Industrial Survey
- Task 2.2: Environment Management System and Pollution Prevention (EMS/P2)
- Task 2.3: Industrial Zones Water Management
- Task 2.4: Integrated Water Resources Management Study
- Task 2.5: Enforce MoEnv's capacity to assess and develop its sustainability in industrial performance monitoring

Task 2.1: Industrial Survey

According to the SOW, the industrial survey was intended to cover four industrial zones: 1) Dhulil Qualifying Industrial Zone; 2) King Abdullah II Industrial Estate; 3) Al Hassan Industrial Estate; and 4) Aqaba Qualifying Industrial Estate. Additionally, the survey was to include industries outside of these zones, with priority given to those with large waste generators, high consumption levels of water and energy, and those who contribute to the Al Akeder and Ein Ghazal disposal sites. The survey results must be easily web-enabled and stored in a GIS database at the MoEnv's IKC.

WREC accomplishments under this sub-task include:

1. Successfully surveyed 400 industries to evaluate and identify priority industry sectors. A detailed report on the survey results was submitted to USAID, MoEnv, and JCI.

Although JCI provided positive feedback on the survey report and mentioned that it was needed, they have yet to receive the requested list of codes from WREC to identify industry sectors and enable them to conduct analyses from the report. Also, JCI thinks that the unit cost is needed to enable industries to evaluate water and energy conservation measures.

The survey results are still not stored in a GIS database, as part of the MoEnv knowledge base, because it is still under development.

2. WREC trained 100 companies, out of the 150 proposed, on module eco-efficiency for sustainable development. Based on this training, 58 companies were identified as potential model partners for EMS/P2 programs and, out of those, 32 signed MoUs with USAID for EMS/P2 program implementation. Task 2 had a target of signing 40 industry MOUs.

The Evaluation Team views the signing of 32 industry MOUs as a good start towards achieving the target of 40, as listed in the SOW, despite some issues raised by industries. Some industries noted that the initial training was theoretical and that the proposed solutions for water, energy savings, and wastewater treatment cannot be implemented due to high associated costs or lack of fit into the existing processes

used at factories. Industries also believe that bestowing industrial zones with the responsibility to manage overall water, energy savings, and wastewater treatment, rather than the factories they manage, and then to provide each factory with a low cost proposal would be the most efficient. However, such a scheme would require the building of eco-efficiency capacity of industrial zone technical staff.

Task 2.2: Environment Management System and Pollution Prevention (EMS/P2)

Per WREC's SOW, each of the proposed 40 signed MOUs were to have organizational development, enterprise audits, detailed assessment to identify water savings and energy and pollution situation, and corporate-wide EMS/P2 report listing how to improve operations while conserving water and energy and preventing pollution from generated waste. In addition, WREC was to prepare a detailed unit cost analysis for the proposed options and then identify the applicable low-cost measures and potential financing options for those measures. Furthermore, the SOW stipulated two training modules for all selected industries on ISO 14001 and investment portfolios on co-financing mechanisms.

WREC accomplishments under this sub-task include:

1. Completed the fieldwork assessment of the 32 industries that signed MOUs as the first step in developing the EMS/P2. The EMS/P2 plan is ongoing and will be completed in the coming months.
2. Prepared a report, submitted in June 2012, for small and medium enterprises (SMEs) on obtaining financing to cover the costs of implementing environmental conservation and water treatment activities. The report identified sources of financing and provided guidance on obtaining financing for implementing P2 and environmental conservation measures.

WREC is still assessing the industries that signed MOUs and developing EMS/P2 plans, which include proposed solutions to conserve water and energy and improve wastewater treatment and management. WREC completed some of the assessment reports and the SME report on co-financing options, mainly through commercial banks.

Although the SME financing report is an important step, it must include all potential financing options and should be accompanied by detailed training on applying for financing for all industries that will sign MOUs. WREC should prepare comprehensive training materials, which will be stored in the MoEnv Network, to serve as a reference for all industries. WREC should prepare a cost analysis and develop a low cost proposal to be funded by the potential funding sources or organizations.

Task 2.3: Industrial Zones Water Management

<u>Wastewater Treatment Plant (IWTP) at King Abdullah II Ibn Al-Hussein Industrial Estate-Sahab</u>

According to the SOW, WREC is required to conduct an assessment of industry interests in a central wastewater treatment plant; identify treatment alternatives and sites; and prepare a feasibility study, which includes economic viability, preliminary design, financial analysis, and institutional aspects. The SOW also calls for undertaking this work at three industrial zones – Dhulil Industrial Zone, King Abdullah II Industrial Estate (Sahab), and a third yet to be determined. The scope was modified in June 2013 to include only the King Abdullah II Industrial Estate at Sahab and the Zarqa IWWTP.

WREC accomplishments under this sub-task include:

1. Completed a preliminary design and preliminary EIA for the WWTP at the Abdullah II Ibn Al-Industrial Estate-Sahab. The alternatives were reviewed by a working group from the MoEnv, MWI, DFZC, and USAID. At several presentations and meetings, Jordan Industrial Estates

Corporation (JIEC) and USAID discussed wastewater treatment alternatives. After an 8-month period, JIEC issued a letter stating their preferred alternative.
2. Completed the wastewater sampling and analysis from 19 selected industrial facilities for the final design of the IWTP at Zarqa Industrial Area, which has already been completed.
3. Completed the following activities for the Sahab and Zarqa plants, although, according to decision makers and technical teams, the costs for both are high and not affordable (without grant money):
    a. Completed feasibility study for Sahab IWTP.
    b. Completed design for Sahab IWTP after receiving JIEC's letter stating their preferred alternative.
    c. Completed feasibility study for Zarqa IWTP. At the time of this evaluation, 10 months have passed with no written decision from the stakeholders despite repeated WREC attempts to move the project forward through presentations to individual stakeholders, as well as the Prime Minister-appointed steering committee.

The Evaluation Team noticed that the Dhulil Industrial Zone was skipped even though it was specifically mentioned in the SOW. AECOM attributed this to Dhulil having declined to participate in WREC. Further, the WREC team noted that it engaged a variety of stakeholders in the selection of sites including representatives from MoEnv, JCI, MWI, etc. Dhulil was not selected by this stakeholder committee based upon the circumstances at the time of selection.

After reviewing the design of the two plants, the Evaluation Team noted that their high costs were due to several factors. The King Abdullah II Industrial Estate's high costs are due to: 1) the fact that, although it is a rehabilitation project, its existing plant requires a complete replacement, including demolition and new construction; 2) additional costs associated with the type of project (design-build); and 3) high contingencies. The Zarqa Industrial Estate's high costs are associated with: 1) the design-build project type; 2) high contingencies; and 3) necessary flood protection site improvements. It should be noted that the designs and costs derive from feasibility studies and, therefore, are subject to change during final design phases.

Task 2.4: Integrated Water Resources Management Study

According to the SOW, WREC was to prepare two integrated water resources management (IWRM) plan studies for the Aqaba Industrial Zone and another zone yet to be determined. The IWRM study was to cover:

1. Pilot projects to conserve water and improve rural economies, water recycling at both the Aqaba fertilizer complex and the stone cutting industry.
2. Revision of reuse allocation strategy and master plans.
3. Providing participatory workshops and training courses on water reuse strategies, allocation, recycling, savings, and pollution prevention.
4. Technical guidance to industries on environmental and social responsibility.

WREC accomplishments under this sub-task include:

1. Finalized IWRM study for the Aqaba Industrial Zone and the King Abdullah II Industrial Estate in Sahab.
2. Completed, upon request from the DFZC, a strategic environmental management plan (SEMP) for the King Abdullah II Industrial Estate in Sahab that comprehensively evaluates environmental issues for the Industrial Estate and can also serve as a model for preparing future SEMPs at other industrial estates. USAID, JIEC, and DFZC sent comments on SEMP. WREC is revising and

sending the subsequent draft to the stakeholders by the end of October 2013 for their review.

The Evaluation Team noticed that even though the SOW specifically mentioned that the IWRM study was to be developed for the Aqaba Industrial Zone, WREC instead developed it for Aqaba city. WREC's focus should be on the industrial, rather than urban, section of the city. Furthermore, WREC should focus on how to conserve water and prepare reuse master plans and strategies for the industrial sector. WREC justified its actions due to Aqaba QIZ low water demand in existing industries. The cost of such a study could have been diverted to another industrial city or zone rather than completing a third or fourth master plan for Aqaba city.

Evaluation Team meetings with ASEZA, ADC, and AWC confirmed that they were not involved in the IWRM study and that the report was sent to them only for comments. Only AWC, and not the Aqaba Industrial Zone, was involved in the reuse study. To date, only one workshop has taken place and no trainings have been provided.

The Industrial Estate Corporation Technical Team at Sahab told the Evaluation Team that they were not involved in the IWRM study and only requested to comment on the report, which discusses general reuse issues and not specifically how to tackle industrial zone issues. In general, industries and QIZ management are seeking specific, targeted recommendations to implement that make quantifiable improvements or cost savings.

Task 2.5: Enforce MoEnv Capacity to Assess and Document Their Suitability in Industrial Performance Monitoring

Under this sub-task, WREC was to assist in building the MoEnv's capacity to document its institutional efforts. WREC accomplishments under this sub-task include:

1. Conducted a baseline assessment and strategic plan for the MoEnv
2. Provided training courses for MoEnv staff on specific monitoring subjects

Such activities were intended to strengthen the MoEnv's capacity in industrial performance monitoring. The assessment should review the existing procedures and identify the gaps and propose WREC plans for improvement.

Summary of Findings

Findings on Task II are listed in the table below and include information on four main categories:

- **Strategy/Management/Implementation** is related to how AECOM managed and implemented the task.
- **Progress %** relates to the work accomplished based on what was proposed in the work plans from 2011, 2012, and 2013 compared to progress reported in Annual Progress Report Year 4.
- **Level of Satisfaction** takes into consideration information gathered during stakeholder interviews stakeholders and Progress %.
- **Sustainability** reflects the views of the Evaluation Team.

Task	Strategy/Management/Implementation	Progress %	Level of Satisfaction	Sustainability
Industrial Survey	The strategy, management, and implementation of this task can be considered successful. However, the	100%	High because accomplishment % is high and feedback from JIC,	No concrete steps have been taken on the MoEnv knowledge base nor determination of who will run and maintain it

Task	Strategy/Management/Implementation	Progress %	Level of Satisfaction	Sustainability
	survey and selection criteria were not agreed upon or discussed with stakeholders and industries. No legitimate justification was given as to why the Dhulil and Aqaba Industrial zones were not covered. The survey results were not stored in a GIS database that should be part of the MoEnv knowledge base and web-enabled database.	0%	MoE was positive Low because of lack of progress	Low -level of enthusiasm from MoEnv on the use of survey results Industrial sector involvement in updating the survey information Same as above
EMS/P2	The strategy and management can be considered good, however the implementation is slow and the EMS/P2 individual industry assessments are ongoing at the present time.	40%	Low because of low progress (<50%) and negative feedback from industry on solution applicability	EMS/P2 plan implementation responsibility Industry affordability and high cost of the proposed solutions Fund availability for implementation phase
Industrial Zone Water Management	The design strategy and management is good	70%	Moderate because progress is 70% and the proposed design options are high cost	Plant sustainability requires technical capacity at industrial zones, which are not yet at the optimal level Monitoring responsibility and law enforcement of industry effluents remains loose, which can affect plant efficiency Charges for wastewater treatment are very low
Integrated Water Resources Management Plans	The strategy, management, and implementation are weak. WREC relied on subcontractors for this task and did not involve ASEZA, ADC, or industrial zones in Aqaba and Sahab in the study. The IWRM was supposed to focus on industrial zones and not on urban areas, such as in Aqaba where WREC performed the IWRM.	90%	Moderate to high due high progress levels but low involvement from stakeholders	Low technical capacity in the responsible body (industrial zones) for implementing the management plan
Institutional Capacity in Monitoring Performance	The strategy and management are good; however, the implementation needs to	100%	Moderate to High due to high progress and moderate focus on	Low level of MoEnv staff interest due to lack of incentives, resources, and weak regulations on law enforcement

Task	Strategy/Management/Implementation	Progress %	Level of Satisfaction	Sustainability
	focus on detailed institutional analysis related to monitoring reinforcement.		enforcement capacity	

4.2.2 Conclusions

1. The industry survey is complete and 32 industries signed MOUs for EMS/P2 assistance.
2. In general, industries are interested in water, energy savings, and pollution prevention programs, provided the associated costs are low.
3. New industrial zones appear to manage industrial solid and liquid waste properly; however, older industry estates such as Sahab are struggling.

4.2.3 Recommendations

1. The industrial sector requires awareness and support to embrace the EMS/P2 activities.
2. The proposed alternatives for industrial sector water, energy savings, and wastewater treatment need to consider the affordability and applicability of such options so they can be implemented.
3. The MoEnv monitoring and enforcement needs additional support.
4. Older industrial zones require technical capacity strengthening for water, energy savings, and pollution prevention management.

4.3 TASK 3: DISPOSAL SITES REHABILITATION AND FEASIBILITY STUDIES

4.3.1 Findings

Under this task, the contractor is requested to carry out a feasibility assessment and rehabilitation plan for: Al Akeder, including a design and feasibility plan for ASEZA waste management and sanitary landfill site; and six mining sites at Russeifa, along with the eventual construction management for Russeifa's site rehabilitation.

Feasibility Assessment and Rehabilitation Plan for Al Akeder and Design and Feasibility for ASEZA Waste Management and Sanitary Landfill Site

The SOW instructed WREC to develop a clean-up plan and bid documents for remediation of the Al Akeder liquid industrial wastewater disposal site, provide the needed expertise and support for ongoing practical guidance (project management) to evaluate the current status and clean-up (site remediation), and train one to two technical staff members at the MoEnv on site remediation and inspection. The SOW also includes providing expertise for ASEZA waste management and sanitary landfill site.

WREC accomplishments under this sub-task include:

Completed the Al Akeder feasibility report with five alternatives. The report was submitted to USAID, MoEnv, and JIEC. The cost of implementation of the various alternatives varies from about $5 million to $36 million.

MoEnv feedback on the report is positive and according to project requirements. However, the Ministry of Municipal Affairs and Joint Council for Services pointed out that they have not been involved and no training has been carried out.

Construction Management Contractor Services for Russeifa Site Rehabilitation in Collaboration with the United States Environmental Protection Agency (USEPA)

WREC, according to the SOW, was to provide an economic evaluation for rehabilitation, engineering design, and drawings for Area 1; evaluation of remediation of options and engineering design remediation options for Area 2 (Pit Area); economic evaluation for remediation and implementation plan for Area 3 (Phosphate Pile); odor and pest control options for Area 4 (Lagoon); closure of tunnels in Area 5; and landscape design for Area 6 (Overburden Pile). The SOW also includes an option for WREC to provide a construction management consultant (CMC) services for Russeifa site rehabilitation if requested by USAID.

Russeifa Phosphate Pile at Site 3

WREC accomplishments under this sub-task include:

The contractor submitted feasibility reports for Areas 1, 2, 5 and 6, and a pre-feasibility study for area 3. Area 4 was excluded since it was considered a small task. No designs have been completed to date. A feasibility report for area 3 will be completed by the end of 2013.

Some of the concerned authorities and inhabitants of the area seem unaware of health hazards (like asthma and disease resulting from interaction with radioactive dust) and environmental consequences of the phosphate pile, in addition to the danger of tunnels collapsing underneath houses. Priorities are different for the six sites. While WREC emphasizes the priority for remediation of Area 3 (Phosphate Pile) due to its radioactive dust, Greater Amman Municipality (GAM) and MoEnv prioritize securing funds for Areas 1 and 2, and developing a park with a playground in Area 3.

The Evaluation Team's conclusions, based on the analysis of the findings in the subtasks listed above and the feedback from interviewed stakeholders, are listed in the table below.

Summary of Findings

Task	Strategy/Management /Implementation	Progress %	Level of Satisfaction	Sustainability
Feasibility Assessment and Rehabilitation Plan for Al Akeder	The strategy, management and implementation of this task can be considered successful since the MoE and Ministry of Municipal Affairs (MMA) view it favorably	100%	High due to good progress and positive feedback from MoEnv and MMA	Responsibility of site remediation, design and operating another site for liquid waste shall be a joint responsibility between MoEnv, and Municipal Affairs, Joint Council for Services There is need for enforcement of rules of monitoring and protection
Design & Feasibility for ASEZA	For Aqaba landfill, neither ASEZA nor ADC are involved in the design of	10%	Low due to low progress and low level of	There is need for enforcement of rules of monitoring and protection ASEZA and ADC involvement

Task	Strategy/Management /Implementation	Progress %	Level of Satisfaction	Sustainability
Waste Management and Sanitary Landfill Site	the new landfill and have only been notified on work to be done on the ground		involvement from ASEZA and ADC[1]	
Construction Management Contractor Services for Russeifa Site Rehabilitation in Collaboration with USEPA	The strategy, management, and implementation of this task are ok. However, prioritization needs to be modified, with Area 3 having the highest priority. If the hazards of this site are highlighted, the phosphate company may become more willing to fund some part of remediation	80%	Moderate to High due to good progress and positive feedback from MoEnv	Sustainability is weak and doubtful There are no funds for high priority area, instead MoEnv secured funds for other areas There is a need for strong coordination between various entities like MoEnv, GAM, and Russeifa Municipality

4.3.2 Conclusions

- Work at Al Akeder has been successfully completed.
- All Russeifa areas will have feasibility studies by the end of 2013.
- Work in Aqaba has progressed slowly since the activity kicked-off in 2013 due to ASEZA's earlier non-responsiveness.
- Remediation efforts require high levels of political support and funding.
- It should be recognized that feasibility studies are the first step. Al Akeder is an example of environmental degradation that requires a multi-faceted approach.

Reuse site with alfalfa in Wadi Musa

4.3.3 Recommendations:

The highest priority projects should be the Al Akeder and Russeifa Area 3 (Phosphate Pile).

4.4 TASK 4: WATER REUSE FOR COMMUNITY LIVE HOOD ENHANCEMENT

4.4.1 Findings

According to the SOW, WREC needed to identify pilot reuse programs, which can generate incomes, and create a detailed design, field training activities, and capacity building support to develop crop rotation techniques for each program. In addition, WREC was to provide the Hashemite Fund with needed technical assistance to extend the pilot in Wadi Mousa to other areas such as Ma'an.

[1] ASEZA and ADC have only recently engaged in these activities and earlier, ASEZA was nonresponsive to requests. For example, ASEZA took more than four months to confirm the landfill site so that field investigations could proceed. The landfill design activities kicked off in March 2013 as planned and ASEZA and ADC have been included in planning and decision making to the extent they were willing. WREC anticipates that they will have more interest and input once field investigations are completed in December 2013 and the feasibility/design progresses.

WREC accomplishments for this task include:

A work group composed of various stakeholders was established. The groups had several meetings and Wadi Musa and Ma'an technical assistance plans were submitted. WREC is working with the Farmers' Association to fix the irrigation system at the farm level in Wadi Musa (by replacing valves and the GRP network) and is planning to build a warehouse to store alfalfa products, as well as establish a co-op to help farmers market their products. WREC will help the association produce alfalfa seeds at the site.

At the time of this report, the team in Ma'an was working with USAID to secure implementation funding. Because of sensitivity issues with the local community, the team in Ma'an will have to wait until funding is secured before initiating direct communication. The target for the future is three to four water contracts between farmers and WAJ in Ma'an.

The Reuse IKC is still under discussion as the host institution in not yet defined, although the Jordan University Water Research Center is a potential host. Reuse is an important supplemental water source for Jordan, and a local organization, which will take responsibility for comprehensive oversight and support, is required.

Madaba and Mafrqa are excluded from the reuse study and Karak might be added in the future.

The Evaluation Team noted the following on the reuse task:

1. Jordan's lack of a responsible body or organization for reuse activities in the country negatively impacts sustainability.
2. The reuse task leader has changed three times.
3. The work group did not receive this task's SOW to compare with planned activities.
4. The Farmers' Association in Wadi Musa is weak and has no technical capacity to run the operation and maintenance (O&M) for major components in the pilot project. O&M should be given to a qualified technical operator such as AWC.
5. AWC claims responsibility only for the water supply from the plant to the pumps. They state that filters, which come after the pumps, are WAJ's responsibility. The three filters have restricted flow for three years, reducing the network pressure and water supply to farms.
6. Farms are expanding in number: they numbered 10 in 2006 and now number 42, with some located on higher land, requiring a new hydraulic design. WREC has not created a design for an expansion nor considered a new booster station (specified in the original design).
7. According to farmers, WREC worked well from 2006 to 2009, when irrigation efficiency started to decline. According to the original design, one pump operated and the second was on standby. Currently, two pumps are running, but the pressure and volume are low.
8. The HFDB is not taking the lead in managing the reuse project. The only support it has offered so far is one operator with a low technical background. Farmers complained about the HFDB not providing support. Although the King visited the pilot project in 2006 and donated 30,000 JD to the association, the money went to the HFDB but has not been received by the association despite opening the (HFDB requested) bank account.

The Evaluation Team's conclusions, based on the analysis of the findings in the subtasks listed above and the feedback from interviewed stakeholders, are listed in the table below.

Summary of Findings

Task	Strategy/Management/Implementation	Progress %	Level of Satisfaction	Sustainability
Support for Wastewater Reuse Activities	The strategy, management, and implementation of this task can be considered working to a certain extent. However, WREC should review the farm design to consider the expansion in the highland and necessity of another booster pump. WREC needs to dedicate O&M responsibility to a qualified operator such as AWC. WREC should work on establishing a body for reuse activities in Jordan. The HFDB is not a good option.	20%	Low due to low progress and negative feedback from farmers	No responsible body for Jordan's reuse activities No responsible body for O&M Farmers' Association does not have technical capacity
Reuse Knowledge Centre	Nothing is achieved yet WREC is still searching for a host institution	0%	Low	Must be independent institution for reuse

4.4.2 Conclusions

Reuse pilots have made little progress as a result of uncertainty in their design. Wadi Musa, the only pilot, still suffers from irrigation inefficiency, the random expansion of farms not based on hydraulic design affecting the quantity and quality of crops, and filters not working resulting in low water pressure at farms. It is anticipated that WREC will successfully address these deficiencies remaining from previous projects.

The Wadi Musa Farmers' Association is weak and has no technical capacity for O&M. With the interventions now being implemented by WREC, this is expected to improve substantially and in a sustainable manner (if stakeholders accept appropriate roles and responsibilities and act accordingly).

Responsibilities for O&M are distributed between AWC, WAJ, HFDB, and Farmers Associations, negatively affecting the pilot project.

The Wadi Musa pilot project went well from 2006 to 2009, when the situation started to deteriorate.

The reuse IKC has been an outstanding issue for many years. WREC tried several options for the host institution; however, the issue remains unresolved.

4.4.3 Recommendations

Establish an organization to be responsible for the reuse activities in Jordan. This organization will be responsible for disseminating information to farmers, monitoring, technical advice, and planning.

Give the O&M responsibility of the water supply system to one qualified operator since the Farmers' Association does not have the required technical capacity.

Consider all potential reuse sites in Jordan during the assessment and planning phase.

5.0 LESSONS LEARNED

- Using the MoEnv as the GoJ counterpart was problematic.
- Three remediation areas are unique: Al Akeder is complex and difficult; Aqaba will move to implement landfill design; and Russeifa's priorities should be based upon technical, financial, social and political factors.
- When working on old USAID projects, try to collect a complete history prior to starting activities.
- The highest level at GOJ should prioritize monitoring and enforcement responsibilities at MoEnv.
- Step-by-step processes for industrial P2/EMS are realistic and necessary. Sustainability will hinge upon the dynamics of the Network, DFZC facilitation, industry demand and funding availability.
- Champions needed to make over major government agencies.
- There is a need for integration of stakeholders' technical staff in all project stages.
- Decisions need to be first agreed upon at the technical level before they are sent for approval to Ministries.
- Human resources issues and staff morale will influence MoEnv's performance.
- Environmental protection agencies must be fully empowered.
- Vested industrial interests will resist GoJ regulatory, monitoring, and enforcement attempts.
- Many industries are not supportive of the EMS/P2 program.
- Industries are looking for affordable "cost saving" recommendations.
- MoEnv, industrial zone managers, and chambers of industry should coordinate efforts.
- Environmental degradation is easy to ignore and acceptance of a poor situation is common.
- Proposed site remediation efforts face many obstacles.
- GoJ needs some incentive to monitor and support agricultural reuse activities.
- Agricultural reuse will occur spontaneously downstream from either WWTPs or untreated wastewater streams. Oversight of these activities by authorities is not ensured.

ANNEXES

ANNEX 1: SCOPE OF WORK

STATEMENT OF WORK FOR THE EVALUATION OF WATER REUSE AND ENVIRONMENTAL CONSERVATION PROGRAM

I. INTRODUCTION

USAID Jordan wishes to carry out a Mid-term evaluation of the Water Reuse and environmental Conservation (WREC) project. The objective of the task is to evaluate the performance of the project, identifying successes and weaknesses, and make recommendations on successful project implementation strategies and approaches that could be replicated/utilized by USAID/Jordan in future programs, especially as related to the water sector.

Details of project to be evaluated:

Project Title:	Water Reuse and Environmental Conservation (WREC) project
Implementing Partner:	AECOM
Total Cost:	$ 27,912,783.00
Duration:	Augus1, 2010 – July 31, 2015

II. BACKGROUND

Scarcity of water and energy sources is the most critical development issue in the Jordan. Enhancing access to clean water contributes to social and economic development, improves citizen well-being, and promotes political stability- all important foreign policy goals. The potential for performance improvement in the Jordanian water sector through improved water reuse and pollution prevention has been recognized for some time. Expanded and coordinated application of water reuse and industrial pollution within the industrial sector has the potential to enhance efficiencies, reduce water and energy consumption, and facilitate the advance of best industrial environmental management practices resulting in better environment for Jordanians, efficient use of water and energy resources, more productive use of critical water resources and energy, and a solid foundation for future improvement.

Over the past several years, a number of projects have implemented efficiency in Jordan's water and energy sector focusing on commercial sector. The geographic and organizational scope of these projects varies and their application to the industrial sector is needed.

USAID proposed to address these constraints, building on the recommendations of previously implemented USAID projects such as the Reuse for Industry, Agriculture and Landscaping (RIAL) and the Manifest projects to position Jordan as a recognized leader in the water reuse and pollution prevention. Additionally, USAID aimed to focus on the need for strong and active support from all levels of Jordan's government to create positive regulatory and promotional green eco-efficient economy for sustainable industry in Jordan. These objectives resulted in development of the WREC project.

In 2012, A review team under Water Indefinite Quantity Contract (IQC) conducted a review of projects currently implemented by the water office to assist the USAID Jordan develop new strategy in Jordan's water and wastewater sector. Based on the analysis and review to the capabilities of the existing projects, an evaluation for the WREC was proposed in the Portfolio

review conducted in May 2012. The purpose of the evaluation is to integrate various efforts and to assess the WREC project and to see how it will fit with our new strategy. The assessment phase final report included comprehensive recommendations for improving water sector performance, to rebalance the USAID/WRE portfolio to one with more focus in infrastructure investments that are planned and needed to improve water supply, the support to Non-Revenue Water, to design and pilot a Highlands Strategic Groundwater Reserve program in the water sector, and to adjust its support to the industrial wastewater treatment programs and to build on the recent reform strategy intended to foster better practices.

The purpose of the WREC project is to help ensure that Jordan's water and wastewater sector. The project provides capacity building, technical assistance and training to support key institutions, such as the Ministry of Environment (MoE) and national laboratories, for improved environmental analysis and governance; engineering feasibility studies for industrial waste management and landfill rehabilitation; industrial wastewater treatment system designs; reclaimed water reuse pilot projects; and pollution prevention initiatives.

A total of 27 subtasks were originally identified for detailed development (with four tasks under the WREC project) as follows:

The four major tasks:

- Task 1: Institutional and Regulatory Strengthening
- Task 2: Pollution Prevention and Industrial Waste Management
- Task 3: Disposal Site Rehabilitation and Feasibility Studies
- Task 4: Water Reuse for Community Livelihood Enhancement

Institutional and Regulatory Strengthening

Extensive consultation with the MoE is supporting a thorough institutional needs and gap analysis at the national and governorate levels. The project is developing technical assistance and training plans to enhance enforcement capability of the MoE and to emphasize on priorities identified during the assessment. Task 1 activities maximize coordination with other USAID projects and other donors to provide training and mentoring to MoE and Environmental Rangers staff. Task 1 also supports the technical abilities of the MoE on abatement of industrial pollution through enhanced access to industrial wastewater laboratory analyses. It will further promote compliance assistance efforts for the regulated community through information sharing and data management, as well as through expanding and promoting the services of the information knowledge center (IKC). To better manage and utilize the IKC and have it more sustainable, it is decided to split the IKC into Environment Compliance Database (ECD) within the MoE and Network components within the industrial community (i.e. the Jordan Chamber of Industry (JCI).

Pollution Prevention and Industrial Waste Management

The project surveyed 400 industries, and in the coming months will provide broad workshop training to about 150 industries. The project is also to work closely with up to 40 selected industrial facilities, to survey pollution sources, gauge interest in pollution prevention activities and instill good environmental practices through Environmental Management Systems (EMS) and pollution prevention (P2) initiatives. The project team is working with stakeholders such as the Development and Free Zones Commission (DFZC) to prepare guidelines for EMS/P2

programs that can be used for new developments at Mafraq, at Ma'an, and near the Dead Sea. Task 2 also includes preparing the conceptual designs, cost estimates, and technical specifications for three Industrial Wastewater Treatment Plants (IWTPs).

Disposal Site Rehabilitation and Feasibility Studies

The project team works closely with local team members, on-site workers, and the MoE to investigate disposal sites, identify potential improvements, and, at certain sites, implement improvements in a cost-effective and environmentally and socially responsible manner. Findings from site investigations are the basis for evaluating the feasibility of alternatives for remedial actions and site closures. Alternatives may include replacing existing active facilities with new proposed facilities. Some sites may need simple low-cost, high–return management changes (such as reducing the landfill working face) will be recommended for immediate action by the local site operations personnel. The intent of these actions will be to minimize release of landfill gas and odors, attractive nuisances (things that might attract children or other trespassers), leachate production and associated risks to public health and safety.

Water Reuse for Community Livelihood Enhancement

The project team has been working with a wide range of stakeholders; primarily the Ministry of Water and Irrigation (MWI) and Water Authority of Jordan (WAJ), to identify and plan new water reuse pilot projects that will enhance community livelihoods for generating income from reclaimed water irrigation of agricultural crops. In addition to the technical assistance to establishing new pilot projects, continuing technical assistance is being provided to the previously established reuse pilot in Wadi Mousa. Sustainability is of utmost importance for these pilot projects, and the project team works closely with the local communities as well as stakeholder government institutions to develop plans to support self-sustainable operation of the pilot projects. The plan for the Reuse Knowledge Center (RKC) has changed form from a physical facility at Wadi Mousa to supporting an NGO (Jordan Desalination and Reuse Association, JoDRA) that has similar goals in terms of dissemination of water reuse knowledge and expertise. The current approach is that the concept of a Wastewater Reuse Knowledge Center should be developed independently of the originally planned facility at the Wadi Mousa pilot site; however, identification of physical sites as interface points for the dissemination of knowledge is ongoing, including the Sustainability Center at the King Abdullah II Park and other sites.

In summary, the project will complete most of its activities in terms of technical assistance, design and analysis by July 2013 according to the year 3 work plan submitted by AECOM.

Task-1, the following will be done:

1.1 Enforcement: Improve regulatory capacity

1.2 Labs: Enhance laboratory capacity

1.3 Knowledge center: Support compliance and awareness

1.4 Industrial Environmental Excellence Award

Task-2, the following will be done:

2.1 Surveys: Evaluated available information and assessed needs. Visited industrial estates Identified priority industry sectors

2.2 Training and Audits: Implement P2 upgrades, Improve environmental management, Conserve water and energy

2.3 Design (3 IWWTP): Evaluating locations and Design 3 industrial wastewater treatment plant at King Abdullah II Industrial Estate at Sahab, at Zarqa and the third is not yet determined.

2.4 Conduct Integrated Water Resources Management (IWRM) study for Aqaba and for King Abdullah II Industrial Estate at Sahab. Strategic Environmental Management Plan was also conducted for King Abdullah II Industrial Estate at Sahab.

2.5 Enforce Ministry of Environment capacity to assess and document their suitability in industrial performance monitoring

Task-3, feasibility and design for the following sites will be done:

3.1 Al Akeder industrial liquid waste lagoons

3.2 Russeifa Site 1 (Landfill Closure)

3.3 Russeifa Site 2 (Minig Pit)

3.4 Russeifa Site 3 (Low-grade Ore pile)

3.5 Russeifa Site 4 (Mining tunnels)

3.6 Russeifa Site 5 (Lagoon)

3.7 Russeifa Site 6 (overburden pile)

3.8 Aqaba landfill

3.9 Aqaba tires recycling

Task-4, the following will be done:

4.1 Socio-economic Impacts of water reuse activities,

4.2 Wadi Mousa Renewal to become sustainable,

4.3 Pilot (1) Ma'an

4.4 Pilot (2) Mafraq

4.5 Pilot (3) Madab

4.5 Reuse Pilot (king Abdulla II Park)

4.3 Reuse Knowledge Center

III. PURPOSE OF THE EVALUATION

The purpose of this external participatory evaluation is to assess the process, methodologies, and outcomes of the Water Reuse and Environmental Conservation (WREC) project on

improving industrial environmental practices with focus on water and energy savings, and measure the sustainability of the achievements on project beneficiaries and of the methodologies used.

The contractor shall review the project's implementation methodology and to the degree possible verify the results achieved in order to:

- Summarize the achievements of the project
- Identify lessons learned and what factors contributed most to success and failure
- Specifically assess the strength and weaknesses of:
  - Project management and administration approach
  - Work with the Government of Jordan
- Provide recommendations to USAID, based on lessons learned from the project, on best approaches and strategies to improve successes, sustainability, and cost-effectiveness of similar future projects in the water sector

This information will help assess the extent of investments in improving governance and decision-making in the water sector.

IV. EVALUATION QUESTIONS

The evaluation must provide detailed answers to the following questions:

1. What have been the achievements of WREC project? What is the success of the various tasks and sub-tasks implemented by WREC? What worked, what did not work and why? Which are fully instituted and which are critical and require further investment?
2. Did the project's strategy enhance or weaken achievement of the anticipated tasks? Did the project's management approach enhance or weaken achievement of the anticipated tasks? Did the project's implementation approach enhance or weaken achievement of the anticipated tasks? Define the approaches – from strategy, management and implementation – that enhanced the project and identify the ones that can be replicated in the future. Also, identify lessons learned that weakened the program and how these can be alleviated in future programs.
3. Determine the level of satisfaction of the counterpart institutions and the stakeholders with the program. Specify what satisfied them and what did not and why.
4. Are the processes, innovations, institutions, partnerships, linkages introduced sustainable?

V. IMPLEMENTATION

A. EVALUATION METHODOLOGY

The Evaluation Team may utilize both qualitative and quantitative methodologies that address all evaluation questions. In consultation with USAID, the Evaluation Team shall perform the following tasks:

1. Preparation & Planning:

1. Review all relevant information and additional materials that may be necessary to support drafting of the evaluation report. The following documents are available at the following website: http://jordan.usaid.gov/en/opportunities/pages/jobs.aspx).
    i. WREC Project scope of work and PMP
    ii. WREC Project annual reports
    b. Meet with USAID and WREC project staff upon arrival in-country to discuss work plan and evaluation methodology.
    c. Update work plan based on kick-off meeting and literature review and present to USAID for approval by close of the 3rd working day of arrival in-country. This should include an updated questionnaire to be addressed during evaluation.
2. Interviews and Site Visits:
    a. Conduct interviews with the appropriate staff of USAID/Jordan, Jordanian Government, stakeholders and beneficiaries of the project, including. USAID will provide initial list of in-country contacts prior to Evaluation Team arrival as well as assist in logistics of appointing meetings if and when needed.
    b. Perform field trips as needed to interview project beneficiaries, business associates, and local government representatives.
3. Reporting:
    a. Conduct weekly progress meetings with USAID while in-country to update USAID on evaluation progress and findings, verify and clarify information, and address any logistical issues.
    b. Present a draft report outline to USAID within 8 working days of arrival in-country.
    c. Conduct a debriefing presentation to USAID management on evaluation findings, initial conclusions and recommendations within 18 working days of arrival in-country.
    d. Submit a draft evaluation report detailing the findings from the evaluation, lessons learned and recommendations for future interventions within 20 working days of arrival in-country. The draft report should incorporate comments from the debriefings. USAID will provide written comments on the draft report within 5 workings days after receipt of draft report.
    e. Submit final evaluation report together with supporting materials detailing the findings from the evaluation, lessons learned and concrete set of recommendations for future interventions within 5 workings days of receiving USAID comments on the draft report. The final report must include an executive summary, table of contents, body and appendices, and must not exceed 40 pages (excluding the appendices). All evaluation questions must be answered, recommendations must be stated in an actionable way with defined responsibility for the action and supported by a specific set of findings, and limitations (on data and in general) must be clearly stated. Copies of evaluation scope of work, sources of information, and all data collection instruments and results must be included as appendices in the final report.
    f. Submit the final report to the Development Experience Clearinghouse (DEC) at http://dec.usaid.gov within three months from completing the final report and after obtaining final clearance from USAID.

B. PERFORMANCE PERIOD

The consultancy will be for a period of 35 days. A draft final report must be submitted before the Evaluation Team departs post.

USAID anticipates that approximately 35 working days are needed to conduct the evaluation. The Evaluation Team will spend up to 4 weeks in Jordan to complete the necessary analysis and draft reports. The following schedule is envisioned:

Preparation work and document review: Up to 5 working days, in home country

Interviews, field work, debriefings, and report writing: Up to 25 working days, in Jordan

Finalizing evaluation report: Up to 5 working days, in home country

The Evaluation Team needs to make arrangements for a 6-day workweek although the formal working week in Jordan is Sunday through Thursday. The Evaluation Team needs to budget for travel within Jordan as needed. The Evaluation Team is expected to arrange all logistics needed for the evaluation.

The Evaluation Team shall provide a detailed work plan for conducting the evaluation. This shall include a list of tasks to be completed, the level of effort for each task, and the deliverables upon the completion of each task.

C. TEAM COMPOSITION

USAID envisions that a Three-member team is required to conduct the evaluation. The Evaluation Team will be composed of two expats and one local with significant knowledge on institutional and capacity building, industrial pollution prevention, rehabilitation of contaminated sites, and water reuse in developing countries.

The Evaluation Team must be qualified and be sufficiently respected so that its recommendations will be authoritative and influential. The Team should have expertise in environment management and design, decision-making and evaluations, with particular focus on:

- Experience in implementing WREC projects and working with conditions and challenges similar to those in Jordan.
- Experience in monitoring and evaluation, especially environmental study, design, and implementation program.
- Developing country experience.
- Excellent writing and communication skills with experience in producing team-based reports.
- Academic background in water, wastewater, environment and evaluations.

See Section L for detailed qualification requirements for the team.

D. MANAGEMENT

The Evaluation Team will work closely with the Contracting Officer Representative (COR) of this task order. USAID staff will join the Evaluation Team on some of their meetings with stakeholders and partners.

The Team will provide debriefings to USAID prior to commencing the evaluation, on a regular weekly basis while in Jordan, and prior to the submittal of the draft report.

The Evaluation will be implemented in Jordan. Travel throughout Jordan may be required.

VI. PERFORMANCE MONITORING PLAN

The contractor's performance shall be evaluated based on the completion of specific tasks as outlined in the Task Order, adherence to the work plan, and reports submitted to the Task Order Contracting Officer's Representative (TOCOR).

VII. BRANDING STRATEGY

The Contractor is required to submit a Branding and Marking Strategy for each part of this this RFTOP. This Branding and Marking Strategy shall be an annex to the Cost Proposal.

VIII. GENDER CONSIDERATION

It is essential that the contractor be cognizant and considerate to gender specific issues, priorities and norms.

ANNEX 2: EVALUATION DESIGN MATRIX

Evaluation Question	Type of Analysis Conducted	Data Sources and Methods Used	Interview Selection Process and Size of Sample	Limitations / Concerns
Task No. 1: Institutional and Regulatory Strengthening				
Q.1.1 Can the Ministry of Environment assume complete responsibility for monitoring and enforcement of solid and liquid waste generation and disposal?	Description based upon content analysis of expert opinions	Key informant interviews with key personnel	Interviewees identified by evaluation team, AECOM, USAID and GoJ	
Q.1.2 Can existing national water quality laboratories be competent service providers for the national MoEnv monitoring program?	Description based upon content analysis of expert opinions	Key informant interviews with key personnel	Interviewees identified by evaluation team, AECOM, USAID and GoJ	Laboratory management and annual budget. Staff
Q.1.3 Are the Network and the Environmental Compliance Database the proper organizations to promote data compliance assistance efforts for the regulated community?	Description based upon content analysis of expert opinions	Key informant interviews with key personnel	Interviewees identified by evaluation team, AECOM, USAID and GoJ	Industry inputs, network financial support
Q.1.4 Has the establishment of the Industrial Environmental Excellence Award fostered the right attitude in the industrial community for national recognition of companies' efforts?	Description based upon content analysis of expert opinions	Key informant interviews with key personnel	Interviewees identified by evaluation team, AECOM, USAID and GoJ	Significance of award among the public and industries
Task No.2:Pollution Prevention and Industrial Waste Management				
Q.2.1 Did WREC manage the process of selection of industries and have MOU's with industries that will eventually lead to abatement activities and replicability?	Description based upon content analysis of expert opinions	Key informant interviews with key personnel and select industries	Interviewees identified by evaluation team, AECOM, USAID and GoJ	Industry board, managers and profitability
Q.2.2 Has training and audits produced the necessary impetus to improve environmental management and conserve energy and water?	Description based upon content analysis of expert opinions	Key informant interviews with key personnel and select industries	Interviewees identified by evaluation team, AECOM, USAID and GoJ	Economic and social benefit
Q.2.3 Has the design of industrial wastewater treatment plants been performed appropriately and will construction follow?	Design review and analysis with GoJ and stakeholders	Key informant interviews with key personnel and select industries	Interviewees identified by evaluation team, AECOM, USAID and GoJ	B/C analysis, GoJ monitoring and enforcement

Evaluation Question	Type of Analysis Conducted	Data Sources and Methods Used	Interview Selection Process and Size of Sample	Limitations / Concerns
Q.2.4 Will the IWRM and the EMP plans lay the ground work for better use of energy and water? Will waste stream disposal be enhanced?	Description based upon content analysis of expert opinions	Key informant interviews with key personnel and select industries	Interviewees identified by evaluation team, AECOM, USAID and GoJ	B/C analysis, future cost & changes for utilities
Task No. 3. Disposal Site Rehabilitation and Feasibility Studies				
Q.3.1 Is remediation of hazardous liquid waste at the Al Akeder site being approached in a manner that is likely to succeed?	Description based upon content analysis of expert opinions	Key informant interviews with key personnel and select industries	Interviewees identified by evaluation team, AECOM, USAID and GoJ	Environmental costs and concerns
Q.3.2Site investigations and feasibility studiesin Aqaba for future landfill and tire disposal are proceeding to a logical conclusion?	Description based upon content analysis of expert opinions	Key informant interviews with key personnel and select industries	Interviewees identified by evaluation team, AECOM, USAID and GoJ	Environmental costs and concerns
Q.3.3 Planning for Russeifa is proceeding in a manner consistent with GoJ follow through and remediation. *1. Landfill* *2. Mining Pit* *3. Ore Pit* *4. Mining Tunnel* *5. Lagoon* *6. Overburden*	Description based upon content analysis of expert opinions	Key informant interviews with key personnel and select industries	Interviewees identified by evaluation team, AECOM, USAID and GoJ	Environmental costs and concerns
Task No. 4: Water Reuse for Community Livelihoods				
Q.4.1 Are the Water Reuse for Community Livelyhoods sites proceeding in a manner consistent with project objectives? *1. Wadi Musa* *2. Ma'an* *3. Mafraq* *4. Madaba* *5. KA II Park* *6. Knowledge Center*	Description based upon content analysis of expert & local opinions	Key informant interviews with key personnel and farmers	Interviewees identified by evaluation team, AECOM, USAID and GoJ	Reliability of flows and economic returns
Q.4.2 Will the Reuse pilot at KA II Park and the Reuse Knowledge Center be useful for information dissemination and reuse promotion?	Description based upon content analysis of expert opinions	Key informant interviews with key personnel and farmers	Interviewees identified by evaluation team, AECOM, USAID and GoJ	User interest and access

Evaluation Question	Type of Analysis Conducted	Data Sources and Methods Used	Interview Selection Process and Size of Sample	Limitations / Concerns
Q.4.3 Has the socio-economic impact assessment established that there is long term viability for reuse activities?	Description based upon content analysis of expert opinions	Key informant interviews with key personnel and farmers	Interviewees identified by evaluation team, AECOM, USAID and GoJ	GoJ support for agriculture

ANNEX 3: DATA COLLECTION INSTRUMENTS

MINISTRY OF ENVIRONMENT QUESTIONNAIRE

Background: name and position; organization; local/regional/national); main activity

WREC: direct experience, your involvement, relationship – yours and organization

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1. What were the initial obstacles?
2. In what way was WREC innovative? Provide examples or aspects.
3. WREC adding to MoE or starting new agenda: what extent, how, what level?
4. Overall perceptions to date, engagement, ownership?
5. WREC leverages other programs or donors? (which programs, in what way)
6. WREC leverages other GoJ programs (national/regional)? (which programs, in what way)
7. WREC assisting GoJ or MoE legal and/or policy reform
8. WREC's main challenges in implementing and achieving outputs?
9. Key changes and accomplishments to date.
10. WREC's role and impact: enforcement, monitoring labs, training and knowledge dissemination.
11. What would you say are the priorities?
12. Have you been informed and involved with activities?
13. Training: you, your staff, what training, how effective, best aspects. Other training needs?
14. What improvements in legal, regulatory or monitoring/enforcement?
15. How to scale up or pursue additional gains?
16. Will gains be permanent?
17. Sustainable without donor support?

AECOM QUESTIONNAIRE

Background: name and position; organization; local/regional/national); main activity

WREC: direct experience, your involvement, relationship – yours and organization

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1. Describe your involvement in the project.
2. Describe initial obstacles.
3. How has AECOM been innovative? Give examples or aspects.
4. AECOM adding to the body of knowledge, how and at what level?
5. How would you characterize buy in by participants?
6. Has AECOM been effective at integrating others efforts? Maximizing development impact or aid effectiveness.
7. What additional opportunities do you see?
8. How has project added to environment sector knowledge?
9. Does the program leverage other USAID or donor programs? What programs – how?
10. Describe the main challenges for implementation or outputs.
11. All four tasks focus on either health or environmental concerns.
12. New contract modification was approved in June 2013 – your thoughts on Modification.
13. Lessons learned?
14. Any scale up or leveraging ideas for upcoming activities?
15. When the project ends – what tasks will continue to progress?
16. Can AECOM do anything to improve sustainability?
17. Any thoughts on how USAID can improve: strategy, management or implementation?

INDUSTRY QUESTIONNAIRE

Background: name and position; organization; local/regional/national); main activity

WREC: direct experience, your involvement, relationship – yours and organization

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Primary industries with MOU's in place

1. Describe your overall perception of the WREC program.
2. Does WREC address important needs?
3. Will WREC improve industrial economic or environmental impact?
4. What training to date for you or your staff? What benefit, how effective, any other training requirements.
5. What benefits from water or energy audits?
6. Three industrial wastewater treatment plant designs will be completed. Will these lead to financing and construction activities?
7. What benefit from integrated water resource plans? ASEZA and SAHAB
8. What are the project priorities? Do they match industry needs?
9. Will finance be available for industry retrofitting?
10. What have been the main contributions so far?
11. What barriers do you see moving forward?
12. Will MoE enforce industrial monitoring and environmental regulations?
13. What are some specific improvements you are aware of? (catalyst, water, energy, P2)
14. Public perception of industries contributions? Good and Bad
15. How do self- regulation, monitoring and enforcement currently work: industrial estates, development areas, free zones with Development and Free Zone Commission, Jordan Industrial Estates, and Jordan Chamber of Industries?

WASTE DISPOSAL SITE REMEDIATION QUESTIONEER

Background: name and position; organization; local/regional/national); main activity
WREC: direct experience, your involvement, relationship – yours and organization

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Russeifa: landfill closure, mining pit, ore pit, mining tunnels, lagoon, overburden;
Al Akeder; and Aqaba: landfill and tire disposal

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1. Describe your experience with WREC
2. Initial obstacles to implementation
3. In what way has WREC been innovative – examples.
4. Has WREC added to the body of existing knowledge?
5. Is WREC leveraging other donors or projects?
6. What will the site rehabilitations main challenges be?
7. How do you see WREC's role and possible impacts?
8. Will these be implementable proposals? Why or why not?
9. Any progress or specific improvements to date?
10. Any lessons learned from past experiences?
11. JD 49 million is available for financing work. Your thoughts?
12. Will health and environmental impacts be improved?
13. What do you know about the project strategy?
14. How is AECOM management so far? Any suggestions?
15. What is your level of satisfaction with WREC?

REUSE QUESTIONNAIRE

Background: name and position; organization; local/regional/national); main activity

WREC: direct experience, your involvement, relationship – yours and organization

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1. What were the Initial obstacles and project delays?
2. How did the working group function?
3. What has WREC added to the reuse efforts to date?
4. How has WREC been innovative?
5. Overall perception of beneficiaries; engagement; and ownership?
6. WREC leverages past reuse activities? Other donors or programs. Examples.
7. WREC main challenges for strategy, implementation and achieving outputs?
8. Sustainable sites: Wadi Musa, Ma'an, Mafraq, and Madaba?
9. Why was the pilot at KAII Park and the Knowledge Center cancelled?
10. Accomplishments after first three years. What happens during the last two years?
11. Lessons learned to date?

ANNEX 4: LIST OF PERSONS INTERVIEWED

TASK 1: Institutional and Regulatory Strengthening

1. M of Env; water laboratories; Royal Rangers
2. PFC-DSEER; WEARRC; WEEL
3. Network (MoE, JCI, DFZC & JSMO)
4. Env Compliance Database (ECD) – DIWAN system
5. Environmental Excellence Award (MoE & KACE)

TASK 2: Pollution Prevention

1. MoE; MoIT; JCI; DFZC; and JIEC
2. EMS Initiatives
3. DF2C (EMS/P2 programs): Aqaba and KAIE
4. IWWTP: KAIE at Sahab and Zarqa Industrial Area
5. MOU's with 40 industries – five sectors: geographic, size and diversity
6. QIZ managers
7. 400 industry survey
8. 150 industry training

TASK 3: Waste Disposal and Feasibility Studies

1. Al Akeder's liquid waste lagoons
2. Russeifa's six activities
3. Aqaba's two activities
4. Monitoring and Enforcement of Waste (solid & liquid) Disposal

TASK 4: Water Reuse

1. Socio-economic impacts
2. Reuse locations: Wadi Mousa, Ma'an, Mafraq, and Madaba
3. Reuse Pilot at KAI park
4. Reuse Knowledge Center

Additional Organizations:

1. JoDRA
2. Groundwater Quantity and Quality Dept at MWI
3. Surface Water Quality at MoH

Organization	Interviewed Personnel	Position	Date
AECOM	Charles Darnell	COP	20-10-2013
	Karl Boyer	DCOP	
	Taunya Atwood	DCOP-Operations	
Ministry of Environment (MOE) first meeting	Maha Maa'ytah	Projects Dept	21 -10-2013
	Butahynah Batarseh	Polices Dept	
	Hiba Za'balawi	Projects Dept	
	Abed Al Kareem Shalabi	EIA Dept.	
	Mohammed Afaneh	Polices Dept.	
Ministry of Water and Irrigation (MWI)	Rania Abed Al Khaleq	Environment Dept	22-10-2013
Jordan Industrial Estates Corporation (JIEC)	Loay Suhweil	Manager	23-10-2013
	Ala'a Zuriekat	Head of Environment Dept	
	Ibtisam Abo Zeid	Technical Contwrol Dept	
AECOM 2nd Meeting	Tasks Leads		24-10-2013
USAID 1st Meeting	Pamla Morris	Program Officer	25-10-2013
	Amer Al Hmoud	Project Manger	
Consultant	Amal Hijazi	Former USAID Employee	26-10-2013
Jordan Chamber of Industry	Abeers Saleh	Assist Director	27-10-2013
Zarqa Chamber of Industry	Mohammed Arslan	Manager	27-10-2013
Water Authority Lab	Muna Hindeiya	Manger	28-10-2013
AECOM 3rd Meeting	Task Leads		29-10-2013
USAID 2nd Meeting	Amer Al Hmoud	Project Manger	29-10-2013
Russeifa Field Visit			29-10-2013
AECOM 4th Meeting	Task Leads		30-10-2013
AECOM 5th Meeting	Task Leads		31-10-2103
Sahab Industrial City Visit and Meetings with Al Riyadh Facotry and Arab Centre for Medical Capsules		Head of Labs	31-10-2013
Wadi Musa Site Visit	Farmers Association		2-11-2013
Aqaba Special Economic Zone Authority (ASEZA)	Mazen Rayyan	Head of Environment Section	3-11-2013
Aqaba Development Corporation (ADC)	Abed Al Raoof Darwish	Assistant Executive Director	3-11-2013
Aqaba Water Company (AWC)	Naeem Saleh	Manger	4-11-2013
	Yaser Hangteh	Sanitation Manger	4-11-2013

ANNEX 5: LIST OF DOCUMENTS REVIEWED

1 AECOM Annual Work Plans (3)
2 AECOM Scope of Work
3 AECOM Contract Modification June 13, 2013
4 AECOM Progress Report October 30, 2012
5 AECOM Draft Progress Report 2013
6 AECCOM Performance Monitoring Plan – Year 3
7 AECCOM Performance Monitoring Plan – Year 4
8 AECOM Training Plans, 2011, 2012, 2013
9 AECOM MoEnv Baseline Assessment, February 2012
10 AECOM MoEnv Action Plan, April 2012
11 Aqaba IWRM Report, December 2011
12 Assessment of Priority Industry Report
13 Selection of 40 Partners August 2012 *
14 IWWTP Designs for Sahab and Zarqa (feasibility study)
15 Al Akeder Feasibility Report
16 Russeifa Feasibility Studies

- Task 1 Landfill Closure *
- Task 2 Mining Pit *
- Task 3 Ore Pile * - report by Dec 31, 2013
- Task 4 Mining Tunnels* - report by Dec 31, 2013
- Task 5 Lagoon*
- Task 6 Overburden Pile*

Note * means not received by ET

ANNEX 6: SUSTAINABLE BIOSOLIDS BENEFICIAL REUSE

SUSTAINABLE BIOSOLIDS BENEFICIAL REUSE

AECOM received a contract modification for the WREC project on June 12, 2013. One of the major revisions deals with decreased reuse LOE that will limit related activities to only two sites. Wadi Musa would receive support for system O&M and some cooperative and marketing strengthening, and Ma'an would receive some start up assistance to support the three to four farmers that use approximately half of the effluent flow for agricultural purposes. The majority of Task 4 LOE will address the beneficial usage of biosolids. Solutions for the disposal of biosolids and sludge have not received any positive attention from the GoJ to date and the stockpiling of this material is becoming untenable. Debate over the fate of biosolids and implementation of a disposal plan for existing stockpiles is long overdue.

WREC's modified SOW includes several tasks: 1) As Samra sludge management geasibility study; 2) poultry and livestock waste management; 3) technical and advisory support to MoEnv and MWI; and 4) support for a Kingdom wide biosolids management strategy. The SOW appears comprehensive and should be able to resolve the government's current reluctance. Biosolids disposal has many options that are currently used worldwide. Therefore, research and information is readily available. Developing countries successfully manage the problem and most programs have effective monitoring and reporting.

Since there appear to be some issues involving the current Minister of Agriculture who is threatening to rescind approval of the beneficial use of biosolids, the Evaluation Team recommends that USAID support GoJ and WREC in their efforts. At a minimum, a condition precedent may be attached to the foreign assistance fund transfer to ensure that technical recommendations for biosolids are acted upon in a rational, straightforward manner. Personal opinions and political agendas could stall approval of a good technical solution. This two year activity needs a facilitated resolution in order to succeed.

One suggestion would be to hold a regional conference on biosolids disposal. In the past, USAID overcame initial GoJ reluctance to embrace reuse and water demand management via study trips followed by MWI-sponsored conferences. Jordanians appreciate being regional leaders and usually promote good technology and sound engineering practices in public venues. USEPA and selected US and European municipalities, along with both good biosolids practice countries (Egypt for example) and others who need to set reasonable guidelines for future disposal would be welcome at a regional conference which would receive national and regional attention and would facilitate approval and implementation within Jordan and elsewhere.

The USAID-funded As Samra wastewater treatment plant has been storing biosolids since it went into operation. However, paying for the storage is unsustainable and has cost the water sector money it cannot afford. Biosolids with the simplest option can be utilized as a soil amendment; in many places, people have been paying for the material to improve their soils. Any desert country has a readily available solution that should have positive revenue generation potential.

ANNEX 7: EVENTS AND TRAININGS RECORD

Training Attendees By Gender Per Task			
Task	**No. of attendees**	**Gender**	
		Male	Female
Task 1	411	246	165
Task 2	274	195	79
Task 3	19	17	2
Task 4	158	123	35
Network	531	390	152
Total	**1393**	**971**	**433**

	Task 1 Training: Regulatory and Institutional Strengthening			
Date of Event	**Title of Event**	**No. of Attendees**	**Gender**	
			Male	Female
29-25 Sep 2011	Implementation of ISO IEC 17025 2005 and Lab Documentation System	29	13	16
4 Dec 2011	EIA Capacity Building	15	9	6
5 Dec 2011	Institutional Capacity Building	25	17	8
9-11 Feb 2012	Ministry of Environment Retreat	45	37	8
5-7 Jul 2012	Ministry of Environment Retreat	32	27	5
9 Sep 2012	Ben Hayyan Laboratory Training	5	3	2
11 & 18 Oct 2012	EIA Review Training	29	15	14
25-29 Nov 2012	PMP Training and Certification	17	2	15
11 Apr 2012	Signing of MOU with Universities	56	33	23
12- Jun 2012	Awareness Session of ISO/IEC 17025: 2005 Standard for Labs	20	12	8
17 Jun 2012	First SP Training	19	15	4
27-28 Jun 2012	Second SP Training	31	25	6
11 & 14 Oct 2012	Additional Trainning Session On ISO/IEC 17025 and Internal Auditing	10	1	9
4-6 Mar 2013	Policy Development and Consultation Training	13	10	3
29 Aug 2013	Writing Nonconformity and Internal Audit Reports (labs)	15	6	9
1 Jun 2012	Training on Newly Designed Management System (labs)	18	5	13
11-14 Oct 2012 & 21-22 April 2013	Additional Trainning Session On ISO/IEC 17025 and Internal Auditing	18	5	13
18 Feb 2013	Process Reengineering and Management Kick off	9	6	3
28 Feb 2013	Process Reengineering Workplan at EIA and Licensing Directorate	5	5	0
Total		**411**	**246**	**165**

Task 1: Network				
Date of Event	**Title of Event**	**No. of attendees**	**Gender**	
			Male	Female
1 Nov 2011	ISO 6000	8	4	4
8 Dec 2011	Indusrty Academia 1	11	10	1
10 Feb 2012	Irbid Energy	12	8	4
14 Feb 2012	Indusrty Academia 2	35	31	4
21 Feb 2012	MOEnv. Event 1	21	10	11
8 Mar 2012	Nuqul	7	7	0
9 Apr 2012	MOEnv. Event 2	11	1	10
22 May 2012	Industry Academia 3	7	5	2
2 Jul 2012	National Paints	18	15	3
16 Jul 2012	Energy Audit	27	25	2
28 Aug 2012	EE (Energy Efficiency) & AE(Alternative Energy) - Amman	38	35	3
19 Sep 2012	Philadelphia	17	12	5
8 Oct 2012	AE (Alternative Energy),EE (Energy Efficiency), EA (Energy Audit) - Aqaba	13	12	12
2 Oct 2012	AE (Alternative Energy),EE (Energy Efficiency), EA (Energy Audit) - Irbid	50	42	8
27 Nov 2012	Nutridar	8	6	2
19 Dec 2012	ES & L (Energy Standardization and Labeling)	38	26	12
21 Jan 2013	USAID and ESCOs	14	10	4
18 Feb 2013	JIEC Introduction to The Network	19	10	9
27 Feb 2013	Energy Series (6): Incentives and Exemptions for Clean Technology and Tools for Energy Efficiency and Renewable Energy	59	36	23
18 Apr 2013	Introducing The Network to the Clean Technology (CT) Cluster at RSS	10	7	3
28 Apr 2013	Introducing The Network to the Jordan Industrial Women Community (JIWC)	7	0	7
12 May 2013	Energy-Related Field Visits: Field Visit to Mutah University (Tri-Generation System)	32	27	5
13 May 2013	Energy-Related Field Visits: Field Visit to AUM (Geothermal Energy)	45	34	11
19 Jun 2013	Moving Towards Net Positive Energy Buildings and Insutries	16	12	4
22-23 July 2013	Taqetna level 3:renewable energy project management and financing	8	5	3
Title		**531**	**390**	**152**

Task 2: Pollution Prevention and Industrial Water Management				
Date of Event	**Title of Event**	**No. of Attendees**	**Gender**	
			Male	Female
10 May 2012	Eco Efficient Economy	151	112	39
28-29 May 2013	Industry Sector Specific Training	18	10	8
4-5 June 2012	Industry Sector Specific Training	13	7	6
6-7 June 2013	Industry Sector Specific Training	34	29	5
16-17 Dec 2012	EMS Training	12	3	9
18-19 Dec 2012	EMS Training	20	13	7
10 Sep 2012	Signing of MOU with selected industry partners	26	21	5
Total		**274**	**195**	**79**

Task 3: Liquid/Solid Waste Management and Disposal Site Rehabilitation				
Date of Event	**Title of Event**	**No. of attendees**	**Gender**	
			Male	Female
18 Jul 2012	Phosphate Ore Stockpile Radiological Survey and Risk Assessment	14	14	0
3-4 Dec 2012	Site Remediation and Inspection Training – Ekeder Site Case Study	5	3	2
Total		**19**	**17**	**2**

Task 4: Water Reuse and Community Livelihoods				
Date of Event	**Title of Event**	**No. of attendees**	**Gender**	
			Male	Female
30 Nov 2011	Partnerships in Water Reuse - The Way Forward	129	97	32
22 Sep 2011	Ma'an Water Reuse Pilot Project Workshop	29	26	3
Total		**158**	**123**	**35**

ANNEX 8: MEETING NOTES

Meeting with MoEnv -21-10-2013

Participants:

- Abed Al Karim Al Shalabi
- Hiba Za'balawi
- Buthynah Batarseh
- Maha Maytah
- Mohammed Afaneh;

The MoEnv team gave an update on the status of the tasks and the main problems facing the work progress. They acknowledged there was good progress on some tasks but their main concern was they were not involved (working side by side) with AECOM tasks lead. Their role was limited to reviewing reports submitted by AECOM. They complained that AECOM coordinates the project directly with the minster and not with the MoEnv counterpart. This approach resulted in delay in some tasks due to changes in ministers. Also, they raised the issue of the ministry needing to be involved in implementation and not just feasibility or the remediation plan. AECOM completed the feasibility for 4 areas in Russiefa and did the prefeasibility for two others. They are expecting to finish all feasibilities before the end of year 2013.

Meeting with Ministry of Water- 22-10-2013

Participants;

- Rania Abed Al Khaleq

The Ministry of Water and Irrigation involvement in this project is limited to the reuse task. The ministry role is a member of the work group for the reuse. She said the work group members did not get the scope of work for this task. The work only covered Wadi Musa pilot reuse project only. The progress in this task was small, nothing on the knowledge center and small work with farmers.

Meeting with Industrial Estates Corporation 23-10-2013

Participants;

- Loay Suhweil
- Ala'a Zuriqat
- Ibtisam Abo Zeid

Sahab treatment plant is not efficient and suffers from high biological loads from industry. The plant was designed for municipal waste only. It was expanded two times and currently is working with half capacity. Currently there are 4 industries only with serious biological and chemical loads which affect the plant. The cost of the proposed new design for Sahab plant is too high around 18.5 Million $. The industrial estate has participated in the pollution prevention preliminary assessment and training by AECOM. Both Mr Ala'a and Mrs Ibtisma do not feel there will be real and efficient water and energy conservation outcome from this project. For the water resources plan they received the report for comments, they feel the value of this report is small as it is more theoretical.

Meeting with Jordan Chamber of industry 27-10-2013

Participants;

- Ms Abeer Saleh

The main work with Jordan Chamber of Industry was the survey of industries. Ms Abeer acknowledged that the importance of the survey report however, she raised the issue of need to know the codes for industry sectors so they can distinguish between it. The GIZ is working on a complementary work on eco efficiency for water and energy.

Meeting with Zarqa Chamber of industry 27-10-2013

Participants;

- Mohammed Arslan

Zaraqa Chamber of industry is involved only in the Zarqa industrial area treatment plant. AECOM completed the feasibility study of the plant and proposed several options. The estimated cost of the cheapest option is high around 17 m JD. The Chamber of industry considers this plant as crucial to the industries in Zarqa the location of plant still an issue. The prime minster office established a special committee from various ministries to decide on the location of the plant.

Meeting with Minstry of Environment 28-10-2013

Participants;

- Mr Sameer Kilani, project coordinator

The ministry is almost satisfied with work progress and what accomplished so far in the project. If here is any delay it is mainly from the MoEnv due to lack of enough resources and changes in the minsters. The ministry used 4 consultants through the project to help the ministry in implementing and following up the various tasks. Task 1 is almost done except the AWRD and the knowledge base. The Ministry was not involoved in both task 2 (pollution prevention for industries and task 4 (reuse).

Meeting with two factories at Sahab industrial estate 30 -10-2013

Two factories were visited; Al Riyadh factory and Arab Centre for Medical Capsules factory.

Al Riyadh factory is manufacturing food and detergent products. The factor wastewater is transferred by tankers to Russeifa landfill. The factor technical team did not believe that the proposed options to reduce water and energy can be applied due the fact that the factories are old and any changes will be very costly.

For the medical factory they welcomed the proposed options by AECOM and they considered it in their renovation plans.

Meeting with Farmers Association at Wadi Musa 2-11-2013

The farmers acknowledged that the project which started by 10 farms was working well until 2008 when the water pressure and quality started to deteriorate. The main problem causing the drop in the pressure is the failure in the filters which affected the pumps efficiency. In

addition the farms expanded to 42 farms and some of which are in high areas. The said there was a booster station in the previous design but it was not constructed. They complained about the Hashemite Fund, as it is not helping them in operation and maintenance of the irrigation network. AECOM did and assessment to the situation there and is working on rehabilitation of water distribution network at the farms and will fix the valves at farms. It also will help them in producing the AlfaAlfa seeds locally and will construction a warehouse for AlfaAlfa storage.

This tasks surfers from long delay as AECOM still in the beginning of this task and not much accomplished so far.

Meeting with Aqaba Development Corporation (ADC) 3-11-2013

Participants;

- Abed Al Raoof Darweesh from ADC
- Mazen Rayyan from ACEZA

Both Mr Darweesh and Rayyan do feel comfortable on how this project was implemented. The raised the issue of being not involved in the project but rather to comment on the submitted reports only.

For the landfill the sites was visited by the evaluation team and found the new site is reasonable. For the tires study they do not feel there is tires problem in Aqaba as most of the used tires are reuse again either in the cement factory or other industries.

At the same day the evaluation team did the design for the lines with Aqaba Water Company and exchanged ideas on this. In summary, there are not a proper drought management plans in all countries in the region.

For the integrated water resources management plan; the scope of work calls to do the meeting at USAID. The completed study on the IWRM for Aqaba focused on water distribution in the city and did not cover the Al Harm in Makka city.

Meeting with MoE- 17-10-2013

Participants;

- Mohammed Al Khashashneh

The meeting was on Al-Ekader feasibility study. The main findings from the meeting are;

- Mr Khashashneh has no confidence in change to new new policy proposed by AECOM. (EIB Regulation are far advanced).
- Zibar and master plan are satisfactory as study.
- Solid waste at Al-Ekader is satisfactory theoretical study (Proposal). Also the same for Zibar and rehabilitation of lagoons if discharge of liquid waste is stopped. But no pilot project on clean up and recycling.
- Other than Zibar study, not satisfied on other issues.
- Insisted that according to agreement, there should have been an implementation.*** TOR (Agreement) states there shall be implementation plan.

Meeting with Minster -18-11-2013

The meeting with minster lasted for one hour. The minster is almost satisfied with AECOM progress and he feels this delay is from the ministry due to lack of resources. He does know that now one from the ministry is in charge of tasks 2, and 4. Therefore he raised the issue of having a consultant to be the project coordinator if USAID or AECOM can fund it.

Meeting with Ministry of Municipality for Al Ekader feasibility study 18-11-2013

Al - Ekader.

Participants;

- Engineer Hussain Muheidat - Ministry of Municipal Affairs

The main findings from this meeting were;

- Study of AECOM satisfactory.
- There was full coordination with AECOM. The staff of AECOM was enthusiastic about the project to the extent that Dr. Charles himself took a boat into the lagoons to take samples.
- There was integration between AECOM study and EIB study.
- But feels too much spent on study, had some budget been allocated for implementation, it would have been much better.
- Feels that WAJ no compromise on the liquid sludge dump in the site was an impediment to implementation of the project.
- Diversion of Liquid Waste (Sludge) is essential for the success or implementation of the project. The site shall be for solid waste and Zibar.
- He indicated that no coordination with Municipality of Russeifa. Although Dr. Iyad Batarseh stated that there was coordination with many members of Municipality of Russeifa.

Meeting with GAM 18-11-2013

Participant;

- Eng. Zaidon Al- Nsoor - GAM

The meeting was about Russeifah sites under GAM responsibility. The main findings from the meeting were;

- The reports are satisfactory, however; too much replication of previous reports.
- Coordination was to some extent.
- No reports submitted to GAM.
- Invitation to workshops when information from GAM staff required.
- Too many replicated studies with high budget for this study , but no implementation
- Study shall focus on how to facilitate donors and implementation