4.3 WDM Activities

4.3.1 Basic Policy

4.3.1.1 Implementation of WDM Activities Based on "Action Plan"

(1) The Purpose and Output of the Project:

- Management capacity of operation and maintenance of water supply facilities is improved at the model areas/facilities in Sharkiya, Gharbia and Minufia Governorates.
- The water distribution management capacity is improved in Sharkiya Governorate as an advanced model.

In order to obtain the above-mentioned output, followings were implemented:

- Flows and pressures of water distribution are monitored in real time and properly measured.
- Water demand (hourly, daily, monthly) is analyzed according to the obtained flows and pressures.
- Operation modes of water treatment plant (WTP) and wells are modified according to the monitored conditions and the demand analyses.
- Report improvement plans based on the analyzed demand.

(2) Implementation of WDM Activities Based on "Action Plan"

WDM activities taken in the Project are summarized as shown in Table 4.3-1.

Table 4.3-1 Actions to be Taken in WDM Activity

Action	Title	Contents	Period
1	Discuss methods and conduct survey for water distribution management		Jun. 2011- Nov. 2011
1-1	Organizing project team	➢ Selection of fulltime WDM members ➢ Organizing WDM teams	Jun. 2011
1-2	Analysis of present data regarding distribution management (Flow rate, pressure, water quality and etc.)	➢ Analysis of the water supply conditions for whole Sharkiya ➢ Analysis of the water supply conditions for candidate areas for pilot project and selection of the candidate ➢ Analysis of present water flows and pressures for water distribution and other issues	Jun. 2011- Nov. 2011
1-3	Study and evaluation of systems for Rod El-Farag, South Giza and Dakahlia	➢ Study on the exiting monitoring systems in Egypt at Cairo (Rod El-Farag), Giza and Dakalia ➢ Study on capability of the Egyptian provider (Giza System) for monitoring system of WDM	Jul. 2011
1-4	Discussion of suitable distribution management system in SHAPWASCO	➢ Confirmation of purposes of WDM and items to be monitored ➢ Confirmation of expected effects by WDM ➢ Discussion of possible methodology	Sep. 2011 - Nov. 2011
2	Conduct training on water		Sep. 2011- Oct. 2011

Action	Title	Contents	Period
	distribution management		
2-1	Training on water distribution management methods (purpose, items to be managed)	➢ Study on management methods through discussions conducted in Action 1-4 ➢ Internal workshop on WDM and necessary system for SHAPWASCO	Sep. 2011
2-2	Training on water distribution management methods (equipment, facilities)	➢ Study on management methods through discussions conducted in Action 1-4 ➢ Study on necessary activities and equipment	Oct. 2011
3	Formulate a plan for water distribution management		Sep. 2011 - Mar. 2013
3-1	Planning of action plan	➢ Trial of isolation for water distribution blocks (DMAs) at the candidate pilot area ➢ Plan of the blocks to be monitored for water flows and pressures ➢ Compiling plans developed by Action 3-2 to 3-5 ➢ Discussion with JICA for pilot project plan as well as inputs and activities ➢ Documentation of action plan	Sep. 2011 - Dec. 2012
3-2	Discussion on the selection criteria	➢ Comparison of the candidate areas for pilot project on characteristics ➢ Discussion on selection criteria for the pilot project area	Sep. 2011 - Jul. 2012
3-3	Selection of pilot project area	➢ Pre-selection of the pilot project area ➢ Confirmation of possible inputs ➢ Final selection of the pilot project area	Dec. 2011 - Jul. 2012
3-4	Outline plan for equipment and equipment installation	➢ Pre-selection of parameters to be monitored ➢ Pre-selection of system for data transfer and management ➢ Pre-selection of necessary equipment	Mar. 2012 - Jul. 2012
3-5	Preparation for equipment installation including isolation work	➢ Determination of the water distribution blocks according to trial isolation conducted in Action 3-1 ➢ Pre-selection (investigation of possibility) for locations to install the meters for monitoring the distribution conditions	Mar. 2012 - Dec. 2012
3-6	Preparation for equipment specification (one of procurement procedures)	➢ Study on candidate equipment for the monitoring system ➢ Study on specifications of the candidate equipment ➢ Preparation of specification sheets for the necessary equipment	Feb. 2012 - Oct. 2012
3-7	Verification of equipment plan	➢ Discussion with JICA for necessary equipment and specifications ➢ Preparation of specifications for bidding	Jul. 2012 - Mar. 2013
3-8	Plan of target flow, pressure and quality of water by block	➢ Hydraulic analysis for the pilot project area in different cases such as summer and winter (Case studies for water flows and pressures) ➢ Confirmation of water production capacity in the pilot project area	Jul. 2012 - Dec. 2012

Action	Title	Contents	Period
3-9	Survey on current condition (summer) by block	➢ Hydraulic analysis on actual water production for summer and winter ➢ Confirmation of actual water pressures in the pilot project area for summer and winter ➢ Complaints analysis on the year 2011/2012	Jun. 2012 - Dec. 2012
3-10	Verification of Plan of target flow, pressure and quality of water by block	➢ Confirmation of necessary water flows and pressures along with Action 3-8 and 3-9 ➢ Confirmation of wells to be cared for water quality	Dec. 2012
3-11	Training in Japan	➢ Training in Japan for WDM situation in Yokohama and Saitama cities and equipment manufacturer	Oct. 2012 - Nov. 2012
4	Install the equipment for water distribution management at the model area		Jul. 2012- Jul. 2014
4-1	Preparation for space for monitoring room	➢ Construction of central monitoring room	Jul. 2012- Apr. 2013
4-2	Preparation for communicating system	➢ Contract with a telephone company and provision of sims for telemeters	Jul. 2012- Apr. 2013
4-3	Chamber construction by SHAPWASCO	➢ Construction of chambers for network flow monitoring ➢ Installation of feeder pipes for pressure gauges	Jul. 2012- Apr. 2013
4-4	JICA procedures for equipment procurement	➢ Bidding for WDM equipment ➢ Delivery of the equipment	Oct. 2012- Apr. 2013
4-5	Installation of the equipment	➢ Instruction and sample installation for equipment by the equipment provider ➢ Installation of equipment (hardware) by SHAPWASCO ➢ Adjustment of software by the equipment provider	Apr. 2013- Jul. 2014
5	Operate the system		Jun. 2013- Apr. 2015
5-1	Well operation	➢ Distribution pressure recording during well operation ➢ Modification of operation mode according to recommendation of WDM team ➢ Preparation of model operation program of wells (time table)	Mar. 2014- Apr. 2015
5-2	Flow / Pressure Monitoring through Telemetry	➢ Real time monitoring of water flows and pressures on the screen of central monitoring system ➢ Recommendation for modification of operation modes of WTP and wells to secure enough water pressures at network	Mar. 2014- Apr. 2015
5-3	Operation of Distribution Pump in WTP according to data	➢ Checking the water distribution flows and pressures on network though the central monitoring system ➢ Modification of operation mode according to data of water flows and pressures and / or recommendation of	Mar. 2014- Apr. 2015

Action	Title	Contents	Period
		WDM team ➢ Preparation of model operation program for water production and distribution (time table)	
5-4	Data Analysis	➢ Analysis of obtained data for water demand (hourly, daily, monthly and per capita) ➢ Analysis of low service pressures as well as relations of distributed volume of water ➢ Analysis on capacity of WTP ➢ Review of development plan of SHAPWASCO and report of issues as well as recommendation for improvement	Mar. 2014- Apr. 2015
6	Develop SOP for water distribution management	➢ Preparation of SOP for data analysis ➢ Practice and trial of the SOP	Feb. 2014 - Nov. 2014
7	Evaluate the operation and SOP for water distribution management	➢ Finalization of SOP according to practice and trial ➢ Evaluation of operation as well as finding issues for improvement	Nov. 2014- Apr. 2015
7-1	Efficiency and Effectiveness Evaluation	➢ Study on cost for WDM ➢ Evaluation for efficiency and effectiveness	Nov. 2014- Apr. 2015
7-2	Interview Survey	➢ Research of customers' opinion for detailed monitoring area	Nov. 2014 - Dec. 2014

Source: JICA expert team

(3) Performance Indicators (PI)

1) Background for Introduction of WDM

SHAPWASCO has been distributed the water at 170LCD for average in Sharkiya as shown in Table 4.3-2. It is a little more than the standard flow instructed in the Egyptian code. A lot of areas are, however, suffering from shortage of the supplied water volume and weak pressure.

Table 4.3-2 Average Distributed Water (LCD) in Sharkiya Governorate

Item	Flow	Population of Sharkiya	Remarks
Total Yearly Production (m^3/Year)	362,210,861	5,824,852	The average LCD has been instructed by the Egyptian code as follows: - For Capital of Governorate = 200 LCD - For Markaz = 165 LCD - For villages up to 50,000 capita =135 LCD Notes: 1. The above LCD includes the leakage in the network. 2. The general average consumption has been calculated at 166LCD on the assumption that 1/3 of population lives in the capital of Governorate, 1/3 lives in capital of the Markaz and the rest lives in villages.
Average Daily Production (m^3/Day)	992,358		
General Average Water Supply (LCD) as Egyptian code	166 (see Note 2)		
Average Distributed Water (LCD)	170		

Note: Data for 2010/2011.
Source: SHAPWASCO

Zagazig City is the Governorate Capital of Sharkiya, in which 60% of the Governorate population reside. Insufficient water flows and pressures in the city, which are often complained about by the customers, is the prioritized problem to be solved in SHAPWASCO.

In Zagazig, the gap between the standard flow and the actual distributed flow is larger. Although the average unit water distribution of 360LCD is much more than the standard flow stipulated in the Egyptian code (200LCD), some areas of Zagazig City are suffering from water shortage and weak pressure. The current water supply conditions in Zagazig City in 2011 are as shown in Table 4.3-3.

Table 4.3-3 Current Water Supply Conditions in Zagazig City in 2011

Item		Flow / Population
Water production (m^3/day)	[Zagazig WTP]	
	- Total design capacity of the old and new facility	91,000
	- Actual average production	76,218
	[Wells]	
	- Actual average production	49,029
	[Total]	
	- Actual average production for total	125,247
Population of Zagazig City in 2011 (persons)		348,000
Average unit water supply in Zagazig City (LCD)		360

Source: SHAPWASCO

Improper water distribution would be caused by random distribution having less analysis of demand, facilities and operation. Due to the random distribution of the produced water, SHAPWASCO receives a lot of complaints from the customers. The Table 4.3-4 shows the number of complaints about water suspension and weak pressure in Sharkiya Governorate in 20102011.

Table 4.3-4 Complaints about Water Suspension and Weak Pressure in 2010/2011

Location	No. of Complaints for Suspension of Water Supply	No of Complaints of Weak Pressure
Whole Governorate	9,296	1,832
Zagazig City	968	350

Notes:
1. Data for 2010/2011.
2. The above complains are the recorded ones at 125 (hotline).

Source: SHAPWASCO

Accordingly, SHAPWASCO should investigate the following and take countermeasures to distribute the water properly and equally for the citizen:

- To grasp and analyze properly the water demand per hour, day and month.
- To check the sufficiency of water production.
- To check the distribution network.
- To monitor the water distribution conditions such as flow and pressure in real time, in order to modify immediately the operation modes of facilities.
- To check the pumps' operation mode as well as distribution flows.
- To check and modify the pumps' operation mode to be demand-oriented.
- To report improvement plans utilizing the analyzed water flows and pressures.
- To find issues to be undertaken and / or improved.

In the circumstances, WDM activities were planned to secure proper water flows and pressures in all areas of Sharkiya.

2) Low Service Pressure

According to proper water distribution, necessary water pressures would be secured on the distribution networks. To evaluate the WDM activities by a determined performance indicator (PI), the water pressures should be monitored on the network and recorded. The recorded data should be analyzed according to the following procedure to evaluate the distribution conditions as PI:

- To count the duration (hours) indicating "under a reference pressure for evaluation" on each pressure gauge, installed on the water distribution network.
- To sum up the counted hours for all pressure gauges.
- To calculate the value of the PI according to the following formula:

Low service pressure ratio =
("Total hours of low pressure recorded at all continuous monitoring points" / ("Number of points for continuous pressure monitoring" x 365days x 24hours)

The reference pressure for evaluation should be a standard pressure on the network, instructed by an official regulation. Since no related regulation is available in Egypt, the Project team selected "1 bar" according to discussion in SHAPWASCO and the steering committee.

3) Number of Complaints

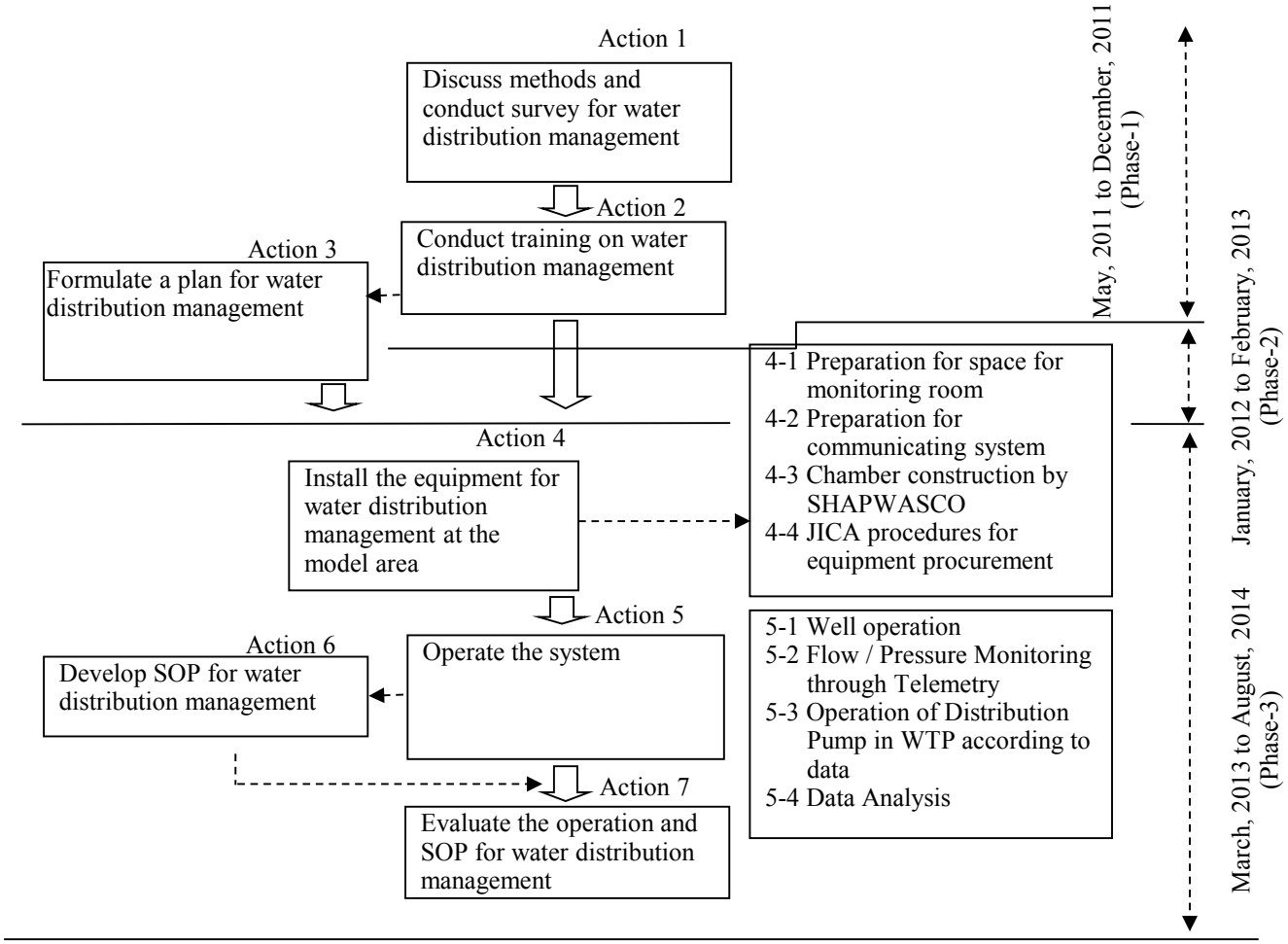
If the proper water distribution was maintained, the number of complaints would decrease for water suspension and weak pressure. The number of complaints should be, therefore, analyzed as PI for WDM activities. The complaints are recorded by 125 (hotline). The recorded data by 125 should be analyzed according to the following procedure to evaluate the distribution conditions as PI:

- To count number of complaints for water suspension and weak pressure.
- To acquire the data of number of subscribers.
- To calculate the value of the PI as follows:

Number of Complaints per 1000 customers =
"Number of complaints on water suspension and low pressure" / 1000 connections

4.3.1.2 Procedure of WDM Activities

The Project team developed Action Plan for WDM Activity in Phase-1 (May 2011 – Dec. 2012), Phase-2 (Jan. 2012 – Feb. 2013), Phase-3 (Mar. 2013 – Apr. 2015). Flow of Actions for WDM activities is shown in Figure 4.3-1.



Source: JICA expert team

Figure 4.3-1 Flow of Actions for WDM Activity

4.3.2 Summary of WDM Activities Based on Action Plan

4.3.2.1 Action-1 Discuss Methods and Conduct Survey for Water Distribution Management

(1) Output from the Action-1

SHAPWASCO formulated the C/P team, called as WDM team, in "Information Center and Decision Strengthen Sector". C/P team, then, conducted the analysis for current water distribution conditions in Sharkiya, the observation of the existing monitoring system in Egypt for water flow, and discussion for objectives of WDM. The results are summarized in Supporting Report S4.1.

(2) Issues to be Tackled in Later Stages

Issue-1: Pilot Project System

Introduction of monitoring system for water flows and pressures is costly. It is difficult to commence the WDM system having real time monitoring for whole Sharkiya immediately. The pilot project

system is, therefore, necessary. In the pilot project, the Project team should attempt the WDM and confirm the effectiveness as well as drawing issues.

Issue-2: Block Management

To distribute the water equally for all areas according to demands of each area, the block management is necessary for water distribution. The block management will realize the proper analysis of water demand for an area and water distribution according to the demand. To have the block management system, SHAPWASCO should divide the water distribution network in to several and isolated blocks which are similar to district metering areas (DMAs). SHAPWASCO should, therefore, formulate water distribution blocks before commencement of the pilot project.

Issue-3: Operation Modes of Pumps for Water Distribution

WDM aims at not only monitoring water distribution conditions but also maintaining necessary water flow and pressure according to the demand. To realize it, SHAPWASCO should undertake modifications / adjustments of pump operations in the pilot project.

4.3.2.2 Action-2 Conduct Training on Water Distribution Management

(1) Output from the Action-2

Along with Action-1, C/P members were trained through discussion with JET for WDM in methods and equipment. JET introduced example systems and equipment for monitoring, which are available in Japan. As a result of the trainings, the Project team formulated the action plan in Action-3.

(2) Issues to be Tackled in Later Stages

The C/P team learned basic information for WDM and monitoring system. It is, however, in paper knowledge and they have not seen the real activities and system. Accordingly, the Project team should organize the training in Japan to see real activities and equipment rather than lectures.

4.3.2.3 Action-3 Formulate a Plan for Water Distribution Management

(1) Output from the Action-3

Based on the in Action-1 and 2, the Project team formulated the action plan as shown in Supporting Report S4.2. The formulation of action plan was conducted in steps, i.e. 1) Concept plan (draft plan) as well as selection and re-confirmation of water distribution condition for candidate pilot project areas, 2) Scope discussion with JICA conducted in July 2012 for objectives, activities and inputs (refer to Attachment-5), and 3) Finalization of the action plan.

In parallel of the action plan, the Project team prepared specifications for necessary equipment for the purpose of bidding in Japan.

The Project team selected preliminary three (3) city / markazes, i.e., 1) Zagazig City (Governorate Capital), 2) Zagazig Markaz (surrounding cities / villages of Zagazig) and 3) Hihya Markaz (an area

supported by the Japan's Grant Aid for water treatment plant) as candidate for the pilot project area. To confirm the water distribution conditions of the areas, the team analyzed the number of complaints as well as population as shown in Table 4.3-5.

Table 4.3-5 Population and Number of Complaints for Candidate Pilot Areas for WDM

Markaz	Population	Number of Complaints						
		Weak pressure	Water suspen-sion	Leakage	Water Quality	Total	Nos. of Complaints per capita	Rank of Nos. of Complaints per capita
Zagazig City	363,867	350	968	347	216	2,891	0.008	1
Zagazig Markaz	362,627	305	1,604	324	135	3,253	0.004	2
Hihya Markaz	233,296	94	166	48	21	702	0.003	3

Note: Data for 2010/2011.
Source: SHAPWASCO

In addition to the above, the team accounted status of facilities, impacts to SHAPWASCO, etc. into the final selection of the pilot project area. The team finally selected Zagazig City as shown in Table 4.3-6.

Table 4.3-6 Selection of Pilot Project Area for WDM Activity

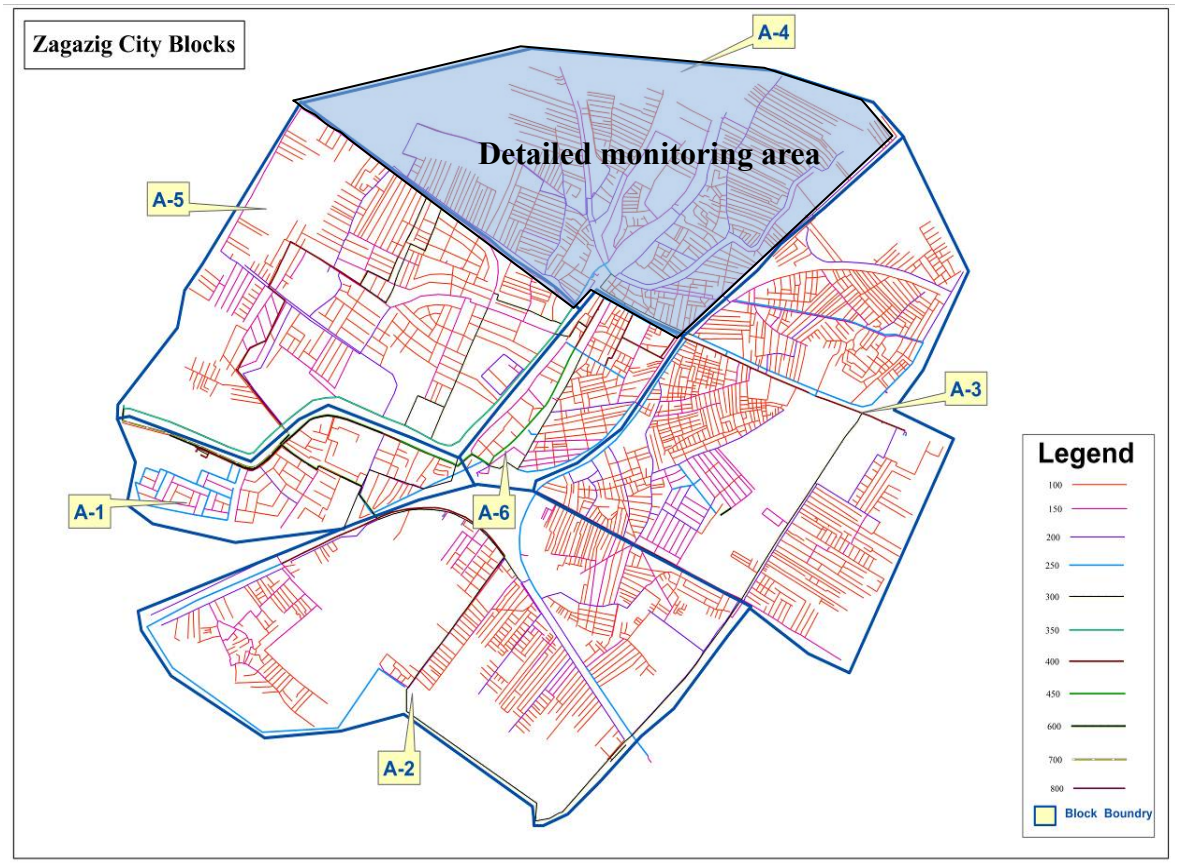
Candidate Area	Criteria for Selection								Total Score
	1	2	3	4	5	6	7	8	
	Number of Customers	Customer's Complaint	Water Supply to Customer	Forming DMA (Isolation)	Preparation of GIS Map	Project Management by HQ	Advertise-ment Effect	Billing Collection	
Zagazig City	3	3	3	2	3	3	3	3	23
Zagazig Markaz	2	2	1	3	3	2	2	2	17
Hihya Markaz	1	1	2	3	1	1	2	2	13

[Marks for each criteria]

1. Number of customer: Largest-**3** / Medium-**2** / Smallest-**1** (in terms of benefit to cost)
2. Customer's complaint: Largest-**3** / Medium-**2** / Smallest-**1** (for pressure, water stoppage, leakage and water quality)
3. Water supply to customer: Enough-**3** / Medium-**2** / Not enough-**1** (in terms of NOPWASD standard)
4. Forming DMA: Easy-**3** / Possible-**2** / Difficult-**1**
5. Preparation of GIS Map: Completed-**3** / To be completed soon-**2** / Not completed-**1** (by the commencement of the Project)
6. Project management by HQ: Easiest-**3** / Medium-**2** / Difficult-**1** (need some time to take action)
7. Advertisement effect: Big-**3** / Medium-**2** / Small-**1** (to the people of Sharkiya and the whole Egypt)
8. Billing collection: Poor-**3** / Fair-**2** / Good-**1**

Source: Project team

After selection of Zagazig City, the Project team examined for block management system and pressure conditions through hydraulic analysis and measurement at sites. As a result, the team noticed that A-4 area was the most serious in low service pressure condition. The planned blocks are shown in Figure 4.3-2.



Source: Project team

Figure 4.3-2 Pilot Project Area (Zagazig City) and Detailed Monitoring Area (A-4)

In Action-3, the Project team conducted the training in Japan to learn real systems for WDM for the C/P members of WDM. It was conducted in Yokohama and Saitama Cities and a system provider.

(2) Issues to be Tackled in Later Stages

Issue-1: Prompt Preparation for Equipment Installation

In order to install the WDM equipment to be provided by JICA, the following actions should be undertaken by SHAPWASCO before the equipment delivery:

- To have proper isolation of blocks to realize the block management for water distribution.
- To select locations of flow meters and pressure gauges in detail.
- To construct chambers for flow meters to be installed under streets.
- To install water feeder for pressure gauges.
- To construct a central monitoring room in Zagazig WTP.
- To contract the tel-communication with a telephone company for telemeters.
- To install analog pressure gauges at all well stations.

Issue-2: Procurement of Equipment

To obtain proper equipment for WDM, JET should assist JICA for the equipment procurement, such as preparation of the equipment specifications and cost estimation.

4.3.2.4 Action-4 Install the Equipment for Water Distribution Management at the Model Area

(1) Output from the Action-4

In April 2013 (the beginning of Phase-3), the procured equipment by JICA was delivered to SHAPWASCO. The central monitoring room and chambers were ready to install the equipment by the delivering time.

To install the equipment and to explain operation and maintenance, the equipment manufacturer sent three supervisors form the end of April to the beginning of May 2013. In parallel of and after that, SHAPWASCO installed the equipment according to instructions of the manufacturer. During the installation, several troubles were found on the data acquisition and processing system.

In March 2014, the system started the service for data acquisition although some troubles remained for data processing. In July 2014, the monitoring system became stable for data processing. Worse electricity distribution and mobile telephone network conditions affected the immediate verification of system stabilities.

(2) Issues to be Tackled in Later Stages

Issue-1: Meters to be Provided and Installed by SHAPWASCO in Zagazig WTP

Initially, the Project team planned to utilize the existing flow meters for raw and treated waters and water level meter for treated water tank. The Project team found, however, troubles of such meters for accuracy. SHAPWASCO should, therefore, provide new meters instead and installed.

4.3.2.5 Action-5 Operate the System

(1) Output from the Action-5

The Project team commenced the monitoring works as well as modification of operation modes from March 2014 in practical. In the beginning time after the commencement, data acquisition and processing were not stable especially for water flows. The water flows data, however, could be analyzed for water demand if selecting good days for data acquisition. The data for water pressures were acquired relatively in stable from the beginning to evaluate the low service pressure ratio. The conditions of data acquisition and processing were improved along with the progress of software adjustment of the equipment manufacturer.

The Project team analyzed the acquired data mainly for the following:

- Low service pressure ratio.
- Water demand in A-4 (hourly, daily and monthly), including the peak demand.

- Estimation of water demand for whole Zagazig, including the peak demand.
- Recommended operation modes for Zagazig WTP and wells.
- Issues on facilities.

According to the analysis results, the Project team recommended the modifications of operation modes to Zagazig WTP and wells. Those facilities commenced the modification according to the recommendation.

As for the WDM Department, it was established in August 2014 by the Chairman Decree 316 in 2014. It was formed by re-organization of C/P team and placed directly under the Chairman of SHAPWASCO for quick decision and integrated management beyond departments.

(2) Issues to be Tackled in Later Stages

Issue-1: Communication and Cooperation System with Wells Operators

It is not easy for WDM team to communicate directly and quickly with wells operators since the communications are taken through sectors heads / managers. It causes delays of modifications of wells operation. It is necessary to improve the communication system with the wells operators as well as trainings of them.

To overcome the problem and to clarify the responsibilities, SHAPWASCO established WDM Department in August 2014 and commenced direct communications between WDM Department and wells operators. For the direct communications, SHAPWASCO distributed mobile phones to all well stations in March 2015. Nevertheless, this direct communication system has been just started. It is required for SHAPWASCO to continue the direct communication system and to find issues for the communication system. After that, SHAPWASCO should develop more efficient and stable communication for the future.

Issue-2: Rehabilitation and Repair of Facilities

To secure stable water distribution, especially in summer having higher water demand, SHAPWASCO should rehabilitate and / or repair the facilities for Zagazig WTP and well stations. Otherwise, the improvement is not expected for water distribution. Since the equipment is deteriorated, such as pumps, electrical panels and wells, the frequent repairs are required. Zagazig WTP and wells are not able to, therefore, respond to orders for modifications of operation modes (increase of distribution flow).

4.3.2.6 Action-6 Develop SOP for Water Distribution Management

(1) Output from the Action-6

In the process of Action-5, the Project team prepared SOPs for WDM. It is mainly for data analysis on water demand and pressure as well as forms for calculation. As for the operation and maintenance of system, the manuals provided by the equipment manufacturer are enough for practices.

(2) Issues to be Tackled in Later Stages

In order to evaluate the system operation and SOPs, SHAPWASCO should undertake more modifications of operation modes according to recommendations and instructions of WDM Department. Moreover, systems should be improved for communication and cooperation with wells operators, to have more integrated and more demand-oriented operation with Zagazig WTP.

4.3.2.7 Action-7 Evaluate the Operation and SOP for Water Distribution Management

(1) Output from the Action-7

In March 2015, evaluation works were conducted with JICA experts for operation of the system and SOPs. Although the system contributes to promotion of awareness of operators of Zagazig WTP and wells and the improvement is observed for securing necessary water pressures in the network, the low water pressures have not been eliminated in perfect. The evaluation is summarized as follows:

- Staff members of WDM Department are able to operate the system and analyze the data currently. Their skills should be upgraded through the continuous operation and expansion of the system.
- Since the central monitoring room is located in Zagazig WTP, the communication with operators of WTP is frequent. It is, however, requested for the operators to check the monitors for flows and pressures more frequently and to modify the operation modes by them.
- WDM Department provided a series of explanations on the system directly to well operators and distribute mobile phones to all well stations for frequent communications. It contributes to promote awareness of wells operators and closed communications.
- In high demand season (summer), the low service pressure ratios were not achieved for the target. Insufficiency of water distribution capacity may cause the low pressures. The low service pressure ratios are improved in low demand season (winter) and it is stable from November 2014 until March 2015. Rehabilitation and / or repair of facilities are strongly required to be undertaken by SHAPWASCO by summer season of 2015.
- In parallel of SOP preparation, the Project team reported several issues for rehabilitations and repairs on facilities.
- Number of complaints per 1,000 connections was increased (not improved). It may be caused by frequent suspension of electricity.

(2) Issues to be Tackled in Later Stages

Issue-1: Rehabilitation and / or Repair of Facilities

Water distribution capacity is insufficient for peak hours and deteriorated equipment is not effective for necessary water distribution flows and pressure due to frequent break-down and maintenance. Even if WDM Department provides appropriate monitoring and instructions, the current facilities are not able to respond to the instructions. SHAPWASCO should accelerate the rehabilitation and repair.

Issue-2: Proper Maintenance of the Monitoring System

SHAPWASCO made a contract with a local service provider for maintenance of the monitoring system, as a part of expansion contract of the system. The contents of contact are separately described in 4.3.3.3 (8).

Since it has been just concluded in March 2015, effectiveness is not confirmed. SHAPWASCO should work and improve the maintenance of system with the service provider through their initiative.

Issue-3: Expansion of the WDM activities in Whole Governorate and Nile Delta

SHAPWASCO has commenced the expansion of monitoring system. It is, however, limited to Zagazig City. Although some meters will be installed at WTPs in other Governorate, it is for production monitoring. SHAPWASCO is recommended to expand the WDM activities as soon as possible after completion of the system for Zagazig and monitoring system of WTPs' productions. In parallel, it is recommended to provide efforts to transfer the experiences to other Governorates in Nile Delta.

4.3.3 Achievement in Pilot Project Area

As aforementioned in 4.3.2.3, Zagazig City was selected as the pilot project area. The achievement of WDM activity in the pilot project area is mentioned hereinafter.

4.3.3.1 Survey for Current Water Distribution Conditions

(1) Population of Zagazig City

The population data was obtained at Sharkiya branch of the Central Agency for Public Mobilization and Statistics (CAPMAS), it was initially 347,935 persons in Zagazig city as shown in Table 4.3-7.

Table 4.3-7 Population for Pilot Project Area (2011/2012)

Item	Unit	Zagazig City	A-4
Area	ha	1,336	260
Administrative Population	persons	347,935	112,187

Source: CAPMAS

In the process of the pilot project, it has been updated to calculate the demand per capita as accurate as possible. The trend of population is shown in Table 4.3-8 for a monitoring period of water distribution conditions in the pilot project. (It includes the population of a part of Zagazig Markaz, of which water is distributed from Zagazig WTP.) The population, which was 350,000 in 2011/2012, increased to 400,000 in the beginning of 2015.

Table 4.3-8 Trend of Population for Pilot Project Area (persons)

Area	2014										2015	
	March	April	May	June	July	August	September	October	November	December	January	February
Zagazig City	385,455	387,035	388,620	389,320	390,132	392,060	393,988	395,916	397,844	399,783	401,710	403,637
A-4	124,286	124,796	125,308	125,533	125,794	126,416	127,038	127,660	128,282	128,905	129,527	130,149

Source: CAPMAS

(2) Water Production / Distribution Capacity for Zagazig City

1) Zagazig WTP

The Project team confirmed the current capacity of Zagazig WTP through SOP, identification plate put by manufacturer and hearing from WTP operators as shown in Table 4.3-9. Although the production (treatment capacity) is 91,000m^3/d, the practical and stable capacity is less than 80,000m^3/d (926L/s) in effective volume basis for distribution, due to break-downs and maintenance requirement of deteriorated equipment. As for the distribution (discharge), the design capacity is 91,000m^3/d (1,060L/s). It is also around 80,000m^3/s (930L/s) for practical basis although it is increased to a level of 1,000L/s for the peak time and for a short period.

Table 4.3-9 Current Capacity of Zagazig WTP

Category	Raw Water Pump				Discharge Pump		
	Installed	Design for Max. Operation	Current/Practical Operation	Effective (10% loss deducted)	Installed	Design for Max. Operation	Current/Practical Operation
Old plant	150L/s x 3 Total 450L/s	150L/s x 2 Total 300L/s	150L/s x 1 Total 150L/s	130L/s	130L/s x 3 Total 390L/s	130L/s x 2 Total 260L/s	130L/s x 1 Total 130L/s
New plant	220L/s x 5 150L/s x 1 Total 1,250L/s	220L/s x 4 150L/s x 0 Total 880L/s	220L/s x 4 or 3 150L/s x 0 or 1 Total 810 - 880L/s	729 - 792L/s	200L/s x 5 130L/s x 1 Total 1,300L/s	200L/s x 4 130L/s x 0 Total 800L/s	200L/s x 4 or 3 130L/s x 0 or 1 Total 730 - 800L/s
Total	1,700L/s	1,100L/s	960 - 1030L/s	859 - 922L/s	1,690L/s	1,060L/s	860 - 930L/s

Source: The Project team

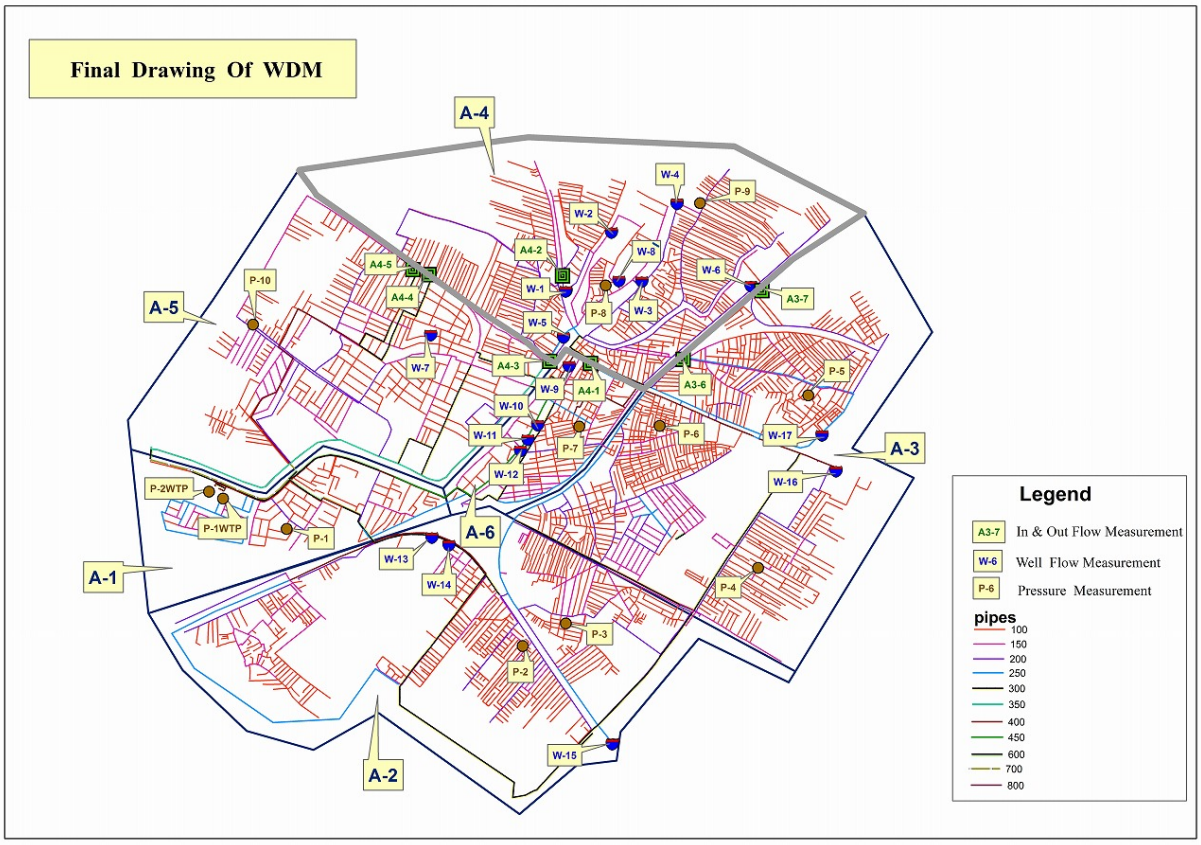
2) Wells

There are 18 well stations in Zagazig City. Although the distribution flows are varied according to operation program and demand, the production capacity is observed at around 50,000m^3/d in total for Zagazig City. The each well station has several wells in general and they are operated in alternate. Number of wells and pumping capacity (design basis) of each well are shown in Table 4.3-10. Locations of well stations are shown in Figure 4.3-3.

Table 4.3-10 Number of Wells and Pumping Capacity

Station	W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9
Well-1 (L/s)	50	15		40	50	40	40	50	40
Well-2 (L/s)	50	15		40	20		40		40
Station	W-10	W-11	W-12	W-13	W-14	W-15	W-16	W-17	W-18
Well-1 (L/s)	40	40	40	40	20	20	25	50	40
Well-2 (L/s)			40		20		25	40	
Well-3 (L/s)							25		
Well-4 (L/s)							40		
Well-5 (L/s)							40		

Note: W-3 is suspended for maintenance.
Source: The Project team



Note: The figure shows well stations together with the planned distribution blocks to facilitate the understandings on the pilot project described in this report. W-" " shows locations of the well stations.
Source: C/P team for WDM

Figure 4.3-3 Locations of Well Stations

3) Total

In total, Zagazig City has the nominal capacity of water production (treatment) at around 141,000m^3/d (1,600L/s). For practical basis, the total distribution capacity is around 1,500L/s (130,000m^3/d) at production sources if the all pumps are available for service. It is converted to 370LCD for 350,000

of population and 325LCD for 400,000. According to the Egyptian code, the capacity seems enough for Zagazig City.

(3) Water Distribution Network

The Project team confirmed the capacity of water distribution network in Phase-2 (Jan. 2012 – Feb. 2013) through hydraulic analyses. They were conducted for different cases of demand to check the capacities. The cases of study to examine the capacity are shown in Table 4.3-11. As a result, the shown cases are possible for water distribution at nearly acceptable pressure. And the existing network of Zagazig City is capable to distribute the water from Zagazig WTP at 1,200L/s and from wells at 800L/s.

- Although some points marks lower pressure than 1.5bar, the network is capable to distribute 1,200L/s from WTP and 800L/s form the wells in the same time for nearly acceptable pressure. If the demand (potentially expected by customers) is higher than 2,000L/s in a peak time, lower pressure points will increase. (Case-1)
- If the demand is 1,770L/s or under in peak hour, 1.5bar of the pressure is able to be secured. (Case-2)
- In off-peak such as winter, WTP can cover whole Zagazig at acceptable level of water pressure without wells' operation if the demand is less than 1,000L/s. (Case-3 and 4)

Table 4.3-11 Cases for Capacity Examination

Case	Reference	WTP Discharge	Wells Discharge	Demand for City		Demand for Markaz	
				Population	LCD	Population	LCD
Case-1	Ideal situation	1200L/s	800L/s	380,400	433	26,600	300
Case-2	Peak (currently capable capacity)	1000L/s	770L/s	380,400	360	26,600	300
Case-3	Winter peak w/o wells	1000L/s	0 L/s	380,400	210	26,600	180
Case-4	Winter peak w/o wells	1200L/s	0 L/s	380,400	260	26,600	180

Note1: Demand (LCD) is converted to LCD basis for easier understandings.
Note2: Zagazig WTP is transmitting the water to a part of Zagazig Markaz.
Source: The Project team

(4) Formulation of Blocks and Blocks Isolation

The water distribution network of Zagazig City has been expanded randomly for a long time and the zoning system is not introduced. To manage water distribution by area, a block system is necessary for the Project. The Project team, therefore, attempted to divide Zagazig City into several isolated blocks. The blocks are expected to be district metering areas (DMAs) in the future.

1) First and Second Attempts for 12 and / 8 Blocks

The Project team planned 12 blocks system at first. To propose the 12 blocks system, the following are conducted:

- The existing water distribution network drawings were revised and confirmed through site survey by the C/P team, the network manager and JICA expert team.

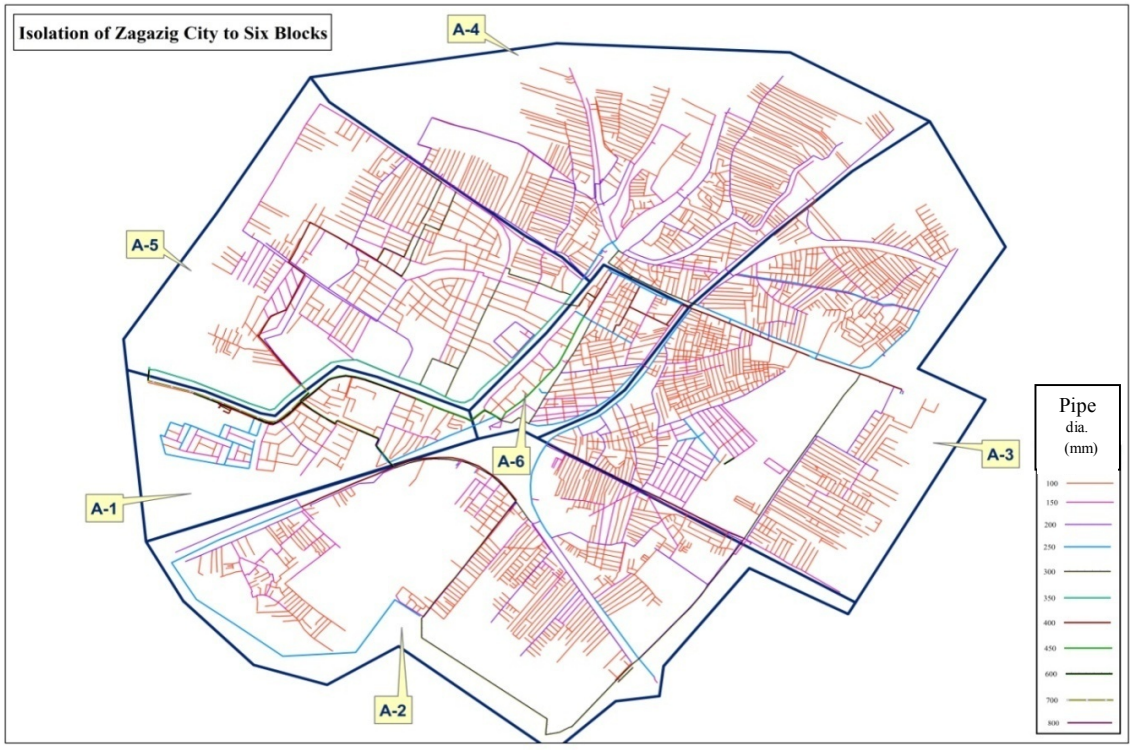
- Survey for valve condition regarding opening and closing was done with the cooperation of the network manager.
- The damaged valves were repaired by the networks staff and the existing network drawings were updated by GIS department.
- Hydraulic analysis was been done for the existing water distribution network to confirm the situations with / without isolation.
- Block isolation was attempted through valve closing.

Water pressure drop occurred, however, in some areas due to valve closing. The valves were, therefore, reopened. It is confirmed that 12 blocks system is difficult to be maintained for securing enough pressures in the network, even if it is good in the hydraulic analysis.

The Project team, accordingly, modified the plan to be eight (8) blocks. After the trial operation for several weeks, the pressure drops were observed as same as the case for 12 blocks system.

2) Third Attempt for 6 Blocks (Final Blocks Plan)

The Project team and the manger of networks reconsidered the blocks to form a new blocks-isolation for Zagazig City to fulfill customer's satisfaction and to avoid weak pressure areas. After review of the existing networks, the Project team divided the city into six (6) blocks with nineteen metering points on the networks. The new blocks-isolation started on the 6th March 2012. No specific complaints regarding the isolation were received according to hotlines (125) of SHAPWASCO. The Project team finalized the plan to be 6 blocks for the pilot project. The Figure 4.3-4 shows the final blocks of Zagazig City.



Source: C/P team for WDM

Figure 4.3-4 Final Block Isolation for Zagazig City (6 Blocks)

(5) Confirmation of Present Conditions for Water Pressures in Network

The Project team confirmed the present conditions of water pressures in the distribution network through hydraulic analysis and actual pressures measurement at site, in June 2012 (as example of summer) and December 2012 (as example of winter). The result is shown in Supporting Report S4.3 and summarized below:

- Edge of Zagazig City and far locations from Zagazig WTP tends to have low service pressures.
- Number of low service pressures (actually measured results and below 1.0 bar) is relatively more in A-4 than others.

4.3.3.2 Plan for Pilot Project

(1) Initial Plan before Determination of Detail Inputs

From the end of Phase-1 to the beginning of Phase-2 (Sep. 2011 – Jun. 2012) the Project team drafted the following plan for the pilot project.

1) Methodology

In the water service company, it is a basic requirement to supply water to the customers with appropriate quantity of water, the water pressure and the quality of the water fairly without deteriorating clean.

It is important that the present water distribution and water supply situation are monitored and confirmed continuously.

By the constant monitoring, the water flow in all areas is identified from the data of blocks. The measurement data should be summarized in a daily report, a monthly report and an annual report. Furthermore, it is necessary to grasp demand fluctuation in day, in season and in year, and to identify the present problems. The measured data in the constant monitoring are helpful to find out the abnormal data and to prevent inappropriate conditions and complaints.

To realize it, the continuous metering and reporting system will be installed for the distribution monitoring. Utilizing the obtained and analyzed data, the operation modes of facilities should be optimal and necessary rehabilitations / repairs should be recommended by the Project team and undertaken by SHAPWASCO.

2) Selection of Required System

Block management system is introduced for the purpose mentioned above. It is necessary to monitor always the required items (parameters) at the metering points. However, it is inefficient that a person always measures by the man - power.

As a constant monitoring method, a telemetry system is used widely in the world. The telemetry system is able to realize an extensive remote monitoring with a small number of people. The

measured data should be utilized for prompt improvements of conditions and future improvement plan.

As for data transfer means for 24hours, three (3) systems, i.e., radio, ordinary telephone and mobile phone systems, are examined for the pilot project. The radio system, however, was rejected by SHAPWASCO due to difficulty of permission. The ordinary telephone system was also evaluated as inappropriate due to necessity of long period for subscription procedures and cabling works. Finally, the mobile phone system, which is easier to adjust to various situations, was selected by SHAPWASCO despite of relatively higher cost.

In the Project, three (3) important parameters, i.e. water flow, water pressure and water quality data are measured at the necessary points. The data are transmitted to the main office by the telemetry system. In the main office, the data are analyzed by PC.

3) Expected effects

The following are planned for effects of the selected system:

Customer Satisfaction

- Increase of reliability on safe water supply
- Increase of satisfaction of customers
- Prompt action for inappropriate conditions and complaints
- Prevention of inappropriate conditions and complaints

Improvement of Management

- Sorting-out of water leakage area (quantitative judgment)
- Reduction and prevention of illegal connection (sorting-out of abnormal distribution flow)
- Present and future demand estimation
- Recommendation of facilities improvement
- Higher efficiency for water distribution

4) Introduction of Telemetry System

The metered data should be displayed at site and the central monitoring room. Monitoring items are planned as follows:

- Flow (measurement range -30m/s～+30m/s in velocity)
- Water Pressure (measurement range 0～10bar)
- Residual Chlorine (measurement range 0～2mg/L)
- Turbidity (measurement range 0～2NTU)

5) Required Equipment for Monitoring System

The Project team planned to divide the Zagazig City into 6 blocks as aforementioned. Since it is difficult to form completely isolated blocks to escape from the pressure drops in the network, the blocks are connected each other by several pipelines. The Project team, therefore, planned to install

flowmeters at all connecting points (inlets and outlets of block). In total, 19 flowmeters were planned to be installed. Required equipment and quantities were planned as shown in Table 4.3-12.

Table 4.3-12 Initially Planned Equipment for WDM Activity

No.	Equipment Name	Quantity
1	Ultrasonic Flow meter	19sets
2	Residual Chlorine Meter	19sets
3	Turbidity Meter	19sets
4	Water Pressure Gauge	19sets
5	Monitor Board for the site with Telemeter	19sets
6	Monitoring System for the Central Monitoring Room	1set
7	Data Collecting PC Server	1set
8	PC for Monitoring	1set
9	Printer	1set

Source: The Project team

(2) Final Plan after Determination of Detail Inputs

In July 2012, the Project team had a meeting with JICA to concrete the pilot project plan including re-confirmation in detail for objectives, activities and inputs. Several discussions were made among JICA, HCWW, SHAPWASCO and the Project team, and the following plan was concreted. An action plan, which was compiled by the Project team, was shown in Supporting Report S4.2.

1) Pilot Project Area

As the target area, Zagazig City was selected. In Zagazig city, WTP and wells will be operated for trial according to demand (not only by time table). The activities include effective utilization of WTP and reservoir. For more precise flow monitoring and trial control, A-4 was selected as the detail monitoring area.

2) Outputs of Pilot Project

Since 1) it is a pilot project for remote monitoring, 2) monitoring items and points should be increased after viability confirmation, and 3) water flow and pressure are more prioritized than water quality, the Project team excluded the water quality from the pilot project. The following are the planned outputs of the pilot project:

- Water demand patterns are grasped.
- The existing water reservoir of Zagazig WTP is effectively utilized. (More discharge from Zagazig WTP at peak hours)
- Zagazig WTP is operated at a stable rate for production (treatment) to minimize the fluctuation. It leads minimization of variable productions of wells.
- Integrated operation is established for water distribution system among the three (3) related General Departments for Zagazig WTP, well stations and water distribution networks.
- The information of water distribution such as per capita demand, peak factors and demand pattern is collected and analyzed.

3) Main Activities

The following are required main activities in order to provide the planned outputs:

Daily Demand

- To collect and analyze operation data of WTP production, operation mode of distribution pumps, water reservoir level, service pressure, well operation and air temperature.
- To analyze the demand pattern.

Water Reservoir

- To try the effective utilization of the existing reservoir at Zagazig WTP, according to demand.
- To review the operation mode of distribution pumps.
- To observe influence of additional volume of distribution from the reservoir by flow and service pressure.

Zagazig WTP

- To formulate daily production (treatment) rate of WTP according to daily forecast of demand.
- To apply the stable production (treatment) of WTP. (To minimize the fluctuation of production rate.)
- To monitor the water level of the reservoir during stable WTP production (treatment).

Integrated Operation

- To instruct the well operators to record outlet pressure of well station and to operate pumps according to the pressure.
- To create the proper cooperation among the three (3) related departments for water service in Zagazig in order to realize the integrated operation.

Basic Information

- To analyze the per capita demand and to review the development plan of SHAPWASCO based on the per capita demand.

4) Inputs

JICA

- Ten (10) pressure gauges and their telemeters utilizing the cellar phone network.
- Fourteen (14) flow meters and their telemeters for pilot area A-4 utilizing mobile phone network.
- Central monitoring equipment including display and software.
- One (1) digital pressure gauge for each of new and old line of distribution pump station in Zagazig WTP.

The Egyptian Side

- Analog pressure gauges at each well station.
- Construction of the central monitoring room.
- Chambers for flow meters in streets / well stations.
- Feeder pipes to pressure gauges.
- Wiring in the Zagazig WTP from following meters to the central monitoring room:
    - Existing water level meter of the reservoir.
    - Existing raw water flow meters.
    - Existing clear water flow meters.
    - Digital pressure gauges to be installed.
- Maintenance of telemetry system.
- Operation and maintenance cost of telemetry system such as power charge and communication fee.
- Replacement of the existing AC pipe with PVC/PE/Steel pipe for flow meters.

4.3.3.3 Preparation of Facilities and Installation of Equipment for Pilot Project

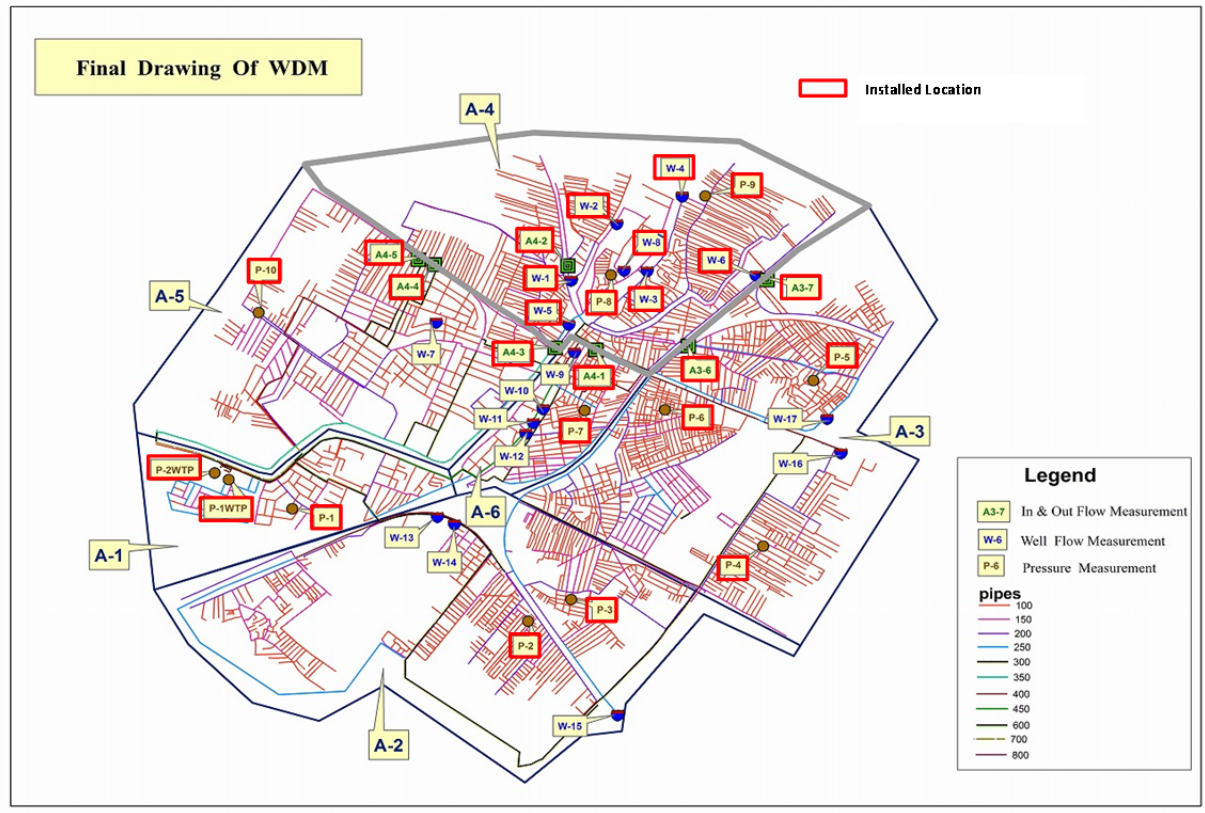
(1) Major Equipment and Installed Location

To conduct the final pilot project plan, the equipment was provided by JICA as shown in Table 4.3-13, Figure 4.3-5 and Figure 4.3-6. The installation was conducted by SHAPWASCO. In parallel, SHAPWASCO provided and installed analogue pressure gauges at all well stations.

Table 4.3-13 Major Equipment Provided by JICA

No.	Equipment Name	Quantity	Outline
1	Ultrasonic flow meter (For small dia. Chamber type)	6	Range: -30m/s - +30m/s, Possible to diameter 100mm or more and less than 300mm, flow accumulation for both positive and negative directions. IP67 or more. For telemeter.
2	Ultrasonic flow meter (For large dia. Chamber type)	1	Range: -30m/s - +30m/s, Possible to diameter 300mm, flow accumulation for both positive and negative directions. IP67 or more. For telemeter.
3	Ultrasonic flow meter (For small dia.)	7	Range: -30m/s - +30m/s, Possible to diameter 100mm or more and less than 300mm, flow accumulation for both positive and negative directions. IP65 or more. For telemeter.
4	Water pressure gauge (For WTP)	2	Range: 0 - 1.00MPa, IP67 or more for sensor. For data transfer by cable.
5	Water pressure gauge	10	Range: 0 - 1.00MPa, IP67 or more for sensor. For telemeter.
6	Telemeter (For indoor type)	17	Box: steel (rust proof paint) or synthetic resin. Main equipment: switch gears, transformer, noise filter, mobile phone module. Wall mounted type. In-door type. IP44 or more.
7	Telemeter (For outdoor type)	7	Box: steel (rust proof paint) or synthetic resin. Main equipment: switch gears, transformer, noise filter, mobile phone module. Pole mounted type. Out-door type. Ventilation fan and heat protection panel. IP44 or more.
8	Central monitoring system	1	Software for data collection and monitoring. PC for data collection. PC for data monitoring. Printer. Allowable number of metering points: possible to expand to 8 parameters and 100 points at least. Trend graph and reporting table (daily, monthly and yearly).

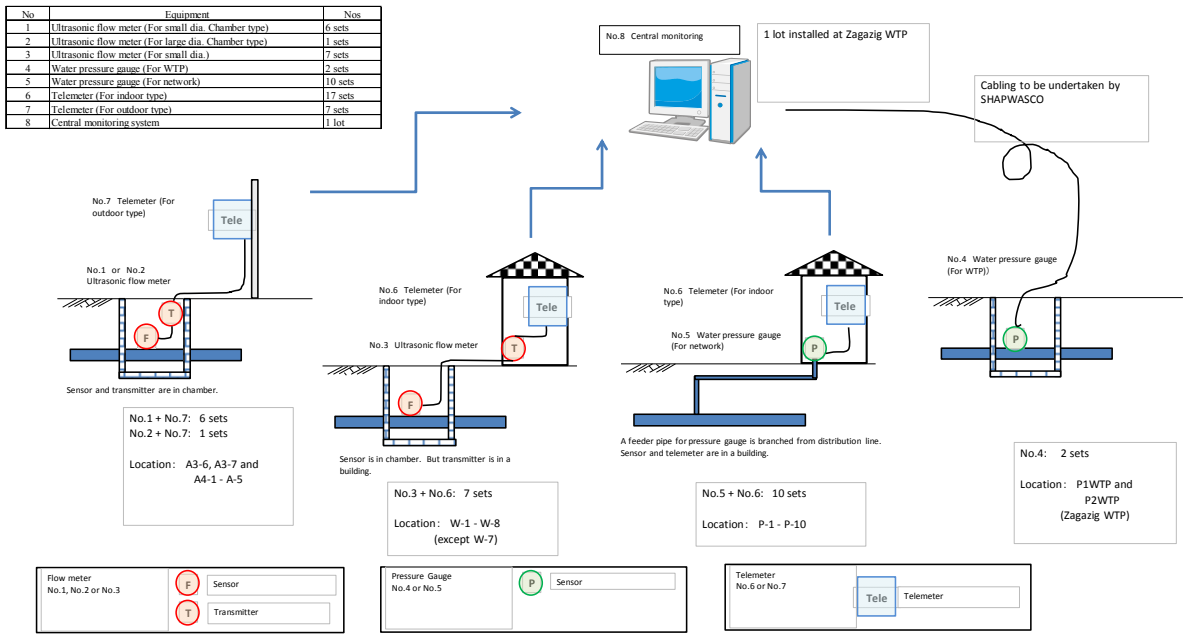
Source: The Project team



Source: The Project team

Figure 4.3-5 Location of Metering Equipment Provided by JICA

No	Equipment	Nos
1	Ultrasonic flow meter (For small dia. Chamber type)	6 sets
2	Ultrasonic flow meter (For large dia. Chamber type)	1 sets
3	Ultrasonic flow meter (For small dia.)	7 sets
4	Water pressure gauge (For WTP)	2 sets
5	Water pressure gauge (For network)	10 sets
6	Telemeter (For indoor type)	17 sets
7	Telemeter (For outdoor type)	7 sets
8	Central monitoring system	1 lot



Source: The Project team

Figure 4.3-6 System Outline for Metering Equipment Provided by JICA

(2) Major Equipment and Facilities Provided by SHAPWASCO

Besides, SHAPWASCO provided the facilities and equipment shown in Table 4.3-14 for preparation of the equipment installation and for associating the monitoring system.

Table 4.3-14 Major Equipment and Facilities Provided by Egyptian Side

Item	Quantities	Remark
Flow meters chambers for both networks and wells	14 locations	
Water feeders for pressure gauges	10 locations	
Signal cables in Zagazig WTP	1 lot for flow meters, pressure gauges and water level meters	
Central monitoring room	1 building in Zagazig WTP	
Contract with telephone company	1 lot for 25 lines	
Pressure gauges for well	18 well stations	
Power feeder and signal cable installation for telemetry system	24 locations	
Uninterruptible power supply (UPS) system for the central monitoring room	1 lot	Improvement works during operation
Mobile phones to communicate with wells	18 sets	Improvement works during operation

Source: The Project team

(3) Installation Works and Schedule for the Monitoring System

1) Equipment Provided by JICA

The equipment procured by JICA was delivered in April 2013 to SHAPWASCO. The equipment manufacturer sent supervisors for installation, operation and maintenance from the 22nd April to the 2nd May 2014. In parallel of their stay and after, SHAPWASCO installed all equipment at the designated locations. It was finished by the end of May 2013.

Unfortunately, a set of pressure gauge and telemeter, which was installed at P-5, was stolen in October 2013. SHAPWASCO will purchase a set of substitute equipment, considering expansion schedule of the monitoring system for whole Zagazig.

Although the hardware installation was finished in May 2013, the following troubles were found on the equipment. The Project team, therefore, was not able to commence immediately monitoring works through the installed system. The manufacturer started adjustment works in June 2013 at site and by remote operation through internet.

- Configurations of routers are not properly done.
- Printed daily and monthly reports do not indicate the data properly.
- Unit of parameters shown on a screen are not appropriate.
- Water flows are not appropriately calculated in the equipment.

In March 2014, the system was improved for a possible level of data acquisition. Since then, the Project team has acquired and analyzed the data. In July 2014, the manufacturer announced that the adjustment works were finished. Since then, the system is stable for data acquisition and processing. Reasons of the long adjustment period are summarized as follows:

- The adjustment works (modification and verification of programs in the system) was conducted through remote operations by the manufacturer. Identification of troubles, adjustments and verifications took longer period.
- Frequent suspension of electricity power and mobile tele-networks were obstacles for quick adjustment and verification.

2) Equipment Provided by the Egyptian Side

The following are installation schedule of main equipment provided by SHAPWASCO.

Analog Pressure Gauges at Wells Outlets

To operate wells according to outlets pressures of wells, SHAPWASCO installed analog pressure gauges at all of the 17 well stations by March 2014.

Flow Meters and Water Level Meter at Zagazig WTP

Initially, the Project team planned to utilize the existing flow meters for raw and treated waters and water level meter for treated water tank. The Project team found, however, troubles of such meters for accuracy. SHAPWASCO procured new meters instead and installed. It was conducted in parallel of the system remedy works of the manufacturer. The installation was conducted as follows:

- Treated water flow and water level meters were installed in July 2014.
- Raw water flow meters were procured in August 2014. They were installed in September 2014. However, adjustment and calibration were required frequently, especially for the meter of new plant. The stable measurement was commenced in March 2015.

Uninterruptible Power Supply

Zagazig City suffers from frequent suspensions of electricity power distribution for the recent two (2) years. When it is extended in Zagazig WTP, the central monitoring room is not able to receive and process the data. It affects data acquisition, storage and output. SHAPWASCO, therefore, installed a device of Uninterruptible Power Supply (UPS) in August 2014.

Mobile Phones

It had been difficult for WDM Department to communicate wells operators directly. In March 2015, SHAPWASCO provided 18 mobile phones for all well stations and allowed direct orders of operation modes from WDM Department. According to distribution of the mobile phones, prompt countermeasures are expected for well stations in operation improvement.

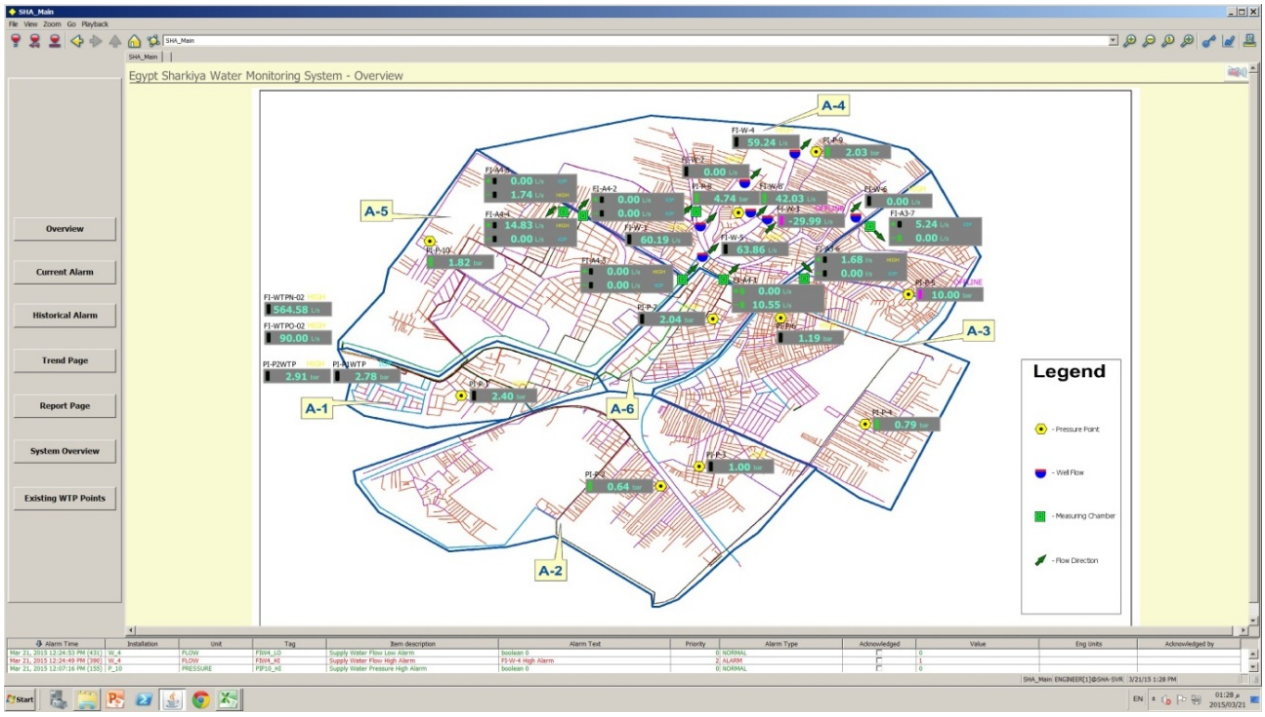
(4) Quotidian Data Monitoring and Analysis

1) Flows and Pressures Monitoring on Screen

WDM Department monitors the water distribution conditions on the monitoring screen through acquired data in flow and pressure. The screen is exampled in Figure 4.3-7. A system operator

monitors the following and recommends immediate modifications of operation modes to Zagazig WTP and wells when necessary:

- Flows and pressures of Zagazig WTP distribution whether appropriate or not.
- Pressures on the network distribution whether appropriate or not.
- Flows and pressures for A-4, including wells flows whether appropriate or not.
- Irregular data and equipment status at sites, including electricity power supply and tel-communications.



Source: The Project team

Figure 4.3-7 Example of Monitoring Screen

2) Demand Analysis for A-4

WDM Department analyzes the water demand for A-4 every day. It is a base of every analysis on demand in Zagazig City. Example is shown in Figure 4.3-8. Through the analysis, the Project team grasps the water demand of customers as well as hourly fluctuations. Since it is difficult to have compete data for monthly and annual demand due to instability of electricity supply and tel-communications, the daily data are utilized to estimate the monthly and annual demands in practical as of March 2015.

Daily Demand Identification Sheet for Area-4

SHAPWASCO

Date:	03/09/14		
Prepared by	Name	Tamer & Nagi	

Population:	112,187	Ave Temperature:	21 - 36

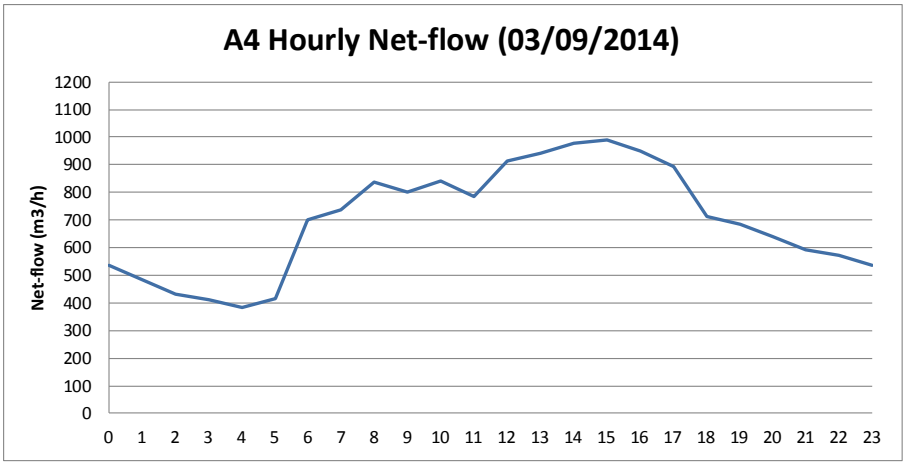
Hours	In-Flow (m^3/h)	Well Flow (m^3/h)	Out-Flow (m^3/h)	Net-Flow (m^3/h)
0	69	495	30	534
1	41	474	30	485
2	30	432	31	431
3	42	400	30	413
4	45	369	29	385
5	75	373	31	417
6	64	656	21	700
7	77	690	31	736
8	55	878	95	839
9	25	885	109	801
10	44	886	88	843
11	88	729	33	784
12	224	739	51	913
13	192	801	51	942
14	203	825	51	977
15	118	932	61	989
16	66	935	52	948
17	231	711	47	895
18	414	338	39	712
19	451	276	41	685
20	257	413	28	642
21	253	366	27	592
22	229	369	26	572
23	183	376	22	538
Total	3,477	14,352	1,055	16,774

Daily Average

149.52	LCD
698,929	L/h

Max.

989	m^3/h
989,368	L/h
142%	Peak F



Source: The Project team

Figure 4.3-8 Example of Daily Demand Analysis for A-4

3) Low Service Pressures in Zagazig City

Situations of low service pressures are also confirmed every day. Operation conditions are confirmed for Zagazig WTP and nearest wells with the low service pressure. The acquired data is the calculation basis for PI of the low service pressure ratio. The summary sheet for low service pressures is exampled in Table 4.3-15.

Table 4.3-15 Example Sheet of Low Service Pressure

Month	November
Year	2014
Prepared by	

Date	Effective Hours											Hours of Low Service Pressure (below 1.0 bar)											Ratio (%)
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Total (a)	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Total (b)	=(b) / (a) %
1	24	24	24	24	0	0	0	24	23	0	143	0	2	1	13	0	0	0	0	0	0	16	11%
2	23	23	23	23	0	11	12	23	22	3	163	0	0	0	9	0	0	0	0	0	0	9	6%
3	24	24	21	24	0	17	24	24	24	9	191	0	2	2	9	0	0	0	0	0	0	13	7%
4	23	24	23	23	0	0	23	24	23	2	165	0	5	6	14	0	0	0	0	0	0	25	15%
5	24	24	24	24	0	0	24	24	24	0	168	0	2	2	11	0	0	0	0	0	0	15	9%
6	23	24	23	23	0	13	24	24	24	0	178	1	1	1	7	0	0	0	0	0	0	10	6%
7	24	24	22	22	0	24	24	24	24	0	188	0	7	7	13	0	3	0	0	0	0	30	16%
8	24	24	24	24	0	24	24	24	24	0	192	0	7	8	12	0	1	0	0	0	0	28	15%
9	24	24	24	24	0	24	24	24	22	0	190	0	0	0	5	0	0	0	0	0	0	5	3%
10	24	23	24	23	0	24	24	20	23	0	185	0	1	2	5	0	0	0	0	0	0	8	4%
11	24	24	24	24	0	24	24	23	24	0	191	0	0	0	5	0	0	0	0	0	0	5	3%
12	24	23	24	24	0	24	24	24	24	0	191	0	0	0	4	0	0	0	0	0	0	4	2%
13	21	24	24	24	0	24	22	23	24	0	186	0	3	3	9	0	1	0	0	0	0	16	9%
14	0	24	24	24	0	24	24	23	24	0	167	0	8	8	14	0	0	0	0	0	0	30	18%
15	0	24	24	24	0	24	24	24	24	0	168	0	7	8	18	0	2	0	0	0	0	35	21%
16	0	23	24	24	0	23	24	24	23	0	165	0	0	0	6	0	0	0	0	0	0	6	4%
17	0	24	24	24	0	24	24	23	24	0	167	0	1	1	7	0	0	0	0	0	0	9	5%
18	0	23	23	23	0	24	23	4	23	0	143	0	0	0	4	0	0	0	0	0	0	4	3%
19	0	24	24	24	0	24	24	7	23	0	150	0	0	0	0	0	0	0	0	2	0	2	1%
20	0	24	22	24	0	23	24	23	24	0	164	0	0	0	0	0	1	0	0	0	0	1	1%
21	0	24	24	24	0	22	24	24	24	0	166	0	2	2	6	0	2	0	1	1	0	14	8%
22	11	24	24	24	0	24	24	24	24	0	179	0	8	8	13	0	0	0	0	0	0	29	16%
23	24	24	24	24	0	24	24	24	24	0	192	0	0	0	1	0	0	0	0	0	0	1	1%
24	24	24	24	23	0	24	24	24	24	1	192	0	0	1	6	0	0	0	0	0	0	7	4%
25	24	24	24	24	0	24	24	24	24	0	192	0	0	0	5	0	0	0	0	0	0	5	3%
26	24	24	24	24	0	24	24	24	23	0	191	0	0	1	7	0	0	0	0	1	0	9	5%
27	24	24	24	24	0	24	24	24	24	0	192	0	2	2	5	0	0	0	0	0	0	9	5%
28	11	11	11	11	0	11	11	11	11	0	88	0	0	0	0	0	0	0	0	0	0	0	0%
29	14	14	14	14	0	13	14	14	13	0	110	0	0	0	7	0	0	0	0	0	0	7	6%
30	24	24	24	24	0	24	24	24	24	0	192	0	0	0	0	0	0	0	0	0	0	0	0%
Total	486	692	686	689	0	589	657	650	685	15	5149	1	58	63	215	0	10	0	1	4	0	352	7%

Area-4		
Effective	Low Press	Raio(%)
47	0	0%
45	0	0%
48	0	0%
47	0	0%
48	0	0%
48	0	0%
48	0	0%
48	0	0%
46	0	0%
43	0	0%
47	0	0%
48	0	0%
47	0	0%
47	0	0%
48	0	0%
47	0	0%
47	0	0%
27	0	0%
30	2	7%
47	0	0%
48	2	4%
48	0	0%
48	0	0%
48	0	0%
48	0	0%
47	1	2%
48	0	0%
22	0	0%
27	0	0%
48	0	0%
1335	5	0.4%

Source: The Project team

4) Demand Analysis for Whole Zagazig

In the pilot project, the installed equipment is not enough to grasp accurately the water distribution flow for whole Zagazig since the installed flow meters are limited in number. It is, however, estimated by the following procedures in quotidian:

- To sum-up the measured flows in A-4 for wells distribution.
- To sum-up the measured flows for WTP distribution.
- To estimate the distribution flow form wells located in other areas than A-4 through pump capacities and operation hours.

5) Utilization of Water Reservoir in Zagazig WTP

Utilization of water reservoir for a new plant of Zagazig WTP was planned to be analyzed for relation among raw and treated flows, and water level of reservoir. Since the raw water flow meter and level meter were frequently instable, the outputs were limited.

(5) Results of Data Analysis (1st Step)

Same data analyses are conducted through a year. They are undertaken in step wise in order to narrow the found issues. The following are the 1st step analysis for basic information.

1) Population

The average water demand had been calculated approximately for whole Zagazig City at 300LCD or more, if calculating by the population obtained at the beginning of the Project. Since it is very large comparing with the Egyptian standard and measured data in A-4, the Project team re-confirmed the population for December 2014 as follows (all examinations include the service population for a part of Zagazig Markaz in consideration):

Population based on CAPMAS

As aforementioned in Table 4.3-8, the population is 399,783 in Zagazig City for December 2014 according to CAPMAS data.

Population based on Number of Customers (Subscribers) for Water Supply

The total number of subscribers is 93,216 in December 2014 for water supply. Average family number per subscriber is estimated 4 or 5 persons. Assuming the population at 399,783 according to CAPMAS, the average population per subscriber is calculated at 4.33. It is within a range between 4 and 5.

Population based on Number of Customers (Subscribers) for Electricity Supply

According to Zagazig branch of the electricity company, the number of subscribers is about 138,000 in December 2014. Assuming the service population per subscriber at three (3), the total population of Zagazig City will be 138,000 x 3 = 414,000 persons. It is near to CAPMAS estimation.

Population based on Sewage Flow

According to sewerage sector of SHAPWASCO, the average daily flow of sewage is 87,185m^3/d. Since the population of Zagazig City is estimated at 399,783 by CAPMAS, the average swage flow is converted to 218LCD.

According to the analyzed data for water distribution in whole Zagazig City, which is mentioned in 4.3.3.3 (5) 3). Average water distribution is calculated at 244LCD. 218LCD of sewage flow is 89% of the 244LCD of distributed water.

Since the Egyptian Code instructs that the design sewage flow should be 80% - 90% of water supply, the 218LCD of sewage flow is within the designated range.

Conclusion

Since the calculated populations from other sources are nearly same as one estimated by CAPMAS. The Project team applied the estimated population by CAPMAS. The Project team, however, has been careful for the monthly increase of population in the demand estimation. It is shown in Table 4.3-16 although shown in aforementioned Table 4.3-8.

Table 4.3-16 Trend of Population for Pilot Project Area (persons)

Area	2014										2015	
	March	April	May	June	July	August	September	October	November	December	January	February
Zagazig City	385,455	387,035	388,620	389,320	390,132	392,060	393,988	395,916	397,844	399,783	401,710	403,637
A-4	124,286	124,796	125,308	125,533	125,794	126,416	127,038	127,660	128,282	128,905	129,527	130,149

Source: CAPMAS

2) Distribution Flow for A-4

Average Distribution Flow

As described in 4.3.3.1 (5), A-4 area had suffered from the low service pressures. In May 2013, SHAPWASCO shifted the wells station "W-8" from the west edge of area to the center. After then, the conditions were improved for the area.

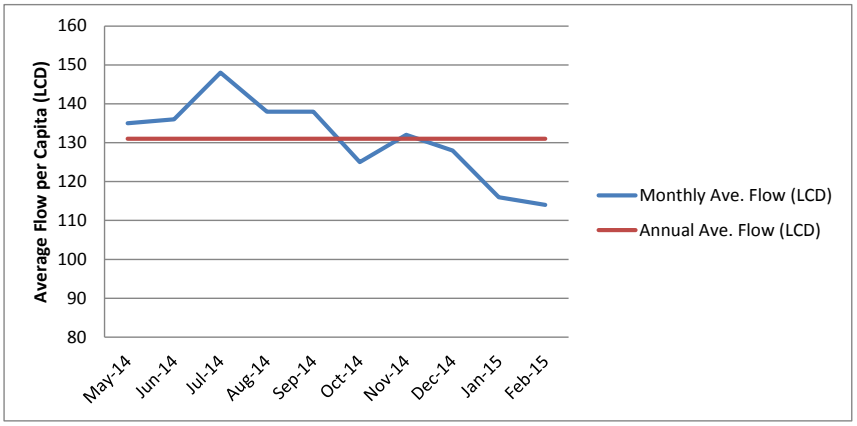
Table 4.3-17 and Figure 4.3-9 show the recorded flows in A-4. In average, the average daily distribution is estimated at 131LCD from the 10 months' records. Comparing the result with the Egyptian code, it is in a level of the standard for village. The following reasons may lead the result:

- In July and August 2014, the higher ratios were recorded for low pressure ratio as described in 4.3.3.3 (5) 4). Due to electricity suspension, the distribution was instable in summer.
- A-4 is principally a residential area for average income families a part of traditional area. There are less water users for high consumption.
- The data do not include ones for March and April, which may be in increasing trend of consumption according to temperature rise.

Table 4.3-17 Daily Flow in A-4 (May 2014 - February 2015)

Month	Recorded Flow (m^3/M)	Number of Effective days	Ave. Daily Flow (m^3/D)	Number of Days in M	Estimated Flow per M (m^3/M)	Population	Ave. Flow (LCD)
May, 14	236,801	14	16,914	31	524,334	125,308	135
June, 14	256,237	15	17,082	30	512,460	125,533	136
July, 14	409,789	22	18,627	31	577,437	125,794	148
August, 14	332,589	19	17,505	31	542,655	126,416	138
September, 14	490,806	28	17,529	30	525,870	127,038	138
October, 14	431,150	27	15,969	31	495,039	127,660	125
November, 14	506,536	30	16,885	30	506,550	128,282	132
December, 14	430,152	26	16,544	31	512,864	128,905	128
January, 15	299,764	20	14,988	31	464,628	129,527	116
February,15	356,015	24	14,834	28	415,352	130,149	114
Total / Average	3,749,838	225	16,666	304	5,066,464	127,461	131

Source: The Project team



Source: The Project team

Figure 4.3-9 Trend of Daily Flow in A-4 (May 2014 - February 2015)

The calculated distribution flows were compared and verified with the volume of consumption as shown in Table 4.3-18. Since the consumptions are around 90% of the distribution flow, the calculated distribution flows may indicate real one or near.

Table 4.3-18 Comparison of Billed Volume with Distributed Volume in A-4

Period	Average Consumption for A-4 as of Issued Bills (LCD)	Average Distribution for A-4 Demand Analysis Results (LCD)	Ratio of Issued bill per Distribution	Estimated NRW Ratio
May & June., 2014	129	136	95%	5%
July & Aug., 2014	121	143	85%	15%
Sept. & Oct., 2014	115	131	88%	12%
Nov. & Dec., 2014	121	130	93%	7%

Source: The Project team

Maximum Flow

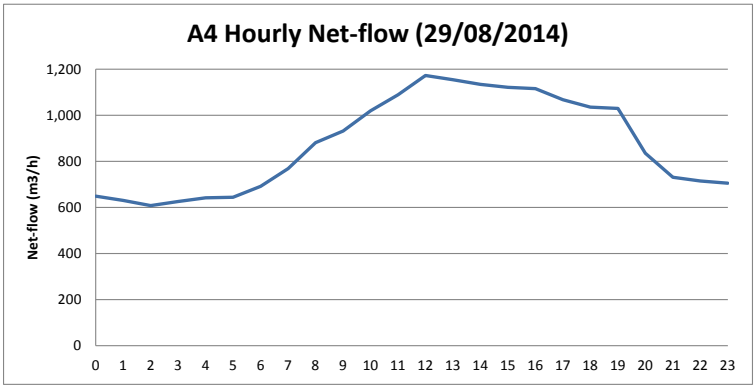
In parallel, the Project team reviewed the water flow data for July, August and September 2014. Table-4.3-19 shows higher days in daily water flow. To select the mentioned days, the Project team omitted the days of which data were not acquired in stable. Among the selected days, the 29th August 2014 recorded the maximum flow per day. It must be the maximum day in a year for the daily distribution. The ratio of 166.07LCD (the maximum daily demand) to 131LCD (average daily demand) is calculated at 1.3 (130%). It is estimated as the daily peak factor in a year.

Table 4.3-19 Maximum Day for Water Flow in A-4

Date	Daily Flow (m^3/d)	Water Flow in LCD
18 July 2014 (Fri.)	19,429	154.45
19 July 2014 (Sat.)	19,788	157.31
29 August 2014 (Fri.)	20,993	166.07
30 August 2014 (Sat.)	19,032	150.55
12 September 2014 (Fri.)	19,218	151.28
30 September 2014 (Sat.)	19,401	152.72

Source: The Project team

The hourly fluctuation of the 29th August 2014 is shown in Figure 4.3-10. The average flow in the day is calculated at 874,727L/h and the maximum flow was recorded at 1,172,439L/h. The ratio of the maximum flow to the average is calculated at 1.3 (130%). It is estimated as the hourly peak factor.



Source: The Project team

Figure 4.3-10 Hourly Fluctuation of 29 August 2014 for Distribution Flow in A-4

Summary for Distribution Flow in A-4

The water distribution flow in A-4 is summarized in Table 4.3-20. Since the low service pressures are recorded at approximately 3.0% in July and August 2014 as described in 4.3.3.3 (5) 4), the calculated values may be less than the requirement of the residents. The A-4 area, however, has maintained almost 1.0bar or more for the network pressures through the year. The Project team, accordingly, assumes that the A-4 area is covered with enough water in average. The calculated values for water flows are, therefore, approximate demands for A-4.

Table 4.3-20 Summary for Distribution Flow in A-4

Item	Value
Daily average demand	131LCD
Daily maximum demand	166LCD
Daily peak factor	1.3 (130%)
Hourly peak factor	1.3 (130%)

Source: The Project team

3) Distribution Flow Whole Zagazig City

Average Distribution Flow

Precise data are not monitored and acquired for whole Zagazig City. It is, however, enough for rough estimation of daily distribution flow.

Since the water distribution flows are not measured by the monitoring system for wells located in other than A-4, the water flows are estimated by the pumping capacities (checked by the C/P team) and operating hours.

Table 4.3-21 and Figure 4.3-11 show the estimated flows for whole Zagazig City. The average daily distribution is estimated at 244LCD from the 10 months' records. Comparing the result with the Egyptian code, it is more than a level of the Governorate capital. The following should be considered for the result:

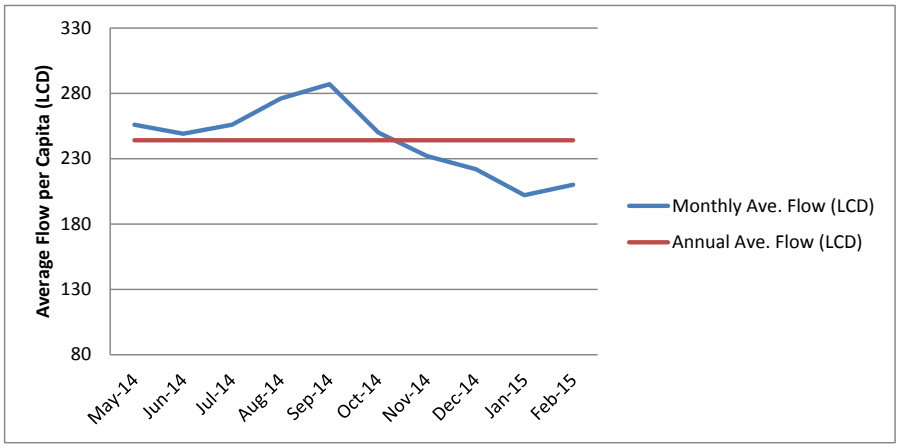
- Actual wells' distribution volume may be less than the estimated capacity due to deterioration of facilities. In these cases, the average daily distribution should be less than the calculated one.
- The estimation for wells located in other than A-4 was made by the records manually prepared by wells operators. The records may be sometimes mistaken by operators.
- On the other hand, the higher ratios were recorded for the low pressure ratio as described in 4.3.3.3. (5) 4). The recorded ratios are more that 10% from June to October 2014. The requirements of the residents must be more than the estimated distribution flow.

Table 4.3-21 Daily Flow in Whole Zagazig (July 2014 - February 2015)

Month	Recorded Distribution		Estimated Distribution	Total Distribution (m^3/M)	Number of Effective days (days)	Ave. Daily Flow (m^3/D)	Number of Days in M	Estimated Flow per M. (m^3/M)	Population	Ave. Flow (LCD)
	WTP	A-4 Wells	Other wells							
	(m^3/M)	(m^3/M)	(m^3/M)							
May, 14	890,563	218,793	283,052	1,392,408	14	99,458	31	3,083,198	388,620	256
June, 14	917,104	233,282	303,270	1,453,656	15	96,910	30	2,907,300	389,320	249
July, 14	1,554,164	357,894	485,232	2,397,290	24	99,887	31	3,096,497	390,132	256
August, 14	1,295,751	285,617	363,924	1,945,292	18	108,072	31	3,350,232	392,060	276
September, 14	2,331,102	451,208	606,540	3,388,850	30	112,962	30	3,388,860	393,988	287
October, 14	2,030,609	415,012	626,758	3,072,379	31	99,109	31	3,072,379	395,916	250
November, 14	1,533,181	343,043	525,668	2,401,892	26	92,380	30	2,771,400	397,844	232
December, 14	1,669,863	386,845	606,540	2,663,248	30	88,775	31	2,752,025	399,783	222
January, 15	1,532,545	352,888	626,758	2,512,191	31	81,038	31	2,512,178	401,710	202

Month	Recorded Distribution		Estimated Distribution	Total Distribution (m^3/M)	Number of Effective days (days)	Ave. Daily Flow (m^3/D)	Number of Days in M	Estimated Flow per M. (m^3/M)	Population	Ave. Flow (LCD)
	WTP	A-4 Wells	Other wells							
	(m^3/M)	(m^3/M)	(m^3/M)							
February, 15	1,456,868	346,465	566,104	2,369,437	28	84,623	28	2,369,444	403,637	210
Total / Average	15,211,750	3,391,047	4,993,846	23,596,643	247	96,321	304	29,303,513	395,301	244

Source: The Project team



Source: The Project team

Figure 4.3-11 Trend of Daily Flow in Whole Zagazig City (May 2014 - February 2015)

The calculated distribution flows were compared and verified with the volume of consumption as shown in Table 4.3-22. The gap between the billed and estimated distribution volumes is larger than ones calculated for A-4. NRW ratios are estimated at around 32% by the table for whole Zagazig City.

Table 4.3-22 Comparison of Billed Volume with Distributed Volume in Whole Zagazig City

Period	Average LCD for Whole Zagazig as of Issued Bills	Average LCD for Whole Zagazig Demand Analysis Results	Ratio of Issued bill to Actual Demand	Estimated NRW
May & June., 2014	176	252	70%	30%
July & Aug., 2014	169	266	64%	36%
Sept. & Oct., 2014	162	246	66%	34%
Nov. & Dec., 2014	168	227	74%	26%

Source: The Project team

Maximum Flow

In parallel, the Project team reviewed the water flow data for July, August and September 2014. Table 4.3-23 shows higher days in daily water flow. Among the selected days, the 20th August 2014 recorded the maximum flow per day. It must be the maximum day in a year for the daily distribution. The ratio of 317LCD (the maximum daily demand) to 244LCD (average daily demand) is calculated at 1.3 (130%). It is nearly the as the daily peak factor of A-4.

Table 4.3-23 Maximum Day for Water Flow in Whole Zagazig City

Date	Daily Flow (m^3/d)	Water Flow in LCD
19 July (Sat.)	117,308	300.69
20 August 2014 (Wed.)	124,461	317.45
7 September (Sun.)	118,010	299.53

Source: The Project team

Summary for Distribution Flow in Whole Zagazig City

The water flow in whole Zagazig City is summarized in Table 4.3-24. Since the low service pressures are recorded at approximately 10% or more in June - October 2014 as described in 4.3.3.3 (5) 4), the calculated values may be less than the requirement of the residents. The team evaluated the distribution flow as follows:

- The required volumes of water should be more than the distributed ones since the low service pressures were recorded, which is more than 10% in the measuring period for June - October 2014.
- Since the estimated NRW ratio is larger than the recorded one in A-4. Inequality may be occurred by area for NRW generation.
- In parallel, accuracy of operation records of wells and meters for customers are doubtful. Those ones should be improved promptly. The higher NRW calculated in the analysis may be caused by inaccuracy of wells operation records and customers' meters.
- As it is difficult to make more precise analysis in the Project, and as the acquired data are enough for rough estimation, the Project team undertaken the activities according to the estimated distribution flow in the table. It should be updated according to progress of meters' installations / improvements.

Table 4.3-24 Summary for Distribution Flow in Whole Zagazig City

Item	Value
Daily average demand	244LCD
Daily maximum demand	317LCD
Daily peak factor	1.3 (130%)

Source: The Project team

4) Service Pressures of Distributed Water in Network

The Project team monitors the service pressures at nine (9) points (P1 to P10, except P5) in the network. The records are summarized as the low service pressure ratio for PI. The summary is shown in Table 4.3-25 and Figure 4.3-12.

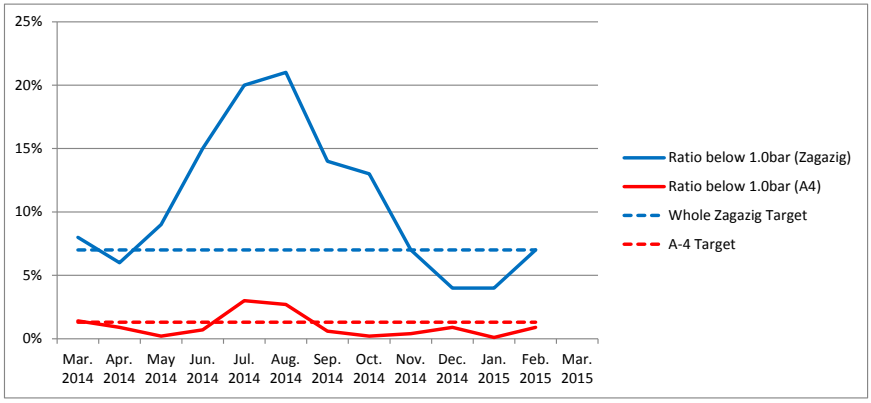
From the Figure, higher hours of low service pressures are recorded in summer season, especially in June - October 2014 in whole Zagazig City. From November 2014, the ratio has been relatively stable. In August 2014, 21% was recorded even if the daily distribution volume was 276LCD. It is very clear that the water distribution is insufficient. For A-4, the pressures are better than ones for whole Zagazig City, they are almost below 1bar although increasing in summer season (July and August 2014).

Table 4.3-25 Summary for Low Service Pressure Ratio

Item	Target	Mar. 2014	Apr. 2014	May 2014	Jun. 2014	Jul. 2014	Aug. 2014
Whole Zagazig							
Total effective hours for data at 9 points		2,887	3,407	2,749	3,465	4,883	4,113
Hours below 1.0bar at 9 points		240	201	253	512	964	852
Ratio below 1.0bar (Zagazig)	7%	8%	6%	9%	15%	20%	21%
A-4							
Total effective hours for data at 2 points		854	848	644	803	1,149	1,002
Hours below 1.0bar at 2 points		12	8	1	6	34	27
Ratio below 1.0bar (A-4)	1.3%	1.4%	0.9%	0.2%	0.7%	3.0%	2.7%
Target							
Whole Zagazig Target		7%	7%	7%	7%	7%	7%
A-4 Target		1.3%	1.3%	1.3%	1.3%	1.3%	1.3%

Item	Target	Sep. 2014	Oct. 2014	Nov. 2014	Dec. 2014	Jan. 2015	Feb. 2015
Whole Zagazig							
Total effective hours for data at 9 points		4,438	4,614	5,149	5,080	4565	5657
Hours below 1.0bar at 9 points		630	582	352	216	178	389
Ratio below 1.0bar (Zagazig)	7%	14%	13%	7%	4%	4%	7%
A-4							
Total effective hours for data at 2 points		1,309	1,330	1,335	1,274	1032	1290
Hours below 1.0bar at 2 points		8	3	5	11	1	12
Ratio below 1.0bar (A-4)	1.3%	0.6%	0.2%	0.4%	0.9%	0.1%	0.9%
Target							
Whole Zagazig Target		7%	7%	7%	7%	7%	7%
A-4 Target		1.3%	1.3%	1.3%	1.3%	1.3%	1.3%

Note: Targets were determined based on the data for March 2014.
Source: The Project team



Source: The Project team

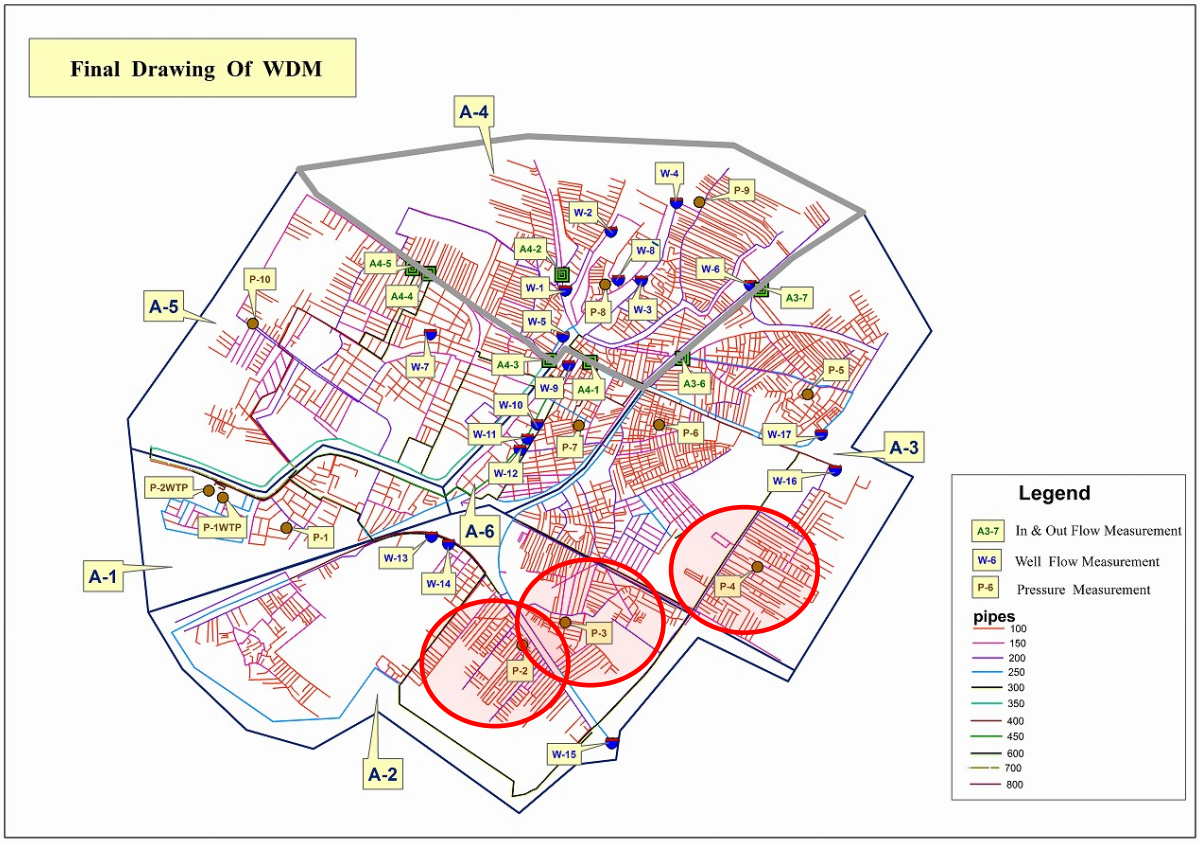
Figure 4.3-12 Trend of Low Service Pressure Ratio

In area wise, conditions of P-2, P-3 and P-4 are frequently in low service pressures. Most of the low service pressures are occurred in the three (3) areas at around 90% of whole Zagazig City as shown in Table 4.3-26. If the pressures were improved in the three (3) areas, conditions would be much improved for whole Zagazig City. The locations of P-2, P-3 and P-4 are shown in Figure 4.3-13.

Table 4.3-26 Summary for Low Service Pressure Ratio by Monitoring Point

Month	Recorded Hours for Low Service Pressures by Monitoring Point										Total (a)	Effec-tive hrs (b)	Ratio (a/b)
	P1	P2	P3	P4	P5	P6	P7	**P8**	**P9**	P10			
	A-1	A-2		A-3			A-6	**A-4**		A-5			
March, 14	3	37	39	113		26	9	**6**	**6**	1	240	2,887	8%
April, 14	1	38	77	64		5	3	**2**	**6**	5	201	3,407	6%
May, 14	1	58	94	75		7	0	**0**	**1**	17	253	2,749	9%
June, 14	0	82	175	168		30	0	**2**	**4**	51	512	3,465	15%
July, 14	0	220	318	288		94	3	**13**	**21**	7	964	4,883	20%
August, 14	0	216	324	229		56	0	**15**	**12**	0	852	4,113	21%
September, 14	0	167	301	141		11	2	**2**	**6**	0	630	4,438	14%
October, 14	0	158	224	213		11	2	**0**	**3**	0	582	4,614	13%
November, 14	1	58	63	215		10	0	**1**	**4**	0	352	5,149	7%
December, 14	0	23	31	142		7	7	**9**	**2**	0	216	5,080	4%
January, 15	0	25	25	117		18	0	**0**	**1**	0	178	4,565	4%
February, 15	3	154	45	124		30	9	**4**	**8**	12	389	5,657	7%
Total	9	1,236	1,716	1,889		305	35	**54**	**74**	93	5,369	51,007	11%
Total (%)	0.20	23.02	31.96	35.18		5.68	0.65	1.01	1.38	1.73	100		
		90.17											

Note: Highlighted figures are for A-4.
Source: The Project team



Source: The Project team

Figure 4.3-13 Locations of P-2, P-3 and P-4

5) Differences of Unit Water demand by Area

The Project team does not measure the water distribution flows in all blocks. It is difficult to grasp the actual water distribution per block. However, the differences of water demand are able to be estimated by consumption data. Table 4.3-27 shows the water consumption data per area. A-2 and A-4 are areas below the average for unit consumption. A-1 and A-5, which are high income and new residential areas, records the unit consumption nearly double of ones of A-4. The unit consumption in A-6, which is the center of Zagazig, is also higher. The consumptions in A-2, A-3 and A-4 occupy, however, nearly 70% of total in Zagazig City.

Table 4.3-27 Difference of Unit Consumption by Area

Block No.	Item	A-1	A-2	A-3	A-4	A-5	A-6	Total
January & February,2014	No. of Subscribers	7,265	12,590	24,392	19,921	20,795	7,290	92,253
	Sold (m^3)	295,718	736,323	1,180,245	1,009,900	808,207	292,760	4,323,153
	m^3/Day	5,012	12,480	20,004	17,117	13,698	4,962	73,274
	Population	21,989	70,290	100,542	123,779	45,886	21,396	383,882
	Average LCD	**228**	**178**	**199**	**138**	**299**	**232**	**191**
March & April, 2014	No. of Subscribers	7,265	12,590	24,392	19,921	20,795	7,290	92,253
	Sold (m^3)	304,801	665,303	1,158,004	987,165	790,761	288,721	4,194,755
	m^3/Day	4,997	10,907	18,984	16,183	12,963	4,733	68,766
	Population	22,171	70,867	101,366	124,796	46,262	21,573	387,035
	Average LCD	**225**	**154**	**187**	**130**	**280**	**219**	**178**
May & June, 2014	No. of Subscribers	7,265	12,590	24,392	19,921	20,795	7,290	92,253
	Sold (m^3)	296,144	664,625	1,146,354	986,793	784,831	295,459	4,174,206
	m^3/Day	4,855	10,895	18,793	16,177	12,866	4,844	68,430
	Population	22,301	71,286	101,964	125,533	46,536	21,699	389,319
	Average LCD	**218**	**153**	**184**	**129**	**276**	**223**	**176**
July & August, 2014	No. of Subscribers	7,265	12,590	24,392	19,921	20,795	7,290	92,253
	Sold (m^3)	287,547	664,046	1,140,877	949,293	789,170	285,680	4,116,613
	m^3/Day	4,638	10,710	18,401	15,311	12,729	4,608	66,397
	Population	22,458	71,788	102,683	126,416	46,863	21,852	392,060
	Average LCD	**207**	**149**	**179**	**121**	**272**	**211**	**169**
September & October, 2014	No. of Subscribers	7,265	12,590	24,392	19,921	20,795	7,290	92,253
	Sold (m^3)	276,337	606,977	1,108,299	896,924	753,616	272,870	3,915,023
	m^3/Day	4,530	9,950	18,169	14,704	12,354	4,473	64,181
	Population	22,678	72,494	103,693	127,660	47,325	22,066	395,916
	Average LCD	**200**	**137**	**175**	**115**	**261**	**203**	**162**
November & December, 2014	No. of Subscribers	7,265	12,590	24,392	19,921	20,795	7,290	92,253
	Sold (m^3)	297,350	669,639	1,138,566	950,309	761,921	285,802	4,103,587
	m^3/Day	4,875	10,978	18,665	15,579	12,491	4,685	67,272
	Population	22,901	73,202	104,706	128,905	47,786	22,283	399,783
	Average LCD	**213**	**150**	**178**	**121**	**261**	**210**	**168**
Total/Average	No. of Subscribers	7,265	726,996	1,262,837	1,048,898	893,145	322,130	4,577,878
	Sold (m^3)	1,757,897	4,006,913	6,872,345	5,780,384	4,688,506	1,721,292	24,827,337
	m^3/Day	4,816	10,978	18,828	15,837	12,845	4,716	68,020
	Population	22,416	71,655	102,492	126,182	46,776	21,812	391,333
	Average LCD	**215**	**153**	**184**	**126**	**275**	**216**	**174**

Source: The Project team

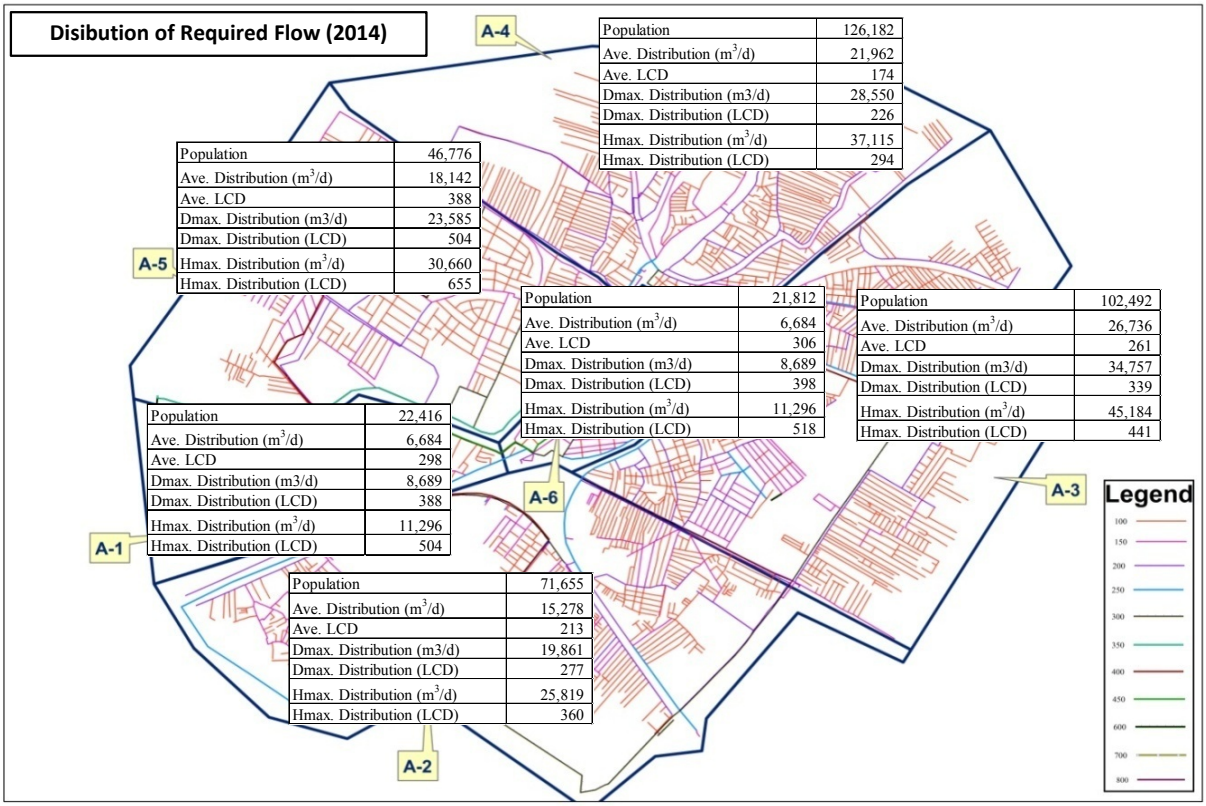
6) Required Flow by Block

Utilizing the estimated distribution flow and consumption data, the Project team estimated the required flow by block for 2014. The results are shown in Table 4.3-28 and Figure 4.3-14. It is one of references for water distribution by block for management.

Table 4.3-28 Estimated Requirement on Distribution Flow in 2014 by Block

Item	A-1	A-2	A-3	A-4	A-5	A-6	Total
Consumption							
Billed water in 2014 (m^3)	1,757,897	4,006,913	6,872,345	5,780,384	4,688,506	1,721,292	24,827,337
Population	22,416	71,655	102,492	126,182	46,776	21,812	391,333
Unit consumption (LCD)	215	153	184	126	275	216	174
Share by Block	7%	16%	28%	23%	19%	7%	100%
Calculation for Distribution							
Ave. Distribution (m^3/y)	2,439,642	5,576,324	9,758,567	8,015,966	6,621,885	2,439,642	34,852,025
Ave. Distribution (m^3/d)	6,684	15,278	26,736	21,962	18,142	6,684	95,485
Ave. Distribution (LCD)	298	213	261	174	388	306	244
Dmax. Distribution (m^3/d)	8,689	19,861	34,757	28,550	23,585	8,689	124,131
Dmax. Distribution (LCD)	388	277	339	226	504	398	317
Hmax. Distribution (m^3/d)	11,296	25,819	45,184	37,115	30,660	11,296	161,370
Hmax. Distribution (LCD)	504	360	441	294	655	518	412

Note: Dmax. means Daily Maximum. Hmax. means Hourly Maximum.
Source: The Project team



Source: The Project team

Figure 4.3-14 Estimated Requirement on Distribution Flow in 2014 by Block

(6) Results of Data Analysis (2nd Step)

According to the results of the 1st step analysis, the Project team conducted the 2nd step analysis to deepen the consideration on issues. The following are the 2nd analysis.

1) Found Issues in the 1st Stage Analysis

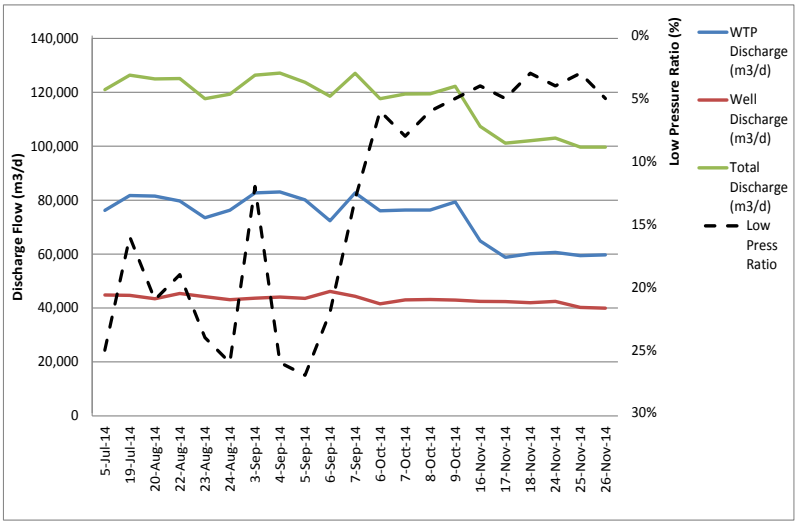
In the 1st step analysis, the following were found as issues:

- In 2014, the distribution flows were insufficient in summer, especially in A-2 and A-3. In other words, the distribution flows in peak season should be increased to a sufficient level.
- The distributed water from Zagazig WTP is delivered to A-2, A-3 and A-4 through A-1 and A-5, which are higher unit demand area. The water may be consumed in A-1, A-6 and A-5 before the delivering to A-2, A-3 and A-4, especially in peak time. It is necessary to distribute more water from Zagazig WTP or to improve / develop wells (or other sources) for A-2, A-3 and A-4.
- Operators skills and awareness may be insufficient and the submitted records are sometimes doubtful. Check and operation order system should be improved as well as provision of trainings.

2) Distribution Flow and Low Service Pressure

In December 2014, the Project team arranged the data for selected day, of which data are appropriately acquired, for the water discharges (distribution flows) and low service pressures ratio as shown in Figure 4.3-15. The following are clear from the figure:

- The higher low service ratios were recorded in summer (July - October 2014), even if the total water distribution volumes were around 120,000m^3/d (306LCD per population of August) or more.
- The pressure ratios were improved at below 10% from November 2014, even if the distribution volumes were reduced.
- The distribution flows are insufficient in summer but approaching the water sufficiency in the beginning of winter.
- The 3rd September 2014 was a trial day for operation modification of Zagazig WTP to increase the distribution flow in peak hours to the full capacity of distribution pump. However, the low service pressures were not eliminated completely.



Source: The Project team

Figure 4.3-15 Relation of Low Service Pressure with Water Distribution Flow

3) Trials for Operation Modification of Zagazig WTP

In the previous analysis, the Project team noticed that the distribution volume is insufficient in peak hours of summer. The Project team made a trial operation of WTP on the 3rd September 2014. The WTP increased the distribution flow over 1,000L/s in peak hours, which is the maximum capacity of distribution pumps. The conditions of the low pressure ratio were compared with the other day (5th September 2014) for P3, which is a point for frequent low pressures seriously, as shown in Figure 4.3-16. The following are clear from the figure:

- Average flows per day were 957L/s and 927L/s on the 3rd and the 5th September respectively. Even if the distribution flows per day are almost same, the 3rd September marked much less frequency of low service pressures.

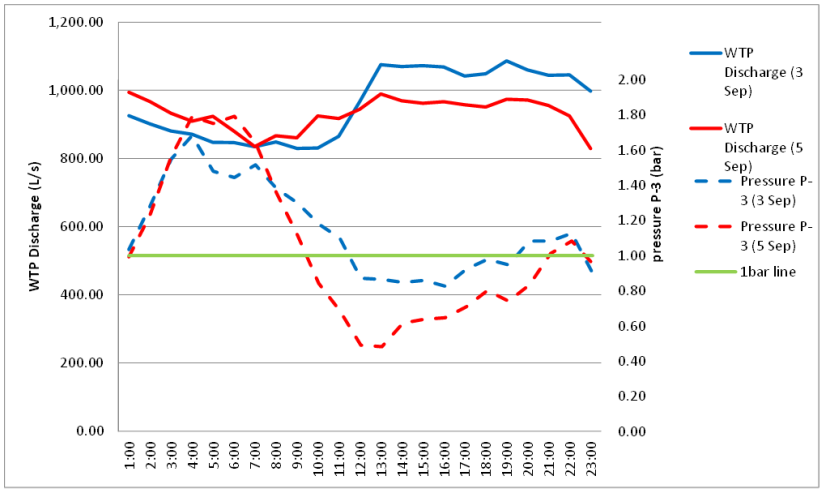
- In the two (2) days, the low service pressures were recorded basically at P2, P3 and P4. For the other points, the pressure of 1bar or more were kept by the water distribution, except 0:00AM of the 3rd September at P6, as shown in Table 4.3-29.

Table 4.3-29 Hours of Low Service Pressure on the 3rd and the 5th September 2014

Month	Recorded Hours for Low Service Pressures by Monitoring Point										Total (a)
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	
3rd Sept, 14	0	0	10	9		1	0	0	0	0	20
5th Sept, 14	0	4	14	17		0	0	0	0	0	35

Source: The Project team

- It was realized by the higher distribution flows in peak times. It is, however, clear that the water distribution flow is insufficient to eliminate the low service pressures, even if the WTP operates at the full capacity for distribution.
- In early morning when the water demand is lower, the distribution flows can be reduced. If enough water is stored in the reservoir during the early morning, WTP is able to distribute more water in stable.



Source: The Project team

Figure 4.3-16 Trial Operation of Zagazig WTP to Increase Peak Flows

If WTP had been operated in the same / similar operation mode as the trial operation in the summer of 2014, the low service pressure ratios could have been much better than the recorded ones. It was, however, difficult for WTP to keep the continuous operation at the full capacity every day due to frequent maintenance / repair of pumps and electric panels due to deterioration. The Project noticed, accordingly, the necessity of replacement for all pumps and rehabilitation of electric panels.

4) Capacity of Water Reservoir for Zagazig WTP

In Zagazig WTP, there are two (2) lines for water treatment, i.e. old plant and new plant. The old plant is quite small for the capacity of 260L/s and not equipped with a reservoir for water distribution. The new plant is bigger at 1,060L/s of capacity and equipped with a reservoir for 14,000m^3. This

water reservoir should be utilized well to store the water in the early morning and to distribute the water in day time at more than 1,060L/s.

The capacity of 14,000m^3 is only for four (4) hours storage of the whole plant capacity (91,000m^3/d). It is smaller than the standard size described in the Japanese guideline. 12 hours storage is the standard in Japan. Since it is difficult to add reservoirs at Zagazig WTP due to space, WTP should utilize the existing reservoir.

5) Simulation for Capable Flow for Distribution and Reservoir Utilization for Zagazig WTP

Necessary Distribution Capacity for Distribution Flow

Assuming the daily maximum flow at 317LCD and population at 400,000, the required distribution water flow is calculated as shown in Table 4.3-30 for peak time in Zagazig City. It is estimated at 1,400L/s. As for wells, 35,800m^3/d is allocated for distribution. In peak time, it should increase to 45,540m^3/d (= 35,800 x 1.3 of hourly peak factor) for average. This planned volume of wells distribution is within the present capacity for average.

Table 4.3-30 Assumed Requirement for Distribution Flow for Peak in Zagazig City

Unit Demand (LCD)	Population	Daily Maximum Flow (m^3/d)	Covered by Wells (m^3/d)	Covered by WTP (m^3/d)	Ditto (L/s)	Hourly peak Factor	Hourly Maximum Flow L/s
a	b	c=a x b	d	e=c - d	f=dx1000/24/ 60/60		g=f x 1.3
317	400,000	126,800	35,800	91,000	1,053	1.3	1,370 around 1,400

Source: The Project team

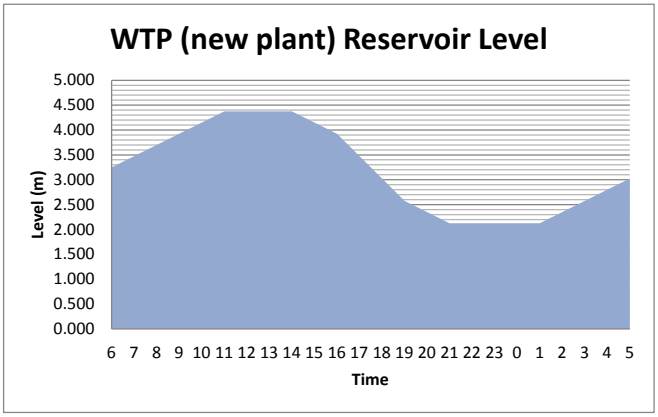
Distribution Capacity and Utilization of Reservoir in WTP

The Project team simulated the capability of flow increase from Zagazig WTP for peak time considering the utilization of the existing water reservoir. The results are shown in Table 4.3-31 and Figure 4.3-17 for operation mode and reservoir utilization. The table and figure show that the WTP is able to distribute the water at 1,460L/s, which is 138% of the current design capacity for distribution, even if the water production (treatment) volumes are maintained at 1,060L/s in a day. Figure 4.3-18 shows that the optimal distribution flow at 1,460L/s. It may cover the actual one recorded on the 3rd September 2014.

Table 4.3-31 Optimal Operation Mode to Discharge (Distribution) 1,460L/s at Zagazig WTP

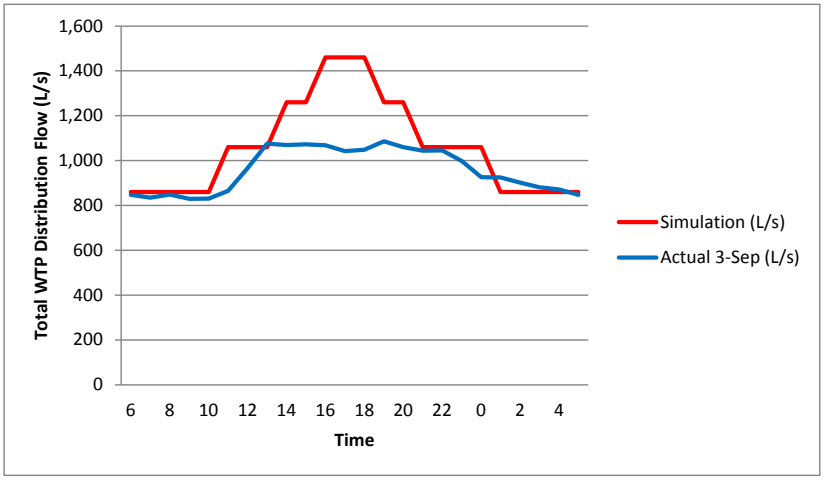
Time	New Plant								Old Plant		Total	
	Production		Discharge		Reserved water	Level of reservoir	Level of SucPit	Reserved water	Production	Discharge	Production	Discharge
	L/S	m^3/h	L/S	m^3/h	m^3	m	m		L/S	L/S	L/S	L/S
6	800	2880	600	2160	10,400	3.250	4.875	74%	260	260	1,060	860
7	800	2880	600	2160	11,120	3.475	5.100	79%	260	260	1,060	860
8	800	2880	600	2160	11,840	3.700	5.325	85%	260	260	1,060	860
9	800	2880	600	2160	12,560	3.925	5.550	90%	260	260	1,060	860
10	800	2880	600	2160	13,280	4.150	5.775	95%	260	260	1,060	860
11	800	2880	800	2880	14,000	4.375	6.000	100%	260	260	1,060	1,060
12	800	2880	800	2880	14,000	4.375	6.000	100%	260	260	1,060	1,060
13	800	2880	800	2880	14,000	4.375	6.000	100%	260	260	1,060	1,060
14	800	2880	1000	3600	14,000	4.375	6.000	100%	260	260	1,060	1,260
15	800	2880	1000	3600	13,280	4.150	5.775	95%	260	260	1,060	1,260
16	800	2880	1200	4320	12,560	3.925	5.550	90%	260	260	1,060	1,460
17	800	2880	1200	4320	11,120	3.475	5.100	79%	260	260	1,060	1,460
18	800	2880	1200	4320	9,680	3.025	4.650	69%	260	260	1,060	1,460
19	800	2880	1000	3600	8,240	2.575	4.200	59%	260	260	1,060	1,260
20	800	2880	1000	3600	7,520	2.350	3.975	54%	260	260	1,060	1,260
21	800	2880	800	2880	6,800	2.125	3.750	49%	260	260	1,060	1,060
22	800	2880	800	2880	6,800	2.125	3.750	49%	260	260	1,060	1,060
23	800	2880	800	2880	6,800	2.125	3.750	49%	260	260	1,060	1,060
0	800	2880	800	2880	6,800	2.125	3.750	49%	260	260	1,060	1,060
1	800	2880	600	2160	6,800	2.125	3.750	49%	260	260	1,060	860
2	800	2880	600	2160	7,520	2.350	3.975	54%	260	260	1,060	860
3	800	2880	600	2160	8,240	2.575	4.200	59%	260	260	1,060	860
4	800	2880	600	2160	8,960	2.800	4.425	64%	260	260	1,060	860
5	800	2880	600	2160	9,680	3.025	4.650	69%	260	260	1,060	860
6					10,400	3.250	4.875	74%				
Total (m^3/d)	69,120	69,120	69,120	69,120					22,464	22,464	91,584	91,584

Note: The table show the production (treatment) capacity after deduction of operation loss.
Source: The Project team



Source: The Project team

Figure 4.3-17 Plan of Water Level for Water Reservoir at Zagazig WTP



Source: The Project team

Figure 4.3-18 Comparison of Optimal Distribution Flow to Actual One on 3 September 2014

6) Contribution of Wells for Distribution Conditions in Zagazig City

The flows of wells are not directly and precisely grasped by the monitoring system, the wells contribute much to maintain the distribution conditions of Zagazig City. One third of water production capacity is covered by wells.

As aforementioned, the water of Zagazig WTP is delivered to A-2, A-3 and A-4, which are far from WTP and delicate areas for low service pressures, through high unit demand areas A-1 or A-5. During peak time, the water distributed by WTP is not delivered sufficiently to A-2, A-3 and A-4 due to consumption in A-1, A-5 and others including inside of A-2, A-3 and A-4. And the influences of WTP are not sufficiently maintained due to distance. Wells are, therefore, necessary for A-2, A-3 and A-4. W-15 for A-2, W-16 for A-3 and W-8 for A-4 contribute much to the respective areas.

7) Plan to Install Flow Meters at All Well Stations

The Project team observed the well operations through the records submitted by operators and the monitoring system for the network pressures. The team found sometime discrepancies between records of flow meters and operation records, and between irregular cases of network pressures and operation record of the nearest well.

The team discussed and examined countermeasures with managers of SHAPWASCO as follows:

- It is difficult to train the operators promptly for enough skills and awareness to manage the wells and records by themselves, although continuous trainings are required.
- Daily patrol system by managers of wells may be one of the effective solutions. It is, however, difficult to conduct as quotidian activities due to shortage of managers and transportation means.
- Mechanical check by flow meters may be another solution to confirm the conditions whether operating or not.
- Communication is not promptly conducted between WDM Department and operators if it has to be through well managers. The present communication mean is an obstacle for quick

confirmation of operation conditions and modification orders of operations. It is, therefore, required to be possible for direct communications between WDM Department (the central monitoring room) and operators.

SHAPWASCO concluded that 1) the mechanical confirmation (flow meters) should be installed at all well stations and connected to the central monitoring room by telemeters, and 2) the direct communication and operation orders are allowed for WDM Department through mobile phones to be distributed.

8) Capacity of Water Production (Treatment) in Zagazig City and Issues for Operations

Assuming the present capacity of water production at 141,000m^3/d (91,000 m^3 for WTP and 50,000 m^3 for wells), the present facilities are able to serve to 440,000 of population at 320LCD for average. It will be sufficient for around two (2) years from January 2015. The Production capacity will not be, therefore, an obstacle for WDM in the Project, although the countermeasures should be planned and implemented promptly by SHAPWASCO for years later than the two (2) years by other studies and projects.

However, the current issues are summarized as follows:

- Although the production (treatment) capacity is sufficient for average, the distribution capacity is insufficient for peak time. Improvement and replacement of distribution pumps facilities are required.
- Facilities and equipment of the production facilities are deteriorated. The frequent repairs and maintenances have been conducted without prior notices due to unforeseen breakdown. It is one of obstacles to maintain the planned distribution flows and pressures according to the operation plans. Rehabilitations and repairs should be promptly implemented for WTP and well stations.
- Wells are necessary especially for A-2, A-3 and A-4, under the present distribution network and production / distribution capacity of WTP. Furthermore, it is difficult to manage always for wells to distribute the water according to demand (pressures in network). Accordingly, programed operation should be a base of wells operations.
- Operation programs (time schedules) are prepared by WTP and wells managers. The facilities are not always operated according to the programs. Systems are necessary to confirm the operation conditions and instruct operators of WTP and wells promptly for WDM Department, as well as confirmation of the operation program according to the monitored and analyzed data.
- When operators of the monitoring system find low service pressures in the distribution network, it is difficult for the operators to instruct modifications of operation modes to operators of WTP and wells due to no direct access to WTP and wells. Communication routes should be improved between WDM Department and Wells.
- All facilities are not equipped with operable emergency generators. Accordingly, the facilities suspend the water distribution during the electricity suspension. It is required to install the generators promptly.

- Unit water demand is different by the water distribution block. The water should be delivered separately to the blocks according to the demand of each block. Isolation of the blocks and exclusive water transmission systems are recommended establishing for each block.

(7) Activities on Modifications for Operation Mode

Considering the issues picked up in the 2nd step analysis, the Project team conducted the following to be demand-oriented operation:

1) Preparation of Standard Program of Operation

According to pressures monitoring and considering the capacities of WTP and wells, the Project team recommended the model programs for WTP and wells. The facilities commenced the operations according to the programs, which are contained in SOP.

The programs are to show the standard time table for switch on / off of pumps. Since it is difficult to identify all cases of trouble for location, time and combination of troubles, prior planning for countermeasures is difficult to be included in the standard program. The Project team has been instructing in quotidian the modification of operation modes according to the network pressures.

- Pressures fluctuation due to change of demands and troubles of facilities.
- Sudden suspension of facilities due to electricity suspension.

2) Improvement of Communication with WTP, Wells and Top Management

In the beginning of the pilot project, all communications with operators of WTP and wells were made through heads of sectors or department managers. It was an obstacle for quick confirmation and recommendation / instruction for operation.

<u>Zagazig WTP</u>

Although the central monitoring room is located in WTP, the distance between the room and WTP manager office had been far at around 100m. It was an obstacle for quick communication and promoting awareness of the WTP manager.

Relocating the manager office to the building of central monitoring room, the Project team realized the close communications with WTP. Awareness of the manager and operators has been much promoted and they have been confirming the flows and pressures by themselves on the screen and modifying the operation modes.

<u>Wells</u>

Communication with wells was more difficult than ones with WTP operators. It was made through heads of sectors and department managers in several steps. To maintain the quick communication, SHAPWASCO allowed direct communications between WDM Department and wells operators. Furthermore, SHAPWASCO distributed mobile phones in March 2015 for all well stations to facilitate

quick communication with WDM Department. The Project team has been communicating with wells operators directly to confirm and recommend / instruct the operation modes.

Establishment of WDM Department and Communication with Top Management of SHAPWASCO

To realize integrated management among General Department (GD) for Zagazig WTP, GD for Small WTP and Wells and GD for Water Networks and Technical Support, SHAPWASCO established WDM Department in August 2014 by a decree of the Chairman. The C/P team reorganized as the department. For prompt exchange of information and counteractions for issues beyond GD / department, the department is placed directly under the Chairman. The structure allowed direct communication with operators of WTP and wells for WDM Department.

3) Trainings of Wells Operators and Expansion of Telemetry Monitoring System

In the beginning of the pilot project, SHAPWASCO installed analogue pressure gauges at all well stations. In parallel of the installation, the Project team explained the contents of the pilot project and request to records of outlet pressures from the well stations. The operators commenced recording the pressure data, but the data are sometime doubtful as aforementioned.

As the next step, the Project team tried own management by wells operators according to outlet pressures (2.7bar as reference pressure). It was, however, difficult for WDM Department to manage all wells for appropriateness of operation and to have skilled operators for all wells. WDM Department, therefore, recommended expanding flow monitoring to all wells in Zagazig City. The expansion was approved by the Chairman and commenced by own budget of SHAPWASCO. WDM Department prepared plan and tender documents under assistance of HCWW for the expansion. The contactor was decided in March 2015 and has commenced the expansion work.

Besides, the WDM Department made another training in March 2015 for the well operators on more detailed information of monitoring activities at the central monitoring room. It included the modification of communication system to be directly made through mobile phones. As it is difficult to invite all operators at one training event, the training was conducted per 4 - 5 persons. WDM Department distributed the mobile phones in the training and to explain the monitoring means by flow in front of screen, in order to promote awareness of the operators on responsibilities.

4) Modifications of Operation Modes according Monitored Network Pressures

Since the installation of the monitoring equipment, the Project team has been recommending modifications of operation modes (increase / decrease distribution flows) according to the monitored real time data for flows and pressures. The reference flows and pressures are shown in Table 4.3-32 as of March 2015.

In the beginning of activities, awareness of managers and operators was low for the monitoring system and recommendation of the Project team. The Project team had repeated discussion with managers related to water productions with the Chairman, but the improvement progressed slowly.

On the occasion of establishment of WDM Department (August 2014) and the re-location of WTP manager office to the same building of the central monitoring room (September 2014), the awareness of WTP has been much promoted. After then WTP operators have been checking and modifying the flows and pressures by themselves, not only waiting the information of the Project team.

Distribution of mobile phones contributes to improved communication with wells operators and prompt modifications of operation modes.

Table 4.3-32 Reference Flows and Pressures for Operation Order according to Real Time Data

Item	Reference	Remark	Ordering Destination
WTP outlet pressure	3.0bar in winter 3.5bar in summer	Flexible dependiding on network pressures.	WTP
WTP outlet flow	700 - 800L/s in winter 800 - 1,000L/s in summer	Flexible dependiding on network pressures and peak / off-peak time.	WTP
Network Pressure in general	1.0 - 1.2bar		WTP and the nearest wellstation
Network Pressure P-2	1.0bar		WTP and W-15
Network Pressure P-3	1.0bar		WTP and W-16
Network Pressure P-4	1.0bar		W-16

Source: The Project team

5) Utilization of Water Reservoir for Zagazig WTP

In the beginning, the Project team planed the following operation for WTP:

- To keep constant raw water flows in a day as much as possible.
- To utilize the reservoir to distribute the water in peak time (to store the water in the nighttime and to distribute it in the daytime)

Unfortunately, the trial for the reservoir utilization was not implemented in summer season due to inaccuracy of meters (provided by SHAPWASCO) for raw water and water level of reservoir although they were installed in July and August 2014.

Inaccuracy conditions for the meters have been continued especially for raw water flows. And in winter season, number of operable distribution pumps was limited to distribute the water at around 700L/s - 800L/s due to repairs and maintenance of pumps. Since the distribution from new plant should be constant for 24hours or near, the trial has been difficult for the reservoir utilization.

6) Rehabilitation and Repair of Facilities

The following are reported by the Project team for rehabilitations / repairs / improvements of facilities.

a) Zagazig WTP

<u>Water Distribution Pump</u>

Since all pumps and electric panels are old and deteriorated, frequent repairs and maintenances are necessary. Replacement of all pumps and rehabilitation of electric power system should be promptly

undertaken. Furthermore, increase of the pumping capacity for peak demand should be considered in the pumps replacements.

To secure 1,406L/s of distribution for peak time, the Project team reported, in December 2014, the necessity to replace all pumps as shown in Table 4.3-33 and rehabilitate the electricity power system.

Table 4.3-33 Recommendation for Water Distribution Pumps in Zagazig WTP

Category	Current Situation			Plan	
	Installed	Design for Max. Operation	Current/Practical Operation	Installed	Design for Max. Operation
Old plant	130L/s x 3 Total 390L/s	130L/s x 2 Total 260L/s	130L/s x 1 Total 130L/s	130L/s x 3 Total 390L/s	130L/s x 2 Total 260L/s
New plant	200L/s x 5 130L/s x 1 Total 1,300L/s	200L/s x 4 130L/s x 0 Total 800L/s	200L/s x 4 or 3 130L/s x 0 or 1 Total 730 - 800L/s	200L/s x 7 Total 1,400L/s	200L/s x 6 Total 1,200L/s
Total	1,690L/s	1,060L/s	860 - 930L/s	1,790L/s	1,460L/s

Source: The Project team

SHAPWASCO decided promptly to undertake urgent replacement for two (2) pumps of the new plant, which are the most deteriorated, together with other two (2) pumps for raw water. Since the exiting three (3) pumps are relatively in stable for the new plant, five (5) pumps would be operable for 1,000L/s. It will contribute to improvement for the next summer. In March 2015, its progress is under tendering and planned to open the tenders on the 5th April 2015.

The remaining as well as electric power system including panels should be undertaken in the next steps.

Intake Facility for Old Plant

Intake pipe is currently clogged so that the old plant is able to obtain only for half volume of the design capacity. Although the plant is small in size, the 130L/s of capacity is valuable for Zagazig City especially during peak time. The Project team reported the necessity of prompt rehabilitation in December 2014.

SHAPWASCO is planning to conduct it in 2015, utilizing the fund of IWSP.

b) Wells

To monitor the operation conditions of all wells and to acquire accurate data for water distribution flow, the Project team repeated the necessity of flow meters for the wells located in other than A-4. SHAPWASCO commenced the flow meters installation in November 2014. The tendering on the installation of telemetry system was commenced in December 2014. Its contract was concluded in March 2015 with a selected company, and the work has commenced to finish within four (4) months. The contract includes the consultation for maintenance on the installed system by the pilot project for a period of two (2) years.

Wells are also deteriorated and the Project team confirmed the efficiency drops for pumping capacity. The project team reported, in December 2014, the necessity of inspection for all wells and rehabilitation and / or replacement of pumps as required.

According to the report, SHAPWASCO undertaken the inspections for all wells and commenced the rehabilitations / replacement of pumps. Progress of works is shown in Table 4.3-34. The necessary works are almost finished and expected the contribution to the next summer.

Table 4.3-34 Progress of Wells Rehabilitation / Replacement of Pump (As of March 2015)

Well St. No.	Well No.	Pump	Current Specification of Pump	Specification after Rehabilitation / Replacement	Flow Meter	Tele-meter	Remarks	Date of Flow Meter Installation by SHAP
1	1	P1	Q=50 L/s - H=40 m	No Rehabilitation	Installed by JICA	Installed by JICA		
	2	P2	Q=50 L/s - H=40 m					
2	1	P1	Q=30 L/s - H=25 m	Rehabilitation for well and pump of Q =50L/s and H= 40 m	Installed by JICA	Installed by JICA	Finish installation but under testing	
		P2	Q=30 L/s - H=25 m					
3	1	P1	Q=30 L/s - H=25 m	Rehabilitation for well and pump of Q =50L/s and H= 40 m	Installed by JICA	Installed by JICA	Finish installation but under testing	
		P2	Q=30 L/s - H=25 m					
4	1	P1	Q=50 L/s - H=40 m	No Rehabilitation	Installed by JICA	Installed by JICA		
	2	P2	Q=40 L/s - H=40 m					
5	I	P1	Q=50 L/s - H=40 m	No Rehabilitation	Installed by JICA	Installed by JICA		
	2	P2	Q=50 L/s - H=25 m					
6	1	P1	Q=50 L/s - H=45 m	Additional well and Additional pump of Q =50L/s and H= 40 m	Installed by JICA	Installed by JICA	Finish installation but under testing	
7	1	P1	Q= 30 L/s - H= 25 m	Rehabilitation for 2 well and 2 pumps each of Q= 50 L/s and H= 40m	Installed by SHAP	To be installed by SHAP	Finish rehabilitation	5-Nov-2015
	1	P2	Q=50 L/s - H=45 m					
8	1	P1	Q=50 L/s - H=40 m	No Rehabilitation	Installed by JICA	Installed by JICA		
Old W8	1	P1		Install new pump of Q= 50L/s and H= 40m	To be installed by SHAP	To be installed by SHAP	Finish installation but under testing	
9	1	P1	Q=40 L/s - H=25 m	No Rehabilitation	Installed by SHAP	To be installed by SHAP		
	2	P2	Q=40 L/s - H=25 m					
10	1	P1	Q=40 L/s - H=25 m	No Rehabilitation	Installed by SHAP	To be installed by SHAP		8-Nov-2015
11	1	P1	Q=40 L/s - H=25 m					9-Nov-2015
12	1	P1	Q=40 L/s - H=25 m		To be installed by SHAP			
	2	P2	Q=40 L/s - H=25 m					
13	1	P1	Q=40 L/s - H=25 m	Under suspension	No action	No action		
14	1	P1	Q=30 L/s - H=25 m	Additional well and Additional pump of Q =50L/s and H= 40 m	Installed by SHAP	To be installed by SHAP	Finish installation but under testing	5-Dec-2015
		P2	Q=30 L/s - H=25 m					
15	1	P1	Q=30 L/s - H=20 m	Additional well and Additional pump of Q =25l/s and H= 30 m	Installed by SHAP	To be installed by SHAP	Finish installation	28-Nov-2015

Well St. No.	Well No.	Pump	Current Specification of Pump	Specification after Rehabilitation / Replacement	Flow Meter	Tele-meter	Remarks	Date of Flow Meter Installation by SHAP
16	1	P1	Q=30 L/s - H=40 m	No Rehabilitation	To be installed by SHAP	To be installed by SHAP		
		P2	Q=30 L/s - H=40 m					
	2	P1	Q=30 L/s - H=40 m					
		P2	Q=30 L/s - H=40 m					
	3	P1	Q=30 L/s - H=40 m					
		P2	Q=30 L/s - H=40 m					
	4	P1	Q=50 L/s - H=40 m					
	5	P1	Q=50 L/s - H=40 m					
17	1	P1	Q=50 L/s - H=40 m	No Rehabilitation	Installed by SHAP	To be installed by SHAP	Finish installation but under testing	4-Feb-2015
	2	P2	Q=50 L/s - H=40 m					
18	1	P1	Q=50 L/s - H=40 m	Additional well and Additional pump of Q =50l/s and H= 40m	Installed by SHAP	To be installed by SHAP	Finish installation but under testing	28-Oct-2015

Note: SHAP means SHAPWASCO.
Source: The Project team

c) Elevated Tanks for Well Stations

JET recommended installing elevated tanks for all well stations to keep easier the distribution pressures from the wells. Moreover, JET recommended that it is easier for operators to control pumps (switch on / off for pumps). The Project team discussed the effectiveness and possibilities of the recommendation and concluded that the elevated tanks are early for SHAPWASCO, considering skills of operators. It will be kept by SHAPWASCO for an issue to be considered in the future. The reasons of inappropriateness are as follows:

- It is difficult to secure enough space for the well stations located at street side.
- It is difficult for operators to observe always the water level of elevated tanks and operate pumps by themselves.

d) Water Distribution Main to A-3 from WTP

In general, the influence of WTP distribution does not approach well A-2, A-3 and A-4, especially zones located at edge of Zagazig City. A-2 is more influenced by WTP because of distance and less demand before the area. Conditions of A-4 were improved by the W-8 which was located at the center of A-4 along with the pilot project. However, ones for A-3 are mainly depending on W-16 and serious during suspensions of the said well station. The Project team reported the necessity of prompt installation of a water distribution main to A-3 from WTP. Although the plan had been kept by SHAPWASCO and NOPWSD, it was not realized. The report of the Project team contributed to acceleration of the work. It will not be realized unfortunately in 2015 because NOPWASD is planning to install sewers before.

(8) Service Contact for Maintenance of Monitoring System

As aforementioned, SHAPWASCO concluded the contract for expansion of monitoring system with a local service provider in March 2015. The contract includes not only system expansion but also service works for maintenance of the system (including the equipment provided by JICA).

The contents of service contact are summarized below:

- Period of service contract is for 2 years.
- Periodical inspection / maintenance should be provided on site at every 4 months interval for both software and equipment.
- The contract includes consultations through telephone and inspections on demand.
- The contactor should bear repair and maintenance cost. However, the spare parts for the equipment provided by JICA should be procured by SHAPWASCO.

4.3.4 Evaluation

4.3.4.1 Low Service Pressure Ratio

If water production is enough and the water is appropriately distributed, the low service pressure will not be recorded on the network. The Project team, therefore, determined the low service pressure ratio as a performance indicator (PI) to evaluate the Project. In parallel, the Project team determined the reference pressure at 1bar. When network pressures are below 1bar, the pressures are counted as low pressure.

Low service pressure ratio =
("Total hours of low pressure recorded at all continuous monitoring points" / ("Number of points for continuous pressure monitoring" x 365days x 24hours)

Since the water distribution pressures were commenced in March 2014 for continuous monitoring, the Project team applied the data as the initial value (baseline) of the Project. Since no data is available for the previous year and monthly fluctuation, the Project team proposes the target simply as shown in Table 4.3-35, expecting the improvement.

Table 4.3-35 Target Ratio of Low Service Pressure

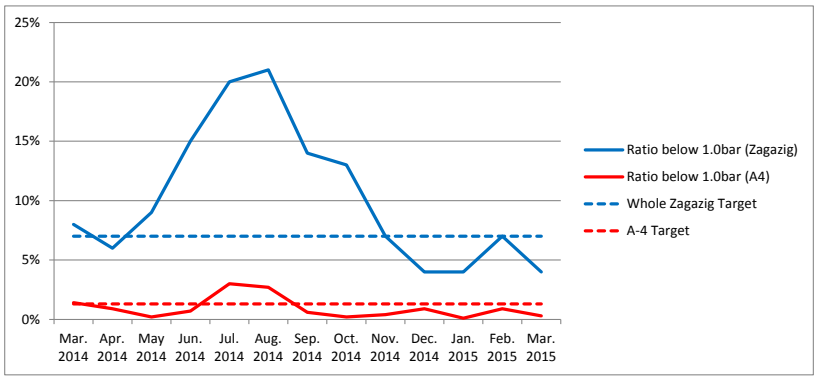
Area	Initial Ratio in March 2014	Target Ratio in March 2015
Whole Zagazig	8.0%	7.0%
A-4	1.4%	1.3%

Source: The Project team

As described in 4.3.3.3(5) 4), the low service pressure ratio fluctuated as shown Figure 4.3-19. In the beginning of the Project and in summer which is the high demand season, higher ratios were recorded. It has been, however, stable below the target from September 2014 for A-4 and from November 2014 for whole Zagazig City.

In summer season, the distribution capacity is insufficient. It caused the frequent low pressures although the production (treatment) capacity may be enough for average. The Project team, therefore,

reported the issue related to the distribution capacity to the top management of SHAPWASCO. SHAPWASCO is conducting the pumps replacement for Zagazig WTP and the rehabilitation of wells.



Source: The Project team

Figure 4.3-19 Trend of Low Service Pressure Ratio

4.3.4.2 Number of Complaints per 1,000 Customers

If water production is enough and the water is appropriately distributed, the number of complaints on water suspension and weak pressure will be reduced. The Project team, therefore, determined "the number of complaints per 1,000 customers for water suspension and weak pressure" as a performance indicator (PI) to evaluate the Project.

Number of Complaints per 1000 customers =
"Number of complaints on water suspension and low pressure" / 1000 connections

The C/P team collected the complaints data from the hot line "125" and analyzed it by area and by category of complaints. The Project teams applied the data for the fiscal year 2011/2012, which is the data before the commencement of pilot project, as the initial value (baseline) of the Project. During the pilot project, the data for 2013/2014 and 2014/2015 were analyzed and arranged for the period of the pilot project (from March 2014 to December 2014). Both the baseline and the result are shown in Table 4.3-36 and 37.

Table 4.3-36 Number of Complaints per 1,000 Customers for Zagazig (As of December 2014)

Item	Baseline (2011/2012)	Mar. 2014 - Dec. 2014	Assumption: converted into "for 1year" (Mar. 2014 - Feb. 2015)
Number of Complaints			
Water Suspension	746	1,231	1,477
Weak (low) Pressure	462	2,049	2,459
Total	1,208	3,280	3,936
Number of Subscribers (Customers)	86,755	92,253	92,253
Number of Complaints per 1000 Customers	13.92	35.55	42.67

Note: Data for Mar. 2014 - Dec. 2014 are adjusted to assume the annual number for Mar. 2014 - Feb. 2015.
Source: The Project team

Table 4.3-37 Number of Complaints per 1,000 Customers for A-4 (As of December 2014)

Item	Baseline (2011/2012)	Mar. 2014 - Dec. 2014	Assumption: converted into "for 1year" (Mar. 2014 - Feb. 2015)
Number of Complaints			
Water Suspension	134	131	157
Weak (low) Pressure	126	335	402
Total	260	466	559
Number of Subscribers (Customers)	19,224	19,921	19,921
Number of Complaints per 1000 Customers	13.52	23.39	28.06

Note: Data for Mar. 2014 - Dec. 2014 are adjusted to assume the annual number for Mar. 2014 - Feb. 2015.
Source: The Project team

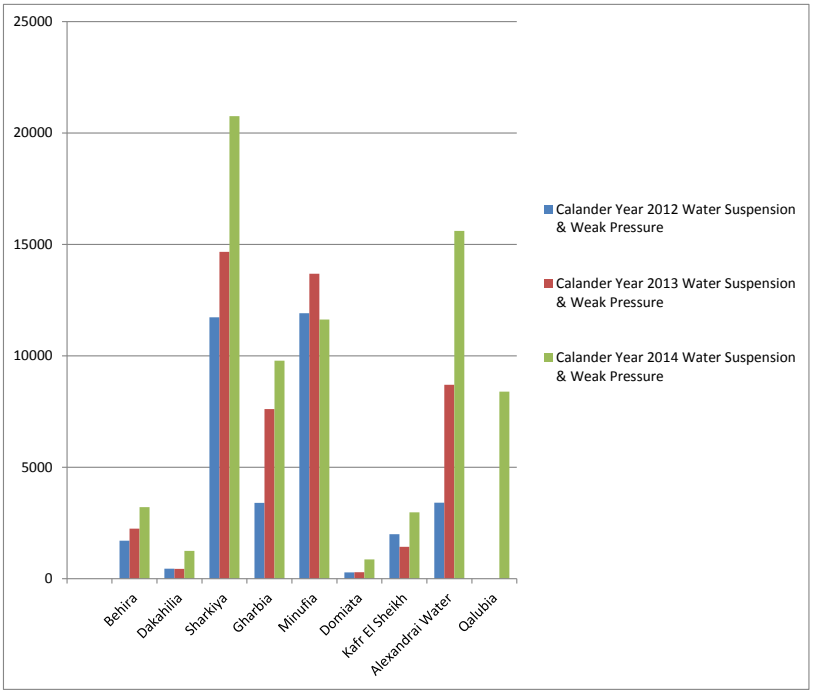
The numbers are dramatically increased. The Project team analyzed the reasons as follows:

- In A-4, the service pressures are almost stable at 1bar or more although the low service pressure ratio increased a little in summer season. It is accordingly difficult to say that the complaints are caused directly by 1bar or less in network pressures.
- Electricity suspensions have been increased dramatically in 2013/2014 and 2014/2015 as shown in Table 4.3-38.
- Suspension hours in 2013/2014 are 10 times more than ones in 2011/2012.
- Suspension hours for 2014/2015 are nearly 10 times more than ones in 2011/2012, if the hours for 2014/2015 are converted in ones for one (1) year.
- During the suspension hours, WTP (for the first 15min.) as well as wells are not operated. Service pressures decreased accordingly. The number of complaints increased correspondingly, even if it was higher than 1bar. .
- Number of Complaints includes ones coming from high floors residents. The service pressures for high floors are affected quickly by the electricity suspension, even if the network pressure remains 1bar or more.
- The increase of complaints is a problem for not only SHAPWASCO but also all over Egypt. The increasing trend is shown in Figure 4.3-20 as an example for the Nile Delta.

Table 4.3-38 Frequency of Electricity Suspension in Zagazig City

Period	Frequency (times)		Duration (hours)	
	A-4	Whole Zagazig	A-4	Whole Zagazig
2011/2012 (July 2011-June 2012)	6	16	6	24
2013/2014 (July 2013 - June 2014)	84	163	98	243
First Half of 2014/2015 (July 2014 - December 2014)	34	91	18	109

Data Source: Zagazig Branch of Electricity Company



Data Source: HCWW

Figure 4.3-20 Trend of Complaints in Nile Delta for Water Suspension and Low Pressure

4.3.4.3 Interview Survey for Customers

In parallel of the above two (2) analyses for PIs, SHAPWASCO conducted the interview surveys on customers' opinions in A-4 before and after the pilot project. The results are shown in Supporting Report S4.4. Trend of opinions has been unchanged. SHAPWASCO analyzes the results as follows according to interviewers:

- The customers complained for weak pressures in 2014. It is mainly for the periods of electricity suspension. Stable water supply is required, including for the periods of electricity suspension.
- Most of complaints are given by residents of the 4th floor or higher. SHAPWASCO is required to distribute the water at higher pressure.

4.3.5 Issues to be Undertaken after Project

To continue the WDM activities and to upgrade the conditions of water distribution, the following should be undertaken by SHAPWASCO:

4.3.5.1 Issues on Monitoring System

- To install more metering points for flow and pressure and to complete the system for all blocks in Zagazig City.
- To re-organize the WDM Department to maintain 24hours monitoring.

- To have more stable organization and system for maintenance such as inspection and prompt repair of equipment, and upgrading of software. It includes continuous contracts with service providers.

4.3.5.2 Issues on Production (Treatment) Capacity

- To make more studies on water demand for the next 15years and to formulate a development plan.
- To implement the plan for the development of production (treatment) capacity.
- To implement the plan for water transmission from Abbasa WTP (500L/s), which is planned by SHAPWASCO.
- To reduce NRW, especially leakage, so that the requirement will be reduced for water production.
- To install the emergency generators to maintain at least 50% of the production capacity, including wells, for the cases of electricity suspension.

4.3.5.3 Issues on Reservoir and Distribution Network

- To improve the distribution blocks to complete DMAs, which are isolated each other and separately managed for water distribution, demand forecast and flow / pressure control.
- To secure enough water reservoir(s) in volume for each DMA. The exiting reservoir in Zagazig WTP (14,000m^3) will be useful for A-1 and A-5. The other blocks should have exclusive reservoirs respectively.
- To lay exclusive transmission lines separately to the reservoirs from WTP. The planned volume to be transmitted from WTP should be fixed monthly, but adjusted by the daily monitoring of flows / pressures.
- To transmit the wells water to the mentioned reservoirs for planed volumes in a day, and not to distribute directly to the network.

4.3.5.4 Issues on Expansion in Whole Sharkiya

- To monitor the water production of major WTPs at the central monitoring room as the 1st steps, in order to grasp roughly water demand and fluctuation. In parallel, the production data of other small WTPs and wells, which are manually recorded, should be added for the data analysis.
- To expand the monitoring system to other small WTPs and wells, in order to grasp more precise data for water demand and fluctuation.
- To select the next city for WDM and to develop WDM system according to the same procedures of Zagazig City.

4.3.5.5 Issues on Expansion in Whole Nile Delta

- To organize presentations and site tours for affiliated companies of HCWW, especially for the Nile Delta area.
- To send lecturers / trainers to the affiliated companies upon requirement or according to offers of SHAPWASCO.

CHAPTER 5 ACTUAL IMPLEMENTATION SCHEDULE

5.1 Actual Implementation Schedule for SOP Activity

Actual implementation schedule for SOP activity which is compared with Plan of Operation (PO3 : Oct. 2013) is shown in Figure 5-1.

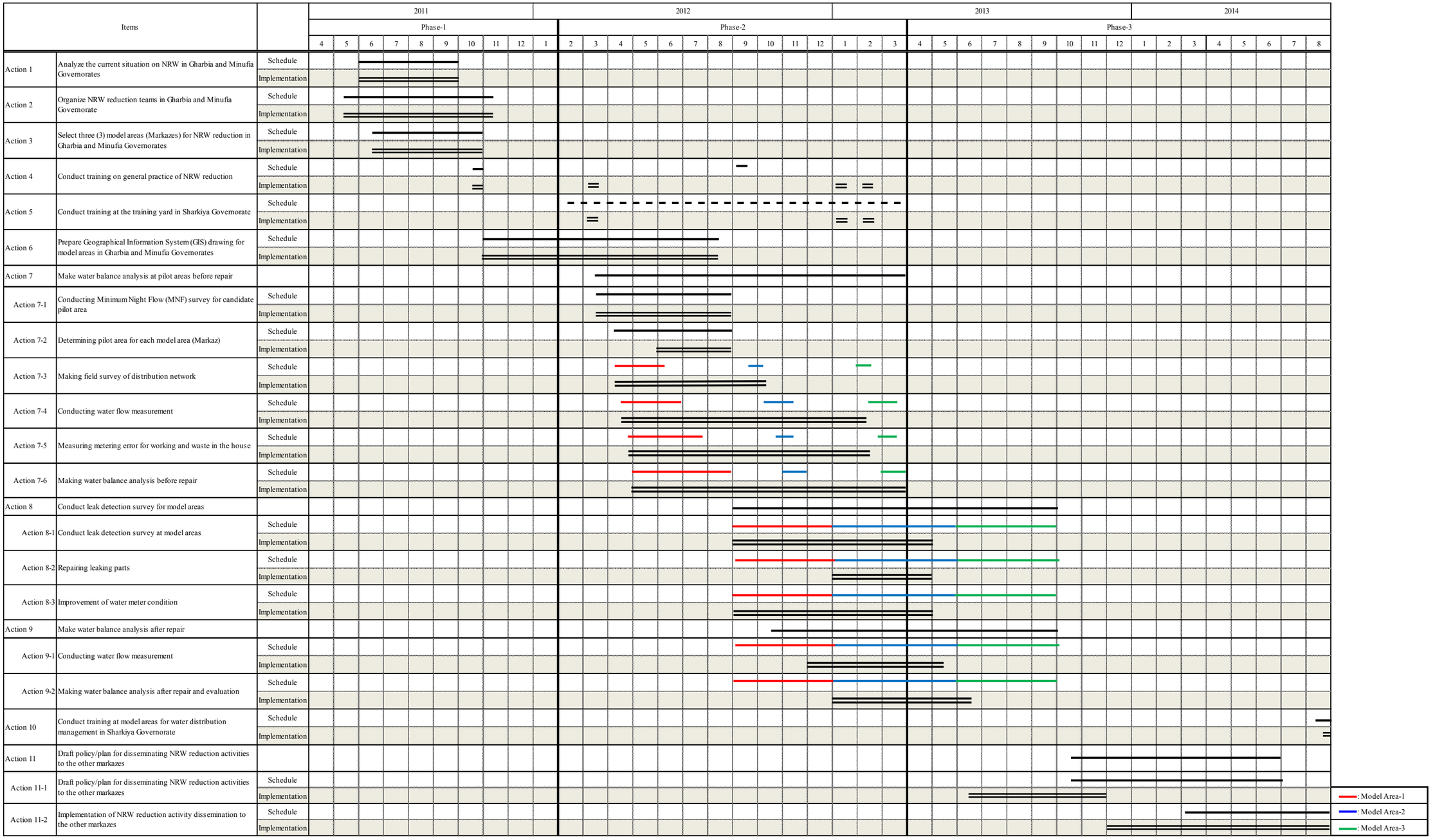
Items			2011											2012												2013												2014							
			Phase-1											Phase-2												Phase-3																			
			4	5	6	7	8	9	10	11	12	1		2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
Action-1	Survey the current conditions of water supply facilities in Gharbia and Minufia Governorates																																												
1-1	Survey of existing conditions for SWTP, IMRP and well facilities	Schedule																																										
		Implementation																																										
1-2	Collection of basic data for the SWTP and IMRF regarding operation and laboratory	Schedule																																										
		Implementation																																										
Action-2	Select 3 model facilities in Gharbia and Minufia Governorates each																																											
2-1	Longlist preparation	Schedule																																										
		Implementation																																										
2-2	Discussion on the selection criteria	Schedule																																										
		Implementation																																										
2-3	Conducting basic survey and shortlist preparation	Schedule																																										
		Implementation																																										
2-4	Conducting detail survey	Schedule																																										
		Implementation																																										
Action-3	Organize SOP teams in Gharbia and Minufia Governorates																																											
3-1	Selection of fulltime SOP members in GHAPWASCO	Schedule																																										
		Implementation																																										
3-2	Selection of SOP members in model facilities	Schedule																																										
		Implementation																																										
Action-4	Conduct training for developing and applying SOPs at the facilities of Sharkiya Governorate																																											
4-1	Assessment of the effectiveness of SOPs in Sharkiya Governorate	Schedule																																										
		Implementation																																										
4-2	Extraction of the problematic point	Schedule																																										
		Implementation																																										
Action-5	Revise SOPs of Sharkiya Governorate, if necessary																																											
5-1	Revision of SOPs of Sharkiya Governorate	Schedule																																										
		Implementation																																										
Action-6	Develop SOPs for model facilities in Gharbia and Minufia Governorates based on SOPs for SHAPWASCO																																											
6-1	Examination for the site condition (C/P organization control, Cooperative framework of trainer etc.)	Schedule																																										
		Implementation																																										
6-2	Preparation of basic system drawings (P&ID, Single line diagram)	Schedule																																										
		Implementation																																										
6-3	Preparation of draft SOPs for O&M with site training	Schedule																																										
		Implementation																																										
6-4	Preparation of unified forms of O&M records and reports	Schedule																																										
		Implementation																																										
6-5	Examination of water quality management	Schedule																																										
		Implementation																																										
6-6	Preparation of draft SOPs for water quality management	Schedule																																										
		Implementation																																										
Action-7	Conduct On-the-Job Training for GHAPWASCO and MCWW to apply SOPs in operation and maintenance																																											
7-1	Applying of SOP on On-the-Job Training	Schedule																																										
		Implementation																																										
Action-8	Monitor the progress of SOP activities																																											
8-1	Monitoring of activity condition on On-the-Job Training	Schedule																																										
		Implementation																																										
Action-9	Draft the policy/plan for disseminating SOP to the other Marakazes																																											
9-1	Compiling of long-term SOP activity target	Schedule																																										
		Implementation																																										
9-2	Preparing the draft policy/plan of SOP activity for whole Garbia and Minufia governorate	Schedule																																										
		Implementation																																										

Note: Based on PO3.

Figure 5-1 Actual Implementation Schedule for SOP Activities

5.2 Actual Implementation Schedule for NRW Activity

Actual implementation schedule for NRW activity which is compared with Plan of Operation (PO3 : Oct. 2013) is shown in Figure 5-2.



Note: Based on PO3.

Figure 5-2 Actual Implementation Schedule for NRW Activities

5.3 Actual Implementation Schedule for WDM Activity

Actual implementation schedule for WDM activity which is compared with Plan of Operation (PO3 : Oct. 2013) is shown in Figure 5-3.

Items			2011												2012												2013												2014												2015			
			Phase-1												Phase-2												Phase-3																											
			4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
Action 1	Discuss methods and conduct survey for water distribution management	Schedule																																																		
		Implementation																																																			
Action 1-1	Organizing project team	Schedule																																																		
		Implementation																																																			
Action 1-2	Analysis of present data regarding distribution management (Flow rate, pressure, water quality and etc.)	Schedule																																																		
		Implementation																																																			
Action 1-3	Study and evaluation of systems for Rod El-Farag, South Giza and Dakahlia	Schedule																																																		
		Implementation																																																			
Action 1-4	Discussion of suitable distribution management system in SHAPWASCO	Schedule																																																		
		Implementation																																																			
Action 2	Conduct training on water distribution management	Schedule																																																		
		Implementation																																																			
Action 2-1	Training on water distribution management methods (purpose, items to be managed)	Schedule																																																		
		Implementation																																																			
Action 2-2	Training on water distribution management methods (equipment, facilities)	Schedule																																																		
		Implementation																																																			
Action 3	Formulate a plan for water distribution management	Schedule																																																		
		Implementation																																																			
Action 3-1	Planning of action plan	Schedule																																																		
		Implementation																																																			
Action 3-2	Discussion on the selection criteria	Schedule																																																		
		Implementation																																																			
Action 3-3	Selection of pilot project area	Schedule																																																		
		Implementation																																																			
Action 3-4	Outline plan for equipment and equipment installation	Schedule																																																		
		Implementation																																																			
Action 3-5	Preparation for equipment installation including isolation work	Schedule																																																		
		Implementation																																																			
Action 3-6	Preparation for equipment specification (one of procurement procedures)	Schedule																																																		
		Implementation																																																			
Action 3-7	Verification of equipment plan	Schedule																																																		
		Implementation																																																			
Action 3-8	Plan of target flow, pressure and quality of water by block	Schedule																																																		
		Implementation																																																			
Action 3-9	Survey on current condition (summer) by block	Schedule																																																		
		Implementation																																																			
Action 3-10	Verification of Plan of target flow, pressure and quality of water by block	Schedule																																																		
		Implementation																																																			
Action 3-11	Training in Japan	Schedule																																																		
		Implementation																																																			
Action 4	Install the equipment for water distribution management at the model area	Schedule																																																		
		Implementation																																																			
Action 4-1	Preparation for space for monitoring room	Schedule																																																		
		Implementation																																																			
Action 4-2	Preparation for communicating system	Schedule																																																		
		Implementation																																																			
Action 4-3	Chamber construction by SHAPWASCO	Schedule																																																		
		Implementation																																																			
Action 4-4	JICA procedures for equipment procurement	Schedule																																																		
		Implementation																																																			
Action 4-5	Installation of the equipment	Schedule																																																		
		Implementation																																																			
Action 5	Operate the system	Schedule																																																			
		Implementation																																																			
Action 5-1	Well operation	Schedule																																																		
		Implementation																																																			
Action 5-2	Flow / Pressure Monitoring through Telemetry	Schedule																																																		
		Implementation																																																			
Action 5-3	Operation of Distribution Pump in WTP according to data	Schedule																																																		
		Implementation																																																			
Action 5-4	Data Analysis	Schedule																																																		
		Implementation																																																			
Action 6	Develop SOP for water distribution management	Schedule																																																		
		Implementation																																																			
Action 7	Evaluate the operation and SOP for water distribution management	Schedule																																																		
		Implementation																																																			
Action 7-1	Efficiency and Effectiveness Evaluation	Schedule																																																		
		Implementation																																																			
Action 7-2	Interview Survey	Schedule																																																		
		Implementation																																																			

Note: Based on PO3.

Figure 5-3 Actual Implementation Schedule for WDM Activities

CHAPTER 6 ACTUAL OUTPUTS

6.1 Input by Japanese Side

6.1.1 JICA Expert Team

JICA experts were dispatched as shown in Table 6-1 to 6-4.

Table 6-1 Dispatch of Experts (Phase-1:Apr. 2011 – Jan. 2012)

		Title	Name	Company	2011 4	5	6	7	8	9	10	11	12	2012 1	Man Month Egypt	Japan
Experts of the Japanese Side	1	Chief Advisor/Water Suppy Planning	Katsumi FUJII	YEC		(5) 9 15 (41) 14 23				(29) 3 1					2.33	0.17
	2	Deputy Chief Advisor/NRW Reduction Management	Mitsuhito OMORI	YEC			(30) 3 2			(60) 3 1			(16) 11 26		3.53	0.00
	3	Leakage Detection	Hiroki NIIMURA	YEC (LIC)						(65) 5 8					2.17	0.00
	4	Water Treatment System	Tomohiro SHIMIZU	YEC		(4) 10 13 (30) 14 12					(45) 2 15				2.50	0.13
	5	Mechanical Equipment	Ryoji NAGAO	YEC (SKK)			(45) 3 17					(40) 23 1			2.83	0.00
	6	Electrical Equipment	Dr. Sayed Osman Madbouly	YEC (Local)				(30) 1 30		(10) 5 14 (4) 26 29 (9) 16 24	(3) 3 5 (2) 26 27 (1) 8 (1) 19				2.00	0.00
	7	Hydraulic Analysis for Network	Kenji YAMADA	YEC						(60) 3 1					2.00	0.00
	8	Distribution Network(1)	Masahiro TAKEUCHI	YEC		(5) 9 15 (15) 14 28				(22) 3 24			(30) 19 18		2.23	0.17
	9	Distribution Network(2)	Kiyoshi KIYAMA	YEC (LIC)			(39) 27 4			(66) 3 7		(15) 8 22			3.50	0.50
	10	Well Monitoring	Nobuyuki IIJIMA	YEC			(46) 20 4					(44) 13 26			3.00	0.00
	11	Water Quality	Kazuhiro UMEKI	YEC							(29) 7 31	(22) 4 8 29	(6) 7 12		1.90	0.00
	12	Coordinator／Assistant for NRW Reduction Management	Atsushi KATO	YEC		(30) 14	12								1.00	0.00
															28.99	0.97
						① I/CR							② P/R1		Total	
Report			Output												29.96	

: Work in the Egypt : Work in the Japan

①: Inception Report (IC/R) ②: Project Progress Report :Phase-1 (P/R1)

Source: JICA expert team

Table 6-2 Dispatch of Experts (Phase-2:Feb. 2012 – Mar. 2013)

		Title	Name	Company	2012 Phase-2 2	3	4	5	6	7	8	9	10	11	12	2013 1	2	3	Man Month Egypt	Japan
Experts of the Japanese Side	1	Chief Advisor/Water Suppy Planning	Katsumi FUJII	YEC		(43) 21 3				(30) 25 24			8	(55) 1			(45) 15 28		5.77	0.00
	2	Deputy Chief Advisor/NRW Reduction Management	Mitsuhito OMORI	YEC		16	(66) 20			(30) 2 31		(30) 26 24		27	(69)		3		6.50	0.00
	3	Leakage Detection	Hiroki NIIMURA	YEC (LIC)	(50) 10 30							26	(110)	13			(45) 15 28		6.83	0.00
	4	Water Treatment System	Tomohiro SHIMIZU	YEC		16	(50) 4			(30) 25 24		(30) 11 10					(45) 15 28		5.17	0.00
	5	Mechanical Equipment	Ryoji NAGAO	YEC (SKK)	(46) 14 30								2	(59) 29					3.50	0.00
	6	Electrical Equipment	Dr. Sayed Osman Madbouly	YEC (Local)	(20) 12 2				(10) 2 11	(20) 28 17			(15) 27 11				(25) 17 10		3.00	0.00
	7	Hydraulic Analysis for Network	Kenji YAMADA	YEC										(90) 14			11		3.00	0.00
	8	Distribution Network(1)	Masahiro TAKEUCHI	YEC										(38) 5	12				1.27	0.00
	9	Distribution Network(2)	Kiyoshi KIYAMA	YEC (LIC)	(30) 10 10	(30) 16	14						(30) 18	17			(20) 30	18	2.67	1.00
	10	Well Monitoring	Nobuyuki IIJIMA	YEC										(45) 14	28				1.50	0.00
	11	Water Quality	Kazuhiro UMEKI	YEC			(30) 29	27							(45) 4	17			2.50	0.00
	12	Coordinator/Assistant for NRW Reduction Management	Atsushi KATO	YEC										(40) 4	13		(30) 30	28	2.33	0.00
																			44.04	1.00
																	③ P/R2		Total	
Report			Output																45.04	

: Work in the Egypt : Work in the Japan

③: Project Progress Report :Phase-2 (P/R2)

Source: JICA expert team

Table 6-3 Dispatch of Experts(Phase-3:Apr. 2013 – Apr. 2015) (1/2)

		Title	Name	Company	2013									2014				
					Phase-3													
					4	5	6	7	8	9	10	11	12	1	2	3	4	5
Experts of the Japanese Side	1	Chief Advisor/Water Suppy Planning	Katsumi FUJII	YEC		(30) 24	22				(20) 20	8			(45) 28	13		
	2	Deputy Chief Advisor/NRW Reduction Management	Mitsuhito OMORI	YEC		(45) 24	7					15 (15) 29			(30) 7	8		
	3	Leakage Detection	Hiroki NIIMURA	YEC (LIC)		6 (60)	4											
	4	Water Treatment System	Tomohiro SHIMIZU	YEC		(60) 16	14								(30) 12	13		
	5	Mechanical Equipment	Ryoji NAGAO	YEC (SKK)														
	6	Electrical Equipment	Dr. Sayed Osman Madbouly	YEC (Local)														
	7	Hydraulic Analysis for Network	Kenji YAMADA	YEC			(28) 1 28	(1.4) 1 2										
	8	Distribution Network(1)	Masahiro TAKEUCHI	YEC														
	9	Distribution Network(2)	Kiyoshi KIYAMA	YEC (LIC)		(50) (16)	(4)									(20) 9	28	
	10	Well Monitoring	Nobuyuki IIJIMA	YEC			(28) 1 28	(1.4) 1 2										
	11	Water Quality	Kazuhiro UMEKI	YEC													(30) 1 30	
	12	Coordinator/Assistant for NRW Reduction Management	Atsushi KATO	YEC											(35) 7	13		

Report	Output

■ : Work in the Egypt □ : Work in the Japan

④: Project Progress Report :Phase-3 (P/R3)、⑤: Project Final Report

Source: JICA expert team

Table 6-4 Dispatch of Experts(Phase-3:Apr. 2013 – Apr. 2015) (2/2)

		Title	Name	Company	2014 Phase-3 6	7	8	9	10	11	12	2015 1	2	3	4	Man Month Egypt	Japan
Experts of the Japanese Side	1	Chief Advisor/Water Suppy Planning	Katsumi FUJII	YEC			(20) 14 2			(30) 17 16			(13) 8 20	(27) 13	(8) 8 9 17	6.17	0.40
	2	Deputy Chief Advisor/NRW Reduction Management	Mitsuhito OMORI	YEC			(19) 4 22							(5) 25 31	(13) 1 13	(3) 14 16	4.23	0.15
	3	Leakage Detection	Hiroki NIIMURA	YEC (LIC)									(13) 23 7				2.43	0.00
	4	Water Treatment System	Tomohiro SHIMIZU	YEC			(15) 5 19							(15) 17 31	(5) 1 5		4.00	0.25
	5	Mechanical Equipment	Ryoji NAGAO	YEC (SKK)													0.00	0.00
	6	Electrical Equipment	Dr. Sayed Osman Madbouly	YEC (Local)													0.00	0.00
	7	Hydraulic Analysis for Network	Kenji YAMADA	YEC													0.93	0.07
	8	Distribution Network(1)	Masahiro TAKEUCHI	YEC													0.00	0.00
	9	Distribution Network(2)	Kiyoshi KIYAMA	YEC (LIC)													2.33	0.00
	10	Well Monitoring	Nobuyuki IIJIMA	YEC													0.93	0.07
	11	Water Quality	Kazuhiro UMEKI	YEC													1.00	0.00
	12	Coordinator/Assistant for NRW Reduction Management	Atsushi KATO	YEC			(30) 4 2							(45) 23 8			3.67	0.00
																	25.69	0.94
							④ P/R3								⑤ F/R		Total	
Report			Output														26.63	

: Work in the Egypt

④: Project Progress Report :Phase-3 (P/R3)、⑤: Project Final Report

Source: JICA expert team

6.1.2 Counterpart Training in Japan

(1) Participants of the Trainings in Japan

The C/P members who participated in the trainings in Japan are shown in Table 6-5.

Table 6-5 Summary of Counterpart Training in Japan

Name	Field	Period	Training Course Title	Hosting Institution	Position when accepted
Dr. Salah Bayoumi	Project Manager	3-Oct-11 – 12-Oct-11	Management Training in Japan	Ministry of Health, Labor and Welfare, Waterworks Bureau of Yokohama City and Japan Water Works Association, to learn the experience for water supply service management in Japan.	Head of Project Sector of HCWW
Mr. Ahmed Abdeen	Project Co-Manager	3-Oct-11 – 12-Oct-11	Management Training in Japan	Ministry of Health, Labor and Welfare, Waterworks Bureau of Yokohama City and Japan Water Works Association, to learn the experience for water supply service management in Japan.	Chairman of SHAPWASCO
Mr. Ayman Abd El Kader	Project Co-Manager	3-Oct-11 – 12-Oct-11	Management Training in Japan	Ministry of Health, Labor and Welfare, Waterworks Bureau of Yokohama City and Japan Water Works Association, to learn the experience for water supply service management in Japan.	Chairman of GHAPWASCO
Mr. Mohamed Abu El Khair	Project Co-Manager	3-Oct-11 – 12-Oct-11	Management Training in Japan	Ministry of Health, Labor and Welfare, Waterworks Bureau of Yokohama City and Japan Water Works Association, to learn the experience for water supply service management in Japan.	Chairman of MCWW
Mr. Wesam Abd El-Fattah	HCWW SOP	5-Dec-11 - 15-Dec-11	SOP and NRW Reduction Training in Japan	Waterworks Bureau of Yokohama City and Saitama City, to learn the technology for SOP activities in Japan.	Operation and Maintenance Dept. of HCWW
Mr. Nagi Yousri	GHAPWASCO SOP	5-Dec-11 - 15-Dec-11	SOP and NRW Reduction Training in Japan	Waterworks Bureau of Yokohama City and Saitama City, to learn the technology for SOP activities in Japan.	Technical Support Sector of GHAPWASCO
Mr. Ahmed Elsayed Rabie	GHAPWASCO NRW	5-Dec-11 - 15-Dec-11	SOP and NRW Reduction Training in Japan	Waterworks Bureau of Yokohama City and FUJI TECOM INC., to learn the technology for NRW reduction activities in Japan.	Water Supply Sector of GHAPWASCO
Mr. Mohamed Fathy Gaber	MCWW SOP	5-Dec-11 - 15-Dec-11	SOP and NRW Reduction Training in Japan	Waterworks Bureau of Yokohama City and Saitama City, to learn the technology for SOP activities in Japan.	Operation and Maintenance Dept. of MCWW
Mr. Mohamed Mostafa El Shafie	MCWW NRW	5-Dec-11 - 15-Dec-11	SOP and NRW Reduction Training in Japan	Waterworks Bureau of Yokohama City and FUJI TECOM INC., to learn the technology for NRW reduction activities in Japan.	Operation and Maintenance Dept. of MCWW
Mr. Ahmed Saeed	SHAPWASCO SOP	5-Dec-11 - 15-Dec-11	SOP and NRW Reduction Training in Japan	Waterworks Bureau of Yokohama City and Saitama City, to learn the technology for SOP activities in Japan.	SOP Dept. of SHAPWASCO
Mr. Saeed Mohamed Attia	SHAPWASCO NRW	5-Dec-11 - 15-Dec-11	SOP and NRW Reduction Training in Japan	Waterworks Bureau of Yokohama City and FUJI TECOM INC., to learn the technology for NRW reduction activities in Japan.	Non revenue water (NRW) Dept. of SHAPWASCO
Mr. Ahmed Maher El sayed Bhnsawy	SHAPWASCO WDM	29-Oct-12 - 8-Nov-12	WDM Training in Japan	Waterworks Bureau of Yokohama City and Saitama City, and Yokogawa Electric Corporation, to learn the technology for WDM activities in Japan.	WDM team of SHAPWASCO

Name	Field	Period	Training Course Title	Hosting Institution	Position when accepted
Mr. Mohamed Atef Abdelhamid Ali	SHAPWASCO WDM	29-Oct-12 - 8-Nov-12	WDM Training in Japan	Waterworks Bureau of Yokohama City and Saitama City, and Yokogawa Electric Corporation, to learn the technology for WDM activities in Japan.	WDM team of SHAPWASCO
Mr. Abd Elreheem Mohamed Abd Elreheem	SHAPWASCO WDM	29-Oct-12 - 8-Nov-12	WDM Training in Japan	Waterworks Bureau of Yokohama City and Saitama City, and Yokogawa Electric Corporation, to learn the technology for WDM activities in Japan.	WDM team of SHAPWASCO
Mr. Moustafa Ibrahim Attia El Sayed	SHAPWASCO WDM	29-Oct-12 - 8-Nov-12	WDM Training in Japan	Waterworks Bureau of Yokohama City and Saitama City, and Yokogawa Electric Corporation, to learn the technology for WDM activities in Japan.	WDM team of SHAPWASCO

Source: JICA expert team

(2) Management Training in Japan

1) Purpose

The purpose of this training is to learn the experience for water supply service management in Japan and utilize it in the water supply service management of GHAPWASCO, MCWW, SHAPWASCO and other water companies in Egypt.

2) Training Schedule in Japan

The training was conducted in Japan from the 1st to the 14th October 2011. The Project manager (Head of Project Sector, HCWW) and the Project co-manager (Chairmen of GHAPWASCO, MCWW and SHAPWASCO) attended the training.

Table 6-6 Training Schedule for Management Training in Japan (Phase-1: the 1st to the 14th October 2011)

Date		Time	Activity	Location
1-Oct-11	Sat.		Departure from Cairo.	
2-Oct-11	Sun.		Arrival at Tokyo.	
3-Oct-11	Mon.		Orientation by JICA.	JICA/TIC
		14:30-17:00	Courtesy call to JICA headquarters.	JICA
4-Oct-11	Tue.	9:00-17:00	Trend and development of water management in the world (Workshop held by IWA-ASPIRE).	Tokyo International Forum
5-Oct-11	Wed.	9:00-12:00	Introduction of national policy and governing organization for water supply. Opinion exchange with the Japanese officials.	Ministry of Health, Labor and Welfare
		14:30-17:00	Introduction of Japan Water Works Association and system for information/technology transfer among water supply service providers. Opinion exchange for technology development.	Japan Water Works Association
6-Oct-11	Thu.	9:25-12:00	Opinion exchange for service and human resources development with a water supply service provider.	Yokohama city
		15:00-16:30	Practice of inter-agency cooperation for technical education and O&M.	Yokohama city
7-Oct-11	Fri.	14:00-15:20	Policy and practice of NRW reduction.	Yokohama city
		15:40-17:00	Practice to promote efficiency (power reduction, tariff collection, water distribution management).	Yokohama city
8-Oct-11	Sat.		Holiday.	
9-Oct-11	Sun.		Holiday.	

Date		Time	Activity	Location
10-Oct-11	Mon.	11:00-12:00	Water Museum in Yokohama (observation of example for publicity).	Yokohama city
		14:00-16:00	Miyagase dam (observation of example for publicity).	Miyagase dam
11-Oct-11	Tue.	11:00-12:00	Observation of solar power facility in the water treatment plant (Nishiya WTP).	Yokohama city
		13:30-15:30	Site observation of a water treatment plant as well as SOP practices (Kawai WTP).	Yokohama city
12-Oct-11	Wed.	11:00-12:00	Closing ceremony and opinion exchanges with JICA.	JICA/TIC
13-Oct-11	Thu.		Departure from Tokyo.	
14-Oct-11	Fri.		Arrival at Cairo.	

Source: JICA expert team

3) Outcomes of the Training

The training was conducted intensively in eight (8) days from the 3rd to the 12th October 2011. The trainees acquired the following knowledge on the water supply service management in Japan through the course:

- Trend and development of water management in the world
- Technology transfer among water supply service providers
- Inter-agency cooperation for technical education and O&M
- Policy and practice of NRW reduction
- System of water treatment plant as well as SOP practices in Japan

(3) SOP and NRW reduction Training in Japan

1) Purpose

The purpose of the training is to learn the experience for SOP and NRW reduction in Japan and utilize it in the water supply service management of GHAPWASCO, MCWW, SHAPWASCO and other companies in Egypt.

2) Training Schedule in Japan

The training was conducted in Japan from the 3rd to the 17th December 2011. Total 7 trainees attended the training.

Table 6-7 Training Schedule for SOP and NRW Reduction Training in Japan (Phase-1: the 3rd to the 17th December 2011)

Date		NRW		SOP	
		Activity	Place	Activity	Place
3-Dec-11	Sat.	Departure from Cairo			
4-Dec-11	Sun.	Arrival at Tokyo			
5-Dec-11	Mon.	JICA Briefing	JICA/TIC	Same as NRW	Same as NRW
		Orientation	JICA/TIC	Same as NRW	Same as NRW
6-Dec-11	Tue.	Outline of water system for Yokohama City	Yokohama City	Same as NRW	Same as NRW
		Risk management in water supply	Yokohama City	Same as NRW	Same as NRW

Date		NRW		SOP	
		Activity	Place	Activity	Place
		Public relations for water supply	Yokohama City	Same as NRW	Same as NRW
7-Dec-11	Wed.	Tariff collection and meter readings	Yokohama City	Outline of integrated monitoring system	Yokohama City
		Monitoring equipment (including meters on streets) for water distribution conditions / management	Yokohama City	Same as NRW	Same as NRW
		Observation of monitoring equipment	Yokohama City	Same as NRW	Same as NRW
8-Dec-11	Thu.	Overview of Non Revenue Water	Yokohama City	Safe and efficient operation of water supply facilities, including management of consumption for electric power and chemicals	Yokohama City
		Organization for leak detection and inspection / maintenance of pipelines	Yokohama City	Operation and maintenance of water treatment plant	Yokohama City
9-Dec-11	Fri.	Management of block system for water supply, and replacement of aged pipes	Yokohama City	Data management of O&M and manual for WTP O&M	Yokohama City
		Outline of pipeline mapping system	Yokohama City	Introduction of standard operation procedures in Japan	Yokohama City
10-Dec-11	Sat.	Holiday		Holiday	
11-Dec-11	Sun.	Holiday		Holiday	
12-Dec-11	Mon.	Outline and principle of leak detection	FUJI TECOM	Outline of water supply for Saitama City	Saitama City
		Training of leak detection	FUJI TECOM	Replacement / rehabilitation plan of wells	Saitama City
13-Dec-11	Tue.	Outline of steel pipes detector, metal pipe detector, correlation detector	FUJI TECOM	Replacement of electric facility and water quality monitoring	Saitama City
		Training of leak detection	FUJI TECOM	Observation of well facility.	Saitama City
14-Dec-11	Wed.	Method of leak detection training	FUJI TECOM	Operation and maintenance of water treatment plant and well	Saitama City
		Training facility and equipment for leak detection, and implementation of leak detection training	FUJI TECOM	Observation of East WTP and Groundwater WTP	Saitama City
15-Dec-11	Thu.	Ending Ceremony	JICA/TIC	Same as NRW	Same as NRW
16-Dec-11	Fri.	Departure from Tokyo			
17-Dec-11	Sat.	Arrival at Cairo			

Source: JICA expert team

3) Outcomes of the Training

The training was conducted intensively in nine (9) days from the 5th to the 15th December 2011. The trainee acquired the following knowledge on the SOP and NRW reduction management in Japan through the course:

- SOP for water supply service management

- Safe and efficient management for operation of facilities
- Water tariff and water charge collecting system
- Water distribution control system
- Institutional framework for NRW countermeasures
- Technology on NRW reduction (leak detection survey, leak detection, leakage repair works, etc.)

(4) WDM Training in Japan

1) Purpose

The purpose of the training is to learn the experience of Japan for WDM and utilize it in the water distribution management of SHAPWASCO and other water companies in Egypt.

2) Training Schedule and Program in Japan

The training was conducted in Japan from the 27th October to the 10th November 2012.

Table 6-8 Training Schedule for WDM Training in Japan
(Phase-2: the 27th October to the 10th November 2012)

Date		Activity	Place
27-Oct-12	Sat.	Departure from Cairo	
28-Oct-12	Sun.	Arrival at Tokyo/Yokohama	
29-Oct-12	Mon.	Orientation	JICA Yokohama
30-Oct-12	Tue.	Outline of water supply system in Yokohama	JICA Yokohama
		Operation and maintenance of water supply facilities and equipment	JICA Yokohama
31-Oct-12	Wed.	Operation and maintenance of water supply facilities and equipment	JICA Yokohama
		Outline of pipeline mapping system	Yokohama Waterworks Bureau
1-Nov-12	Thu.	Observation of facility in water treatment plant for mechanical and electrical systems	Yokohama Waterworks Bureau
		Outline of systems in water treatment plant	Yokohama Waterworks Bureau
		Observation of facility in water treatment plant for control room	Yokohama Waterworks Bureau
		Operation and maintenance of mechanical and electrical equipment	Yokohama Waterworks Bureau
2-Nov-12	Fri.	Operation and maintenance of electrical equipment	Yokohama Waterworks Bureau
		Training of daily maintenance of electrical equipment	Yokohama Waterworks Bureau
		Observation of electrical equipment	Yokohama Waterworks Bureau
		Discussion on operation and maintenance of electrical equipment	Yokohama Waterworks Bureau
3-Nov-12	Sat.	Holiday	
4-Nov-12	Sun.	Holiday	
5-Nov-12	Mon.	Integrated management system for water supply and distribution	Yokohama Waterworks Bureau
		Observation of integrated management system for water supply and distribution	Yokohama Waterworks Bureau
		Observation of meters for water distribution conditions	Yokohama

Date		Activity	Place
			Waterworks Bureau
6-Nov-12	Tue.	Water distribution management for wells' water	Saitama City Waterworks Bureau
		Observation of water distribution center	Saitama City Waterworks Bureau
7-Nov-12	Wed.	Explanation of SCADA System	Yokogawa Electric Corporation
		Explanation of water loss management	Yokogawa Electric Corporation
8-Nov-12	Thu.	Closing ceremony and opinion exchanges with JICA	JICA Yokohama
9-Nov-12	Fri.	Departure from Tokyo	
10-Nov-12	Sat.	Arrival at Cairo	

3) Outcomes of the Training

The training was conducted intensively in nine (9) days from the 29th October to the 8th November 2012. The trainees acquired the following knowledge on WDM in Japan through the course:

- WDM system
- Operation and maintenance of water facilities related to WDM
- WDM for wells' water
- SCADA System in Japan

6.1.3 Information Exchange with Water Authority of Jordan

(1) Purpose

In Jordan, Water Authority of Jordan (WAJ) and JICA also conducted technical cooperation projects in a period of 2005 - 2011 (Phase-1 and 2) for NRW reduction. They took different approaches to the reduction of NRW, especially reduction of water distribution pressure and skill trainings on feeder pipes (house connections) installation. The experiences of both the Egyptian and the Jordanian sides could provide useful information each other. "Contractor Certification System for Water Service Connection Installation", which was developed for WAJ, is a good example as a useful attempt for HCWW. JICA expert team proposed, therefore, exchange of information between WAJ and HCWW, including WAJ's sites observation by HCWW. The proposal was accepted by both HCWW and JICA and a team was sent to Jordan for exchanging the information.

(2) Contents of Information Exchange

The following are main contents for the information exchange:

(1) Both sides introduce the present governing system of water supply (national level and provincial level), as well as past improvement achievement and challenges.
(2) Both sides introduce the present activities and achievements of JICA technical cooperation projects, as well as utilization of technology developed by JICA's projects.
(3) The Egyptian side observes particular sites of WAJ in improvement/development, especially training and management site of "Contractor Certification System for Water Service Connection Installation".

(4) The Egyptian side observes water supply facilities, such as water treatment plant, as well as organization and governing structure including PPP (Public-Private Partnership).

(5) Both sides exchange information on management system of water supply for national, provincial and top management levels.

"Contractor Certification System for Water Service Connection Installation" is interesting for HCWW to be developed in Egypt. HCWW is now examining necessity / possibility of the introduction of similar system. For the Jordanian side, SOP is interesting. SOP is expected to be a new attempt for the Jordanian side.

(3) Schedule and Participants in Jordan

The schedule of the information exchange was shown in Table 6-9.

Table 6-9 Schedule of Information Exchange with Water Authority of Jordan

Date	Activities
14th October 2012 (Sun.)	• 10:00: Move to Amman. (The Egyptian side) by RJ502. 10:00: Cairo, 13:15: Amman. • 16:00-17:00: Courtesy call to JICA Jordan Office and Schedule Meeting.
15th October 2012 (Mon.)	Site Observation: Training center of WAJ. • 09:00-13:00: Presentation on the training of Service Connection installation. • 13:30-14:30: Visit Water Meter Workshop.
16th October 2012 (Tue.)	10:00-10:30: Courtesy call to WAJ by the Egyptian sides. 13:30-15:00: Introduction/presentation of activities and information exchange. • Eng.Waleed Sukkar / Presentation on the activities of the JICA projects. • Eng. Malek Roushdeh/ Presentation on the licensing system for service connection. • Dr. Salah Bayoumi / Presentation on the JICA projects in Egypt. • Opinion exchanges.
17th October 2012 (Wed.)	Site Observation (continued). • 9:30-11:30: Zai Water Treatment Plant. • 12:00-14:00: Fuheis Pilot Project. 14:15-15:45: Report meeting at JICA Jordan Office. 16:00-16:30: Courtesy call to Arab Countries Water Utilities Association.
18th October 2012 (Thu.)	• 17:30: Move to Cairo. (The Egyptian side) by RJ505. 17:30: Amman, 18:00: Cairo.

Source: JICA expert team

The participants for the information exchange are shown in Table 6-10.

Table 6-10 Participants to Information Exchange with Water Authority of Jordan

Name	Position	Organization
JICA Jordan Office		
Mr. Shinji Goto	Senior Representative	JICA Jordan Office
Mr. Kenji Takada	Representative	JICA Jordan Office
Mr. Hani H. Al-Kurudi	Program Officer	JICA Jordan Office
Jordanian side		
Mr. Waleed A. Sukkar	Advisor for the Minister of Water and Irrigation	Ministry of Water and Irrigation
Mr. Malek Roushdeh	Assistant Secretary General	Water Authority of Jordan
Mr. Mohamed Al Awameieh	Secretary General Advisor	Water Authority of Jordan
Ms. Hanan Khouri	Training Director	Water Authority of Jordan
Mr. Firas Zriqat	Trainer, Training Center	Water Authority of Jordan
Mr. Mousa	Engineer, Meters workshop	Water Authority of Jordan

Name	Position	Organization
Mr. Haitham Al-Kilani	Production and Quality Director (Director of Zai Water Treatment Plant)	Miyahuna Jordan Water Company
Egyptian side		
Dr. Salah Bayoumi	Head of Projects Sector	HCWW
Mr. Shaker Abdel-Fattah	Head of Technical Support Sector for Projects	SHAPWASCO
Mr. Adel Attia	Head of Operation and Maintenance Sector	GHAPWASCO
Mr. Ayman Bassyouny Abdeen	Head of Operation and Maintenance Sector	MCWW
Mr. Katsumi Fujii	Chief Adviser / Water Supply Planning	JICA expert team
Mr. Mohamed Nagi Gaber	Facilitator	JICA expert team

Source: JICA expert team

6.1.4 Provision of Equipment

(1) Equipment

For reducing NRW ratio in the water supply system, it is important to clarify the contents of NRW consisting of commercial loss (or apparent loss) and physical loss (or real loss). The physical loss means the water loss by leakage in the water supply system, and it is the main part of NRW for most cases.

In order to detect the leakage in the water supply system, leak detection equipment shall be introduced in the Project.

For SOP activity, some equipment such as well level indicator and ultrasonic flow meters is required for the model facilities.

In order to manage the water distribution for SHAPWASCO's pilot project, WDM equipment is necessary.

The equipment procured in the Project is summarized in Table 6-11.

Table 6-11 Equipment Procured for SOP, NRW Reduction and WDM Activities

No.	Item	Quantity			JET	JICA	Location	Delivery date
		SHAP	GHAP	MCWW				
1	Water leak detector	-	3	3	✓		Japan	20-Oct-11
2	Digital sound detector	-	2	2	✓		Japan	20-Oct-11
3	Acoustic rod	-	4	4	✓		Japan	20-Oct-11
4	Pressure data logger	-	3	3	✓		Japan	20-Oct-11
5	Pipe and cable locator	-	2	2	✓		Japan	20-Oct-11
6	Metal pipe locator	-	1	1	✓		Japan	20-Oct-11
7	Magnetic locator	-	1	1	✓		Japan	20-Oct-11
8	Non-metallic pipe vibrator	-	2	2	✓		Japan	20-Oct-11
9	Hammer drill	-	2	2	✓		Japan	20-Oct-11
10	Drill bit	-	8	8	✓		Japan	20-Oct-11
11	Boring bar	-	2	2	✓		Japan	20-Oct-11
12	Water level indicator	-	2	2	✓		Japan	19-Dec-11
13	Generator	-	2	2	✓		Egypt	20-Oct-11
14	Leak noise correlator	-	1	1		✓	Japan	21-Feb-12

No.	Item	Quantity			JET	JICA	Location	Delivery date
		SHAP	GHAP	MCWW				
15	Portable ultrasonic flow meter (For large diameters)	-	3	3		✓	Japan	21-Feb-12
16	Portable ultrasonic flow meter(For normal diameters)	-	2	2		✓	Japan	21-Feb-12
17	Pickup	-	1	1		✓	Egypt	26-Jul-12
18	Copy and Fax machine	-	1	1		✓	Egypt	26-Jul-12
19	Personal computer (Desk top)	-	1	1		✓	Egypt	26-Jul-12
20	Personal computer (Notebook)	-	2	2		✓	Egypt	26-Jul-12
21	Software for Hydraulic Analysis	-	1	1		✓	Egypt	22-Mar-12
22	Ultrasonic flow meter (For SOP)	-	1	1	✓		Japan	2-Jul-12
23	Ultrasonic flow meter (For small dia. Chamber type)	6	-	-		✓	Japan	4-May-13
24	Ultrasonic flow meter (For large dia. Chamber type)	1	-	-		✓	Japan	4-May-13
25	Ultrasonic flow meter (For small dia.)	7	-	-		✓	Japan	4-May-13
26	Water pressure gauge (For WTP)	2	-	-		✓	Japan	4-May-13
27	Water pressure gauge	10	-	-		✓	Japan	4-May-13
28	Telemeter (For outdoor type)	17	-	-		✓	Japan	4-May-13
29	Telemeter (For indoor type)	7	-	-		✓	Japan	4-May-13
30	Central monitoring system	1	-	-		✓	Japan	4-May-13
31	Water leak detector	-	2	2	✓		Japan	26-Jun-13

SHAP; SHAPWASCO, GHAP; GHAPWASCO, JET; JICA expert team
Source: JICA expert team

1) Water leak detector

Water leak detector is used for the leaking point detection. Three (3) sets are initially provided for NRW teams in each company.

2) Digital sound detector

Digital sound detector is used for detecting leaking sound spread through valves, hydrants, etc.

3) Acoustic rod

Acoustic rod is used for detecting leaking sound directly from pipe, valves, hydrants, etc.

4) Pressure data logger

Pressure data loggers are used for the measurement of pressure during the continuous monitoring for 24hours / 48hours.

5) Pipe and cable locator

Pipe and cable locators are used for searching pipe location and depth.

6) Metal Pipe Locator

Metal Pipe locators are used for searching valve location.

7) Magnetic Locator

Magnetic locators are also used for searching valve location which is buried deeply. The principle of the equipment is by magnetic detection.

8) Non-metallic pipe vibrator

Non-metallic pipe vibrators are used for searching pipe (non metal like plastic) location by vibration of water hammer.

9) Hammer drill

Hammer drill is used for making a hole on road to check the exact leak point.

10) Drill bit

Drill bits are necessary parts for the hammer drill to make a hole on road.

11) Boring bar

Boring bar is inserted to the hole made by the hammer drill to secure enough size of hole for investigation by acoustic rod.

12) Water level indicator

Water level indicators are necessary for well monitoring in water table.

13) Generator

Generators are required for electricity source of hammer drill.

14) Leak noise correlator

Leak noise correlators are used for the leaking point detection. This equipment can search the leaking area automatically by input piping data. After using leak sound detection, water leak detector is used for the leaking point detection in this area.

15) Portable ultrasonic flow meter (For large diameters)

Portable ultrasonic flow meters are necessary for incoming / outgoing flow measurements for a pilot area, in case of checking NRW for 24hours / 48hours. The mentioned item is for larger diameter pipes.

16) Portable ultrasonic flow meter (For Normal diameters)

The purpose of this equipment is same as mentioned for item 16. It is for normal diameter pipes.

17) Pickup

Pickup trucks are used for transportation for the field work by SOP and NRW teams.

18) Copy and Fax machine

In order to prepare the required documents for the Project, as well as securing the sufficient communication, equipment for copy and fax is necessary.

19) Personal computer (Desk top)

In order to analyze the collected data, establish a database and analyze the hydraulic conditions, a desk top computer is necessary.

20) Personal computer (Notebook)

In order to analyze the collected data, prepare the required documents and to set-up the flowmeters at sites, a notebook type computer is necessary.

21) Software (hydraulic analysis)

Software for hydraulic analysis is used for pipe network calculation. An appropriate pipe diameter and pressure is simulated by the software.

22) Ultrasonic Flow Meter (For SOP)

Ultrasonic flow meters are necessary for flow measurement of inflow / outflow of plants. This item is applied for SOP activities.

23) Ultrasonic Flow Meter (For Small Dia. Chamber Type)

Ultrasonic flow meter is necessary for the water distribution flow measurement of a water supply pipe. This item is applied for WDM activities. This is for small diameter pipeline.

24) Ultrasonic Flow Meter (For Large Dia. Chamber Type)

The purpose of this equipment is same as mentioned for item 23. It is for large diameter pipes.

25) Ultrasonic Flow Meter (For Small Dia.)

Ultrasonic flow meter is necessary for the well flow measurement. This item is applied for WDM activities.

26) Water Pressure Gauge (For WTP)

Water pressure gauge is used for water pressure measurement of a water treatment plant. This item is applied for WDM activities.

27) Water Pressure Gauge

Water pressure gauge is used for water pressure measurement of a water distribution pipe network. This item is applied for WDM activities.

28) Telemeter (For Outdoor Type)

Telemeter is required for sending and receiving the water flow data. It is a type to be installed on street. This item is applied for WDM activities.

29) Telemeter (For Indoor Type)

Telemeter is required for sending and receiving the water flow / pressure data. It is a type to be installed in building. This item is applied for WDM activities.

30) Central Monitoring System

It is required for receiving the data transmitted from the telemeters and the data transmitted by the cable from Zagazig water treatment plant. This item is applied for WDM activities.

31) Water leak detector

It is same equipment as item 1). To expand the covering area of NRW reduction activities, 4 sets of the equipment are additionally procured in Phase-3.

(2) Delivery Status of Equipment Status

Delivery of the equipment was completed as shown in Table 6-12.

Table 6-12 Equipment Status

Delivery date	JFY	Item	Maker	Responsible Agency
20-Oct-11	2011	Water leak detector	FUJITECOM	GHAPWASCO,MCWW
20-Oct-11	2011	Digital sound detector	FUJITECOM	GHAPWASCO,MCWW
20-Oct-11	2011	Acoustic rod	FUJITECOM	GHAPWASCO,MCWW
20-Oct-11	2011	Pressure data logger	Ashridge	GHAPWASCO,MCWW
20-Oct-11	2011	Pipe and cable locator	FUJITECOM	GHAPWASCO,MCWW
20-Oct-11	2011	Metal pipe locator	FUJITECOM	GHAPWASCO,MCWW
20-Oct-11	2011	Magnetic locator	FUJITECOM	GHAPWASCO,MCWW
20-Oct-11	2011	Non-metallic pipe vibrator	TOKYO RHYTHM	GHAPWASCO,MCWW
20-Oct-11	2011	Hammer drill	HITACHI	GHAPWASCO,MCWW
20-Oct-11	2011	Drill bit	YUNIKA	GHAPWASCO,MCWW
20-Oct-11	2011	Boring bar	FUJITECOM	GHAPWASCO,MCWW
19-Dec-11	2011	Generator	HONDA	GHAPWASCO,MCWW
20-Oct-11	2011	Water level indicator	CTI Science	GHAPWASCO,MCWW
21-Feb-12	2011	Leak noise correlator	FUJITECOM	GHAPWASCO,MCWW
21-Feb-12	2011	Portable ultrasonic flow meter (For large diameters)	TOKYO KEIKI	GHAPWASCO,MCWW
21-Feb-12	2011	Portable ultrasonic flow meter (For normal diameters)	TOKYO KEIKI	GHAPWASCO,MCWW
26-Jul-12	2012	Pickup	NISSAN	GHAPWASCO,MCWW
26-Jul-12	2012	Personal computer (Desk top)	HP	GHAPWASCO,MCWW
26-Jul-12	2012	Personal computer (Notebook)	HP	GHAPWASCO,MCWW
26-Jul-12	2012	Copy and Fax machine	Xerox	GHAPWASCO,MCWW
22-Mar-12	2011	Software (hydraulic analysis)	Bentley	GHAPWASCO,MCWW
2-Jul-12	2012	Ultrasonic flow meter (For large and normal dia.)	Endress Hauser	GHAPWASCO,MCWW
4-May-13	2012	Ultrasonic flow meter (For small dia. Chamber type)	TOKYO KEIKI	SHAPWASCO
4-May-13	2012	Ultrasonic flow meter (For large dia. Chamber type)	TOKYO KEIKI	SHAPWASCO
4-May-13	2012	Ultrasonic flow meter (For small dia. indoor type)	TOKYO KEIKI	SHAPWASCO
4-May-13	2012	Water pressure gauge (For WTP)	Yokogawa Electric	SHAPWASCO
4-May-13	2012	Water pressure gauge (For indoor type)	Yokogawa Electric	SHAPWASCO
4-May-13	2012	Telemeter (For outdoor type)	Yokogawa Electric	SHAPWASCO
4-May-13	2012	Telemeter (For indoor type)	Yokogawa Electric	SHAPWASCO
4-May-13	2012	Central monitoring system	Yokogawa Electric	SHAPWASCO
26-Jun-13	2013	Water leak detector	FUJITECOM	GHAPWASCO,MCWW

JFY; Japanese Fiscal Year

Source: JICA expert team

6.1.5 Field Expense of JICA Expert Team for the Project Implementation

The field expense of JICA expert team is shown in Table 6-13.

Table 6-13 Field Expense of JICA Expert Team for the Project Implementation

(Unit: Yen)

Major Budget Item		Phase-1 (May.2011 - Jan.2012)	Phase-2 (Feb.2012 - Mar.2013)	Phase-3 (Contract Amount)	Total
1	General Cost	9,728,000	21,677,813	40,433,000	71,838,979
1.1	Local Staff Cost	6,888,754	13,964,285	30,693,000	51,546,039
1.2	Equipment Maintenance Cost	0	0	117,000	117,000
1.3	Consumable Cost	145,311	583,554	294,000	1,022,865
1.4	Travel Expense	0	0		0
1.5	Communication Cost	69,640	116,862	143,000	329,502
1.6	Document Preparation Cost	275,144	9,095	61,000	345,239
1.7	Rental Cost	2,349,317	7,004,017	9,125,000	18,478,334
1.8	Light, Fuel and Water Cost	0	0	0	0
1.9	Staff Training Cost	0	0	0	0
1.10	Facility Maintenance Cost	0	0	0	0
1.11	Field Training Cost	0	0	0	0
1.12	Domestic Activity Cost	0	0	0	0
1.13	Domestic Consultant Cost	0	0	0	0
1.14	Miscellaneous Cost	0	0	0	0
2	Equipment Cost (JICA Expert's Equipment)	11,689,000	1,296,000	1,992,000	14,977,000
3	Equipment Shipping Cost (JICA Expert's Equipment)	254,000	49,000	30,000	333,000
4	Equipment Cost (Carry Equipment)	0	0	0	0
5	Equipment Shipping Cost (Carry Equipment)	0	0	25,000	25,000
6	Equipment Cost (Other Equipment)	0	0	0	0
7	Equipment Shipping Cost (Other Equipment)	38,000	0	0	38,000
8	Report Preparation Cost (Printing and Binding)	11,000	11,000	1,286,000	1,308,000
9	Report Preparation Cost (Exclude Printing and Binding)	19,000	19,000	2,314,000	2,352,000
10	Local Consultant Cost	666,000	0	1,054,000	1,720,000
11	Local NGO Cost	0	0	0	0
12	Construction Cost	0	0	0	0
13	Meeting Cost	0	0	0	0
14	Insurance Cost	0	0	0	0
15	Cost for Training in Japan	1,837,000	896,000	0	2,733,000
Total in Japanese Yen		**24,242,000**	**23,948,000**	**47,134,000**	**95,324,000**

Source: JICA expert team

6.2 Input by Egyptian Side

6.2.1 Expenses of the Egyptian Side

The expense of the Egyptian side is shown in Table 6-14.

Table 6-14 Budget Allocation in Egyptian Side

(Unit: LE)

Company Activity	Item	No. of units	Price in Egyptian pound
SHAPWASCO			
WDM	Chamber construction for installation of WDM equipment	13	265,100.00
	Construction of SCADA Room	1	950,000.00
	Internet Communication	25	33,750.00
	Electricity for Equipment	1	4,500.00
	Electricity meters and Poles Installation	1	5,000.00
	Materials for Equipment Installation	1	5,000.00
	Transport cost for Equipment	1	2,000.00
Total			**1,265,350.00**
GHAPWASCO			
SOP	Auma Control valves	10	166,500.00
	Adjustments for Auma valves (water level indicator and control panels)	10	140,000.00
	Water flow meters Calibration	11	8,250.00
	Chlorine Cylinder balance	1	13,000.00
	Air Scouring flow meter	2	82,000.00
	Flow meter Chamber in Tanta WTP	1	17,000.00
	Residual Chlorine indicator meter	1	23,000.00
	Chlorine leakage detection system	1	14,000.00
	Chlorine Dosing flow meter for IMRF	2	3,000.00
	Chemical dosage indicator utility bags (Chlorine and Manganese)	2	2,000.00
	Computers for Model facilities	2	11,000.00
	Vacuum pump for back wash in Tanta WTP	1	22,000.00
	Alum dosage totalizer	1	13,000.00
	Ultrasonic flow meters for Tanta WTP	4	96,000.00
NRW	Chamber construction for installation of NRW equipment	8	136,000.00
	Acoustic rods for leak detection	20	32,000.00
Other	Approximate expenses for the Project by company such as office and JICA Car fuel and maintenance, workshops, etc.	----	10,000.00
Total			**788,750.00**
MCWW			
SOP	Calibration Works		
	1st Gezy IMRF		
	Electromagnetic F.M	4	2,800.00
	Ultrasonic level transmitter	6	3,600.00
	(pH) measurement level	2	1,200.00
	(NTU) measurement level	2	1,200.00
	(ITT) portal for Residual Chlorine	1	700.00
	Electronic pressure switch	2	1,200.00
	2nd El Sadat SWTP		
	Raw water Ultrasonic F.M	1	700.00
	Treated water Ultrasonic F.M	1	700.00

Company Activity	Item	No. of units	Price in Egyptian pound
	Ultrasonic F.M for filtered water	14/16	9,800.00
	Ultrasonic level measurement	15/16	9,000.00
	Ultrasonic level transmitter	6	3,600.00
	Level meter controller	15/16	9,000.00
	Electronic level switch (Intake)	1	600.00
	Raw water F.M (Intake)	1	700.00
	Analyzer for residual Chlorine	1	700.00
	Chlorine dosing controller (touch)	1	900.00
	Purchasing & Installation works		
	Purchasing & Installation Ultrasonic F.M for filter back wash water	1	54,595.00
	Purchasing & Installing Air F.M for El Sadat 8"	2	79,780.00
	Purchasing & Installing Ultrasonic level controller	3	59,700.00
	purchasing & Installing 1Ton Table balance for Chlorine cylinder	3	51,000.00
	Purchasing & Installing Air F.M for Gezy 2"	1	41,000.00
	Purchasing & Installing Air F.M for Gezy 3"	1	41,500.00
	Purchasing & Installing permanganate potassium glass indicator(Gezy)	1	4,100.00
	Purchasing & Installing electromagnetic F.M	1	27,500.00
	Purchasing & Installing ultra-sonic F.M (El Sadat-Shebeen-Minouf)	3	66,600.00
	Purchasing & Installing pressure gauge (Kom Akhdar)	2	1,000.00
	Purchasing & Installing pipes & valves (to change Chlorine point)	3	6,000.00
	Purchasing & Installing stainless plate for (Gezy)	1	1,000.00
	Purchasing & Installing filter sand (Gezy) 5m^2	5	1,800.00
	Purchasing Only		
	Purchasing pressure gauge (-) 0 to -10 mws	4	2,600.00
	Purchasing Chlorine cylinder Hook balance	2	26,400.00
	Purchasing electromagnetic F.M	1	27,500.00
	Purchasing pressure gauges different types	42	23,520.00
	Purchasing pressure gauges different types	30	18,300.00
	Purchasing submersible pump 25L/s.-60 m head	1	42,500.00
	Purchasing injection pump for permanganate potassium	1	7,500.00
	Purchasing injection pump for Alum	3	180,000.00
	Purchasing normal 1/2" valves	40	1,800.00
	Purchasing ruler balance for hooked Chlorine cylinder 1Ton	1	2,550.00
	Purchasing Alum line screen net 50mm	3	6,000.00
	Print out the necessary records for all model/extension facilities	50	500.00
	Print out the necessary instructions, SLD, P&ID for model/extension facilities	100	500.00
NRW	Chamber construction for installation of NRW equipment	9	95,247.00
	Acoustic Rods for leak detection	10	15,000.00
Other	Approximate expenses for the Project by company such as office and JICA Car fuel and maintenance, workshops, etc.		15,000.00
Total			**946,892.00**
Grand Total			**3,000,992.00**

Source: SHAPWASCO, GHAPWASCO, MCWW

CHAPTER 7 DEVICE AND LESSON ON PROJECT MANAGEMENT AND IMPLEMENTATION

Devices and lessons on the Project management and implementation are as follows:

7.1 Preparation Stage

(1) Selection of JET Members

Since the skills transfer, which should be conducted by SHAPWASCO to GHAPWASCO and MCWW, is incorporated in the Project, the experienced experts in the previous project for SHAPWASCO were assigned to secure smooth arrangement of inter-company cooperation. The assigned experts contributed to realization of the cooperation made by SHAPWASCO in the beginning of the Project. And they coordinated the training programs provided by SHAPWASCO through the Project period.

(2) Local Experts

JET formed a team by not only the Japanese engineers but also local experts for the following reasons:

- To have enough knowledge for local habitudes and practices as well as issues, which are difficult for the Japanese to learn beforehand.
- To utilize local technology efficiently and effectively.
- To facilitate the transfers of the Japanese experience by the local language.
- To explain relations / differences between the Japanese and local technologies.
- To maintain the communications and facilitation of the Project activities, including for periods of absence of the Japanese experts.

The local experts contributed to smooth communication and implementation for the Project as well as promotion of confidences of the Japanese experts.

7.2 Implementation Stage

(1) Contribution of SHAPWASCO

In general, it is not easy to have confidences of C/P team in the beginning of the Project for appropriateness of activities plan. Since the Project is incorporated with SHAPWASCO's assistances, they provided enough information of their experiences in the beginning of the Project. It was effective for smooth commencement of the Project. SHAPWASCO made good lectures on their experiences for issues, approaches and results. It contributed to promotion of the motivation for GHAPWASCO and MCWW.

(2) Steering Committee and PTM

In the Project, two (2) kinds of meetings were organized in addition to the JCC meetings. The 1st one is the steering committee meeting, which was mainly to discuss inter-company cooperation among the 3AC and HCWW, general issues and progress of the Project. The meetings were made by the Project Manager, the Project Co-Managers, key members of C/P team and JET.

The 2nd one is the PTMs (Project Team Meetings). It was organized almost monthly by each of GHAPWASCO and MCWW to share the information and to promote the motivation of the teams. The C/P teams reported their activities and progress to the Chairman in the meetings. It included sometimes the progress of the other ACs. This PTM system boosted their initiatives and brought the active participation of C/P members.

(3) Initiative of C/P

At the beginning of the Project, JET had plans for the selecting criteria of model facilities and areas. According to discussion with C/P teams, JET found that C/P teams also have some ideas for the selection. It includes not only technical issues but also management / development policies of the Governorates. Those are invisible for JET but ones of the key issues for the selection. JET respected their ideas and led the Project for the smooth implementation. It was a key to develop the autonomy and continuity and to have good outcomes in the Project that C/P teams conduct the Project with initiatives.

(4) Competition of 3ACs

The 2ACs (GHAPWASCO and MCWW) implemented almost the same programs simultaneously. And the members of the 3ACs sometimes met in the workshops, seminars, meetings, etc. C/P teams exchanged their information on progress and the results in the occasions of meetings. The information exchanges promoted the awareness on cooperation and competition.

(5) TOT

Skills transfer from SHAPWASCO to GHAPWASCO and MCWW was incorporated in the Project, . Moreover, the C/P members conducted trainings among themselves, from HQ members to site members (in branch offices and treatment facilities) for example. Such trainings were effective for the Project to have trainers for the future. The experiences as a trainer contributed to motivation up and changing mindsets of the C/P members.

- The members of SHAPWASCO provided trainings on SOP, NRW reduction and leak detection for GHAPWASCO and MCWW. It contributed to promotion of awareness on cooperation and motivation for the activities.
- The C/P teams of GHAPWASCO and MCWW provided also trainings internally for site members. It contributed to promotion of their motivation for the Project and the awareness of site members. The C/P teams for NRW reduction organized leak detection trainings at Hihya training yard of SHAPWASCO for the members of branch offices. It provided a good example of inter-company cooperation.

(6) Visible Performance Indicators

The Project team selected visible performance indicators (PIs) for the Project evaluation. They have been measured monthly and evaluated by numerical indicators. It contributed to promotion of the motivation of C/P team members. It also brought the improvement of information transfer to top management of each AC and HCWW, and it led the top management to proper commitment for developing SOP, NRW and WDM.

Table 7-1 shows the selected PIs.

Table 7-1 Selected PIs for the Project

Activity	PI	Note
SOP	Ratio of effective utilization of raw water (%)	Water loss in treatment process
	Unit consumption of chemical (g/m^3) Alum sulfate, Chlorine, Potassium Permanganate	Usage of chemical per $1m^3$ of produced water
	Energy consumption per cubic meter of water produced (kWh/m^3)	Electricity consumption per $1m^3$ of produced water
NRW	NRW ratio (%)	Ratio of NRW volume to Distributed volume
	Reduction rate of NRW (%)	Reduction rate of NRW ratio between before and after NRW reduction activity
WDM	Low service pressure ratio (%)	Ratio of hours of low service pressure to total number of metering points and hours
	Number of complaints per 1,000 customers on water suspension and low pressure (number of complaints / 1,000 customers)	Analysis result of complaints data obtained by 123 hotline

Source: The Project team

(7) Motivative Factors for the Project Implementation

It is the firm commitment of top-managements of HCWW and the 3ACs, to lead the Project to successful completion. Nevertheless, the following certainly contributed to motivate the C/P members, as well as top-managements, for active participation and improvement.

- As mentioned above, the performance indicators (PIs) motivated the C/P members and Chairmen of the ACs for improvement and cost reduction. The PIs were also helpful to maintain the competitive activities among the 3ACs.
- The improvement and reduction of chemicals, NRW, etc. were evaluated in cost reductions. They were good indicators for C/P members to recognize the improvement and publicize the results of the activities, so that the motivations of C/P members were promoted.
- The trainings in Japan and the information exchange with Water Authority of Jordan stimulated interest of C/P members in development / improvement of water supply business.
- Since inter-company cooperation and plans to disseminate to other governorate are incorporated, C/P members had occasions (or will have occasions) to train staff members of

other governorates. C/P members are proud to be trainers. It is one of motivative factors for C/P members.

7.3 Lessons

(1) Seasonal Fluctuations of Water Demand and Quality

SOP team selected "the consumptions of chemicals" as PIs. Since the quality of raw water fluctuates seasonally, it was difficult to achieve the target in several months. WDM team selected "the low service pressure ratio" and "the number of complaints for water suspension and weak pressure" as well. As the water demand of citizens fluctuates seasonally, it was also difficult to maintain pressures always at the same level.

Although it is ideal to evaluate the Project by annual performances of the mentioned PIs, enough monitoring periods are difficult to be secured in a short project period. In case of selecting PIs, attentions should be, therefore, paid for the monthly fluctuation of conditions and the appropriate monitoring periods.

(2) Conditions of Electricity Power

In 2013 and 2014, the Egyptian citizens suffered from frequent interruptions of electricity distribution. The electricity interruptions affect much operation conditions of water supply facilities. In Zagazig City, a lot of water supply facilities are affected by the unforeseen electricity interruptions and it caused interruptions of water supply. Accordingly, the conditions made the Project team difficult to achieve the target of PIs for "the low service pressure ratio" and "the number of complaints for water suspension and weak pressure".

In case of selecting PIs, it should be, therefore, careful for the political and economic conditions influencing the related infrastructures to the project.

(3) Equipment Procurement

For WDM activity, JICA procured necessary equipment for the monitoring system. Since SHAPWASCO has enough skills for the installation of hardware, the installation work was not included in the procurement contract for the equipment provider. Although the initial instruction on usage and operation and maintenance was included for two (2) weeks, the completion of system establishment at site was not the scope of the equipment provider.

This contract condition caused a long period of remedy work, which was done by the equipment provider, for inappropriateness of software and configurations of the equipment. In case of procuring the system equipment, it is recommended to include the installation work in the procurement contract.

(4) Effectiveness of Monitoring System

As described in Section 4.3, it was confirmed that insufficient facilities hinder in appropriate WDM. And the monitoring system is not a tool to solve the fundamental problems. Nevertheless, the Project

team confirmed that the monitoring system is effective to improve the water distribution conditions through demand-oriented operations of WTP and wells. Visualization of water distribution in flows and pressures promoted the awareness of operators for WTP and wells, and assisted C/P members in appropriate operation of pumps.

CHAPTER 8 EVALUATION OF THE PROJECT

8.1 Mid-term Review

8.1.1 Objective of Mid-term Review

In November 2012, JICA organized the Mid-term review for the following purposes:

- To review the performance, achievements and implementation process of the Project.
- To conduct a comprehensive evaluation from the viewpoints of five evaluation criteria, i.e. 1) Relevance, 2) Effectiveness, 3) Efficiency, 4) Impact and 5) Sustainability.
- To draw up recommendations for further improvements of the Project during its remaining period and afterward.

Members of the review team and their schedule are shown Table 8-1 and Table 8-2 respectively.

Table 8-1 Members of Mid-term Review

Name	Position	Organization
Egyptian side		
Dr. Salah Bayoumi	Head of Projects Sector	HCWW
Japanese side		
Mr. Yoshiki Omura	Leader	Senior Advisor, JICA
Mr. Satoshi Hamano	Evaluation Planning	Global Environment Department, JICA
Mr. Nobuhisa Iwase	Evaluation Analysis	Partner, IMG Inc.

Source: JICA expert team

Table 8-2 Schedule of Mid-term Review

Date			Activity
9-Nov-12	Fri.	AM	
		PM	Dept. from Tokyo (Mr. Iwase)
10-Nov-12	Sat.	AM	Arrival at Cairo (Mr. Iwase)
		PM	Meeting with experts
11-Nov-12	Sun.	AM	Meeting at JICA Office
		PM	Courtesy call and meeting in HCWW
12-Nov-12	Mon.	AM	Meeting in GHAPWASCO (Chairman)
		PM	Meeting in Project Office of GHAPWASCO Meeting at site of GHAPWASCO
13-Nov-12	Tue.	AM	Meeting in MCWW (Chairman)
		PM	Meeting in Project Office of MCWW Meeting at site of MCWW
14-Nov-12	Wed.	AM	Meeting in SHAPWASCO & Workshop observation
		PM	Meeting in SHAPWASCO & Workshop observation Meeting with Chairman Site observation
15-Nov-12	Thu.	AM	Preparation of report
		PM	Preparation of report
16-Nov-12	Fri.	AM	Preparation of report
		PM	Preparation of report
17-Nov-12	Sat.	AM	Meeting with experts at Cairo
		PM	Meeting with experts at Cairo Dept. from Tokyo (Mr. Omura and Mr. Hamano)

Date			Activity
18-Nov-12	Sun.	AM	Interim meeting at HCWW Arrival at Cairo (Mr. Omura and Mr. Hamano)
		PM	Meeting at JICA Office Internal meeting
19-Nov-12	Mon.	AM	Meeting in MCWW (Chairman & key members)
		PM	Observation of site activity at MCWW site
20-Nov-12	Tue.	AM	Meeting in GHAPWASCO (Chairman & key members)
		PM	Observation of site activity at GHAPWASCO site
21-Nov-12	Wed.	AM	Meeting in SHAPWASCO (Chairman & key members)
		PM	Internal meeting to prepare the report
22-Nov-12	Thu.	AM	Open Seminar (Tanta)
		PM	Internal meeting
23-Nov-12	Fri.	AM	Preparation of report
		PM	Preparation of report
24-Nov-12	Sat.	AM	Preparation of report
		PM	Preparation of report
25-Nov-12	Sun.	AM	Report / MD meeting in HCWW
		PM	Internal meeting
26-Nov-12	Mon.	AM	JCC (Cairo)
		PM	JCC (Cairo)
27-Nov-12	Tue.	AM	Meeting in Embassy of Japan
		PM	Dept. from Cairo

Source: JICA expert team

8.1.2 Results

The Mid-term Review team concluded the review as shown in Attachment-7. The summary is shown below:

(1) Conclusion of the Evaluation

- The Project has made a steadfast progress in strengthening the capacity in operation and maintenance of water supply facilities despite some delays in implementation of the Project activities.
- The relevance of the Project is evaluated as very high.
- The effectiveness of the Project is evaluated as medium.
- The efficiency of the Project is evaluated as relatively high.
- It is difficult to foresee the potentiality and scale of expected impact of the Project, although basic foundations for their continuous efforts to enhance effective operation and maintenance of water supply facilities are being established.
- The prospect of achieving sustainability is evaluated to be relatively high.

(2) Recommendations

- The Project team should set the targets of PIs as soon as possible to assess the achievement in terminal evaluation.
- GHAPWASCO and MCWW are requested to establish full-time work project units officially.
- It is recommended to strengthen relationship between NOPWASD and Water supply companies,

including introduction of feedback and handover system between NOPWASD and water supply companies, to accelerate SOP activities' efficiency and effectiveness and to improve the facilities design.

- It is required to establish institutional system to disseminate the developed skills to whole Nile Delta Area.
- It is required to secure budget and resource for equipment procurement and facilities rehabilitation to implement dissemination of the skills.

8.2 Terminal Evaluation

8.2.1 Objective of Terminal Evaluation

In February 2014, JICA organized the Terminal Evaluation for the following purposes:

- To review the performance, achievements and implementation process of the Project.
- To conduct a comprehensive evaluation from the viewpoints of five evaluation criteria, i.e. 1) Relevance, 2) Effectiveness, 3) Efficiency, 4) Impact and 5) Sustainability.
- To draw up recommendations for further improvements of the Project during its remaining period and afterward.

Members of the evaluation team and their schedule are shown Table 8-3 and Table 8-4 respectively.

Table 8-3 Members of Terminal Evaluation

Name	Position	Organization
Egyptian side		
Dr. Rifaat Abdel Wahaab	Professor of Environmental Science and Head, Research and Development (R&D) Sector	HCWW
Japanese side		
Mr. Yoshiki Omura	Leader	Senior Advisor, JICA
Ms. Momo Fukushima	Evaluation Planning	Global Environment Department, JICA
Ms. Emi Yoshinaga	Evaluation Specialist	Japan Development Service Co. Ltd

Source: JICA expert team

Table 8-4 Schedule of Terminal Evaluation

Date			Activity
12-Feb-14	Wed.	AM	
		PM	Dept. from Tokyo (Ms. Yoshinaga)
13-Feb-14	Thu.	AM	Arrival at Cairo (Ms. Yoshinaga)
		PM	Meeting at JICA Office
14-Feb-14	Fri.	AM	Preparation of report
		PM	Preparation of report
15-Feb-14	Sat.	AM	Visit GHAPWASCO SOP site (Samanoud) and Meeting with SOP site members
		PM	Meeting with Experts and Facilitators
16-Feb-14	Sun.	AM	Visit GHAPWASCO NRW site (Santa) and meeting with NRW C/P members
		PM	Meeting with IWSP and GHAPWASCO Chairman
17-Feb-14	Mon.	AM	Meeting with MCWW Chairman and then with C/P (SOP & NRW) members
		PM	Visit SOP site (Shebeen)
18-Feb-14	Tue.	AM	Meeting with SHAPWASCO Chairman and then with C/P (WDM) members

Date			Activity
		PM	Visit WDM sites
19-Feb-14	Wed.	AM	Visit GHAPWASCO SOP site (Mahalet Marhoom)
		PM	Visit MCWW NRW site (Berket El Sab'a)
20-Feb-14	Thu.	AM	Preparation of report
		PM	Preparation of report
21-Feb-14	Fri.	AM	Preparation of report
		PM	Preparation of report
22-Feb-14	Sta.	AM	Preparation of report
		PM	Internal team meeting to prepare the report
23-Feb-14	Sun.	AM	Courtesy call to HCWW and Meeting in HCWW
		PM	Meeting in JICA Office and GIZ
24-Feb-14	Mon.	AM	Progress confirmation for WDM with SHAPWASCO Chairman and WDM members
		PM	
25-Feb-14	Tue.	AM	Preparation of report
		PM	Internal team meeting to prepare the report
26-Feb-14	Wed.	AM	Preparation of report
		PM	Meeting in HCWW
27-Feb-14	Thu.	AM	Visit MCWW SOP site (Sadat) and meeting with SOP site members
		PM	Visit MCWW SOP site (Gezy) and meeting with SOP site members
28-Feb-14	Fri.	AM	Preparation of report
		PM	Preparation of report
1-Mar-14	Sat.	AM	Preparation of report
		PM	Preparation of report
2-Mar-14	Sun.	AM	JCC
		PM	
3-Mar-14	Mon.	AM	Meeting in JICA Office
		PM	Meeting in Embassy of Japan, Dept. from Cairo

Source: JICA expert team

8.2.2 Results

The Terminal Evaluation team concluded the evaluation as shown in Attachment-8. The summary is shown below:

(1) Conclusion of the Evaluation

- Overall, the project implementation structure is well-functioning and the key decisions and information on the Project are shared among the C/Ps. Each C/P staff, both at management level and operational level, participate well to the Project, while the level of participation somewhat depends on respective members.
- The relevance of the Project is evaluated as high.
- The effectiveness of the Project is evaluated as relatively high.
- The efficiency of the Project is evaluated as relatively high.
- The impact of the Project is evaluated as high.
- The prospect of achieving sustainability is evaluated to be high.

(2) Recommendations

Recommendations for the actions to be taken before the end of the Project

1) To ensure the achievement of Output 4 (WDM), JICA will start necessary preparation to extend the project period.

2) The Project will summarize, in its Final Report, the economic effect of the NRW/SOP activities undertaken during this Project, and share the results with the Egyptian counterparts.

3) The Project will summarize, in its Final Report, the findings on the design of the facilities from the viewpoint of facility operators during this Project, and share the results with the Egyptian.

Recommendations for the actions to be taken after the Project

1) HCWW will share the summary of the findings on the facility design with the NOPWASD stakeholders in charge of design and construction of these facilities. HCWW will also make its utmost efforts to promote increased information-sharing between the contractors and the operators, through such actions as hosting an opportunity for the NOPWASD stakeholders to visit the facilities that participated in this Project.
2) To sustain and disseminate the outcome of this Project, GHAPWASCO and MCWW undertake the following:
   a) For NRW, ensure that the "5-year Plan for Non-revenue Water Reduction" formulated in this Project will be implemented. The 2ACs will also undertake the following measures to facilitate the NRW activities.
      - Maintain the current staff allocation and implementation arrangement for NRW (both at HQ and at Markaz branches), and increase the collaboration with each branch.
      - Provide to the NRW teams the vehicle(s) and equipment necessary for NRW activities.

   b) For SOP, ensure the implementation of SOP dissemination plans created in this Project. The 2ACs also regularly undertake the following actions to facilitate the implementation of the plans.
      - Purchase of spare parts necessary for the O&M at WTP and IMRP.
      - Calibration of instrumentation devices.

3) To achieve the super goal of this Project, GHAPWASCO, MCWW and SHAPWASCO will extend the project activities also to other Governorates, upon the completion of the dissemination within their Governorates.

4) To sustain the skills and motivation of the staff involved in this Project, the GHAPWASCO and MCWW will take initiatives to promote the sharing of experiences and outputs of this Project. An example of possible actions they could take is to utilize the network fostered in

this Project to organize joint seminars, where the operational-level staff will be given opportunities to share their experiences with other ACs.

5) To ensure correct data collection and improve the water fee collection rate, HCWW, GHAPWASCO, MCWW, and SHAPWACO will make utmost efforts to sensitize the water users on the need for regular replacement of water meters. The four organizations also discuss concrete measures to promote the replacement of the meters by the users. HCWW should consider the house connections (including the meters) to be the property of the HCWW instead of the customers, to ensure the maintenance and replacement of these meters.

6) After confirming the effects of Output 4 activities, SHAPWASCO will apply the WDM activities to other water distribution facilities within Sharkiya Governorate which were not covered in this Project. In so doing, SHAPWASCO will ensure not only the dissemination of the distant monitoring system, but also of the water distribution management capacity to address the issues identified through the monitoring. With precise data acquired through monitoring, SHAPWASCO is recommended to analyze the present conditions of water distribution in Zagazig, and establish countermeasures to solve the problems such as low service pressure and intermittent water supply.

7) SHAPWASCO will ensure the proper maintenance and management of the distant monitoring system provided by the Project. In so doing, SHAPWASCO will establish a maintenance agreement with the approval firm familiar with this system, to address any problem that may arise with the software, and undertake upgrading of the software in cooperation with the supplier. SHAPWASCO will also secure the budget to address any problem relating to the system that cannot be covered by the supplier.

8.3 Terminal Evaluation for the Extended Term

8.3.1 Objective of Terminal Evaluation for the Extended Term

The Project has been extended for 13 months due to delay in water distribution management (WDM) activities caused by the equipment/software failure and travel restriction. Although the terminal evaluation was conducted in February - March 2014, WDM was not fully covered by the evaluation. JICA organized, therefore, the Terminal Evaluation for the Extended Term to evaluate WDM and update the information related to the evaluation.

Members of the evaluation team and their schedule are shown Table 8-5 and Table 8-6 respectively.

Table 8-5 Members of Terminal Evaluation for the Extended Term

Name	Position	Organization
Japanese side		
Mr. Yoshiki Omura	Leader	Senior Advisor, JICA
Ms. Tomoko Kashihara	Evaluation Analysis	Global Environment Department, JICA

Source: JICA expert team

Table 8-6 Schedule of Terminal Evaluation for the Extended Term

Date			Activity
28-Mar. 2015	Sat.	AM	Arrival at Cairo (Mr. Omura, Ms. Kashihara)
		PM	Preparation of report
29-Mar. 2015	Sun.	AM	Meeting in JICA Office
		PM	Courtesy call and meeting in HCWW
30-Mar. 2015	Mon.	AM	Observation of site activity at SHAPWASCO
		PM	Meeting in SHAPWASCO
31-Mar. 2015	Tue.	AM	Preparation of report
		PM	Preparation of report
1-Apr. 2015	Wed.	AM	Report / MD meeting in HCWW
		PM	JCC
2-Apr. 2015	Thu.	PM	Meeting at JICA Office, Dept. from Cairo (Mr. Omura, Ms. Kashihaara)

Source: JICA expert team

8.3.2 Results

The Terminal Evaluation for the Extended Term team concluded the evaluation as shown in Attachment-9. The summary is shown below:

(1) Conclusion of the Evaluation

- The Project provided the skills for the SOP based operation, the reduction of NRW, and the WDM, with the view to improving the operations and maintenance at the water treatment plants in the three (3) target Governorates
- The C/P members are all committed to the Project activities, and efforts have been observed to increase the implementation efficiency through the utilization of existing knowledgebase in the country.
- The relevance of the Project is evaluated as high.
- The effectiveness of the Project is evaluated as relatively high.
- The efficiency of the Project is evaluated as moderate.
- The impact of the Project is evaluated as high.
- The sustainability of the Project is evaluated as relatively high.

(2) Recommendations

Recommendations for the actions to be taken after the Project

The Terminal Evaluation for the Extended Term team added / modified the recommendations to / from the Terminal Evaluation conducted in February - March 2014 as flows:

1) To sustain and disseminate the outcome of the Project relating to WDM, it is recommended for SHAPWASCO to undertake the following:

i. Ensuring proper maintenance of the remote monitoring system provided by the Project:
It is recommended for SHAPWASCO to continue an operational support agreement with a firm familiar with this system to consult on any problem that may arise with the software. It is also recommended that the necessary budget should be secured to upgrade the software

and procure necessary spare parts as well.

ii. Ensuring necessary human resources for WDM:
It is recommended for SHAPWASCO to recruit and train personnel for WDM team as planned. Current effort on the training and timely instruction for well operators for proper operation should be continued.

iii. Improving water distribution based on the WDM:
It is recommended for SHAPWASCO to continue regular reporting to the management of SHAPWASCO and HCWW about issues on water distribution. With precise data acquired through monitoring, SHAPWASCO is recommended to analyze the present conditions of water distribution in Zagazig, and continue its effort to solve the problems such as low service pressure and intermittent water supply.

iv. Expanding the WDM activities to other water distribution facilities within Sharkiya governorate which were not covered in the Project:
It is recommended for SHAPWASCO to ensure not only the dissemination of the remote monitoring system, but also of the capacity of water distribution management.

2) To achieve the super goal of the Project, following shall be considered:

i. HCWW shall expand the project activities to other Governorates in collaboration with GHAPWASCO, MCWW, and SHAPWASCO.

ii. HCWW shall promote sharing experiences and outputs of the Project in collaboration with GHAPWASCO, MCWW, and SHAPWASCO in view of sustaining the skills and motivation of the staff involved in the Project. (An example of possible actions is to utilize the network fostered in the Project to organize joint seminars, where the operational-level staff will be given opportunities to share their experiences with other ACs.)

CHAPTER 9 VARIOUS MEETINGS

9.1 Joint Coordinating Committee (JCC) Meeting

JCC meetings were held as shown in Table 9-1. The minutes of meeting are attached in Attachment-3.

Table 9-1 List of Joint Coordinating Committee

No.	Date	Contents
1st JCC	27th September 2011	APO, PDM1 and PO1 were discussed and approved by JCC.
2nd JCC	11th March 2012	APO were discussed and approved by JCC.
3rd JCC	26th November 2012	PDM2 and PO2 were discussed and approved by JCC.
4th JCC	30th October 2013	PDM3 and PO3 were discussed and approved by JCC.
5th JCC	2nd Mach 2014	Results of the terminal evaluation were explained and confirmed at JCC.
6th JCC	2nd April 2015	Results of the terminal evaluation (for the extended period) were explained and confirmed at JCC. Termination of the Project was confirmed at JCC.

Source: JICA expert team

9.2 Steering Committee (SC) Meeting

SC meetings were held as shown in Table 9-2. The minutes of meeting are attached in Attachment-4.

Table 9-2 List of Steering Committee

No.	Date	Contents
1st SC	8th June 2011	➢ Confirmation of members of the Steering Committee. ➢ Confirmation of C/P team members. ➢ Preliminary plans of the ACs on model/pilot facilities/areas. ➢ List of equipment to be provided by JICA expert team. ➢ Training such as seminars and work shop to be done by SHAPWASCO. ➢ Coordination with IWSP. ➢ Training in Japan for Top Management.
2nd SC	12th September 2011	➢ Candidate Trainees for Training in Japan for SOP and NRW. ➢ Delivery of the Equipment and responsibility for the Equipment. ➢ Additional activity to promote public awareness. ➢ PDM-1 and PO-1.
3rd SC	26th February 2012	➢ APO for Phase-2 (Jan. 2012 – Feb. 2013). ➢ Discussion on contents of the 2nd JCC meeting. ➢ Schedule and contents of Training in Japan for WDM. ➢ Necessity to promote public awareness for efficient water supply management. ➢ Management of the equipment procured by JICA side.
4th SC	16th July 2012	➢ Contents of pilot project in SHAPWASCO for WDM. ➢ Progress and issues on SOP and NRW activities in GHAPWASCO and MCWW. ➢ Overall schedule of Phase-2 (Jan. 2012 – Feb. 2013). ➢ Schedule of Mid-term review and open seminar.
5th SC	8th November 2012	➢ Report of the special training “Information exchange with Water Authority of Jordan”. ➢ Program of Mid-term review. ➢ Difficulties on Water Balance Survey for NRW.

No.	Date	Contents
		➢ PIs for the current condition and target to be improved by the Project. ➢ Modification of overall schedule for Phase-2 (Jan. 2012 – Feb. 2013).
6th SC	20th June 2013	➢ APO for Phase-3 (Mar. 2013 – Aug. 2014). ➢ Progress and issues on SOP and NRW activities in GHAPWASCO and MCWW. ➢ Progress and issues on WDM activities in SHAPWASCO. ➢ Target of PIs to be authorized. ➢ Schedule of Terminal Evaluation and Open Seminar.
7th SC	31st August 2014	➢ Confirmation of trainers for SOP and NRW. ➢ Period extension for WDM activities. ➢ Modification of PO.

Source: JICA expert team

9.3 Project Team Meeting (PTM)

The Project Team Meeting (PTM) were held to share the progress between teams for SOP and NRW reduction and to discuss the problems for the Project. It is an internal communication approach in GHAPWASCO and MCWW. The minutes of meeting are attached in Attachment-5.

9.4 Seminar and Workshop

Seminar and Workshop were held as follows:

Table 9-3 List of Seminars, Workshops and Trainings Organized by Inter-company Cooperation

	Date	Title	Program	Attendance	Trainer
	April 2011 – January 2012 (Phase-1)				
1	8th-9th June 2011, 10:00-13:00	1st Mini Seminar for SOP Activity	- Introduction of the SOP activity of SHAPWASCO Project (Presented by C/P team of SHAPWASCO) - Discussion	• Project manager, Project co-manager • C/P team of GHAPWASCO • Engineers and operators in GHAPWASCO • C/P team of MCWW • Engineers and operators in MCWW • C/P team of SHAPWASCO • JICA expert team	SHAPWASCO
2	18th-19th June 2011, 10:00-13:00	2nd Mini Seminar for NRW Reduction Activity	- Introduction of the NRW reduction activity of SHAPWASCO Project (Presented by C/P team of SHAPWASCO) - Discussion	• C/P team of GHAPWASCO • Engineers and operators in GHAPWASCO • C/P team of MCWW • Engineers and operators in MCWW • C/P team of SHAPWASCO • JICA expert team	SHAPWASCO
3	2nd-3rd July 2011, 10:00-14:30	3rd Mini Seminar on Selection Criteria for SOP and NRW	- Discussion of selection criteria for model facility and pilot area (Presented by C/P team of SHAPWASCO) - Difference between NRW and UFW (Presented by C/P team of SHAPWASCO)	• C/P team of GHAPWASCO • Engineers and operators in GHAPWASCO • C/P team of MCWW • Engineers and operators in MCWW • C/P team of SHAPWASCO • JICA expert team	SHAPWASCO
4	13th July 2011, 10:30-12:30	3ACs Workshop for Well Monitoring Activity	- Method, contents and importance of the well monitoring and experience of implementation of well monitoring (Presented by C/P team SHAPWASCO) - Usage of the result of well monitoring (ditto) - Discussion	• C/P team of GHAPWASCO • Engineers and operators in GHAPWASCO • C/P team of MCWW • Engineers and operators in MCWW • C/P team of SHAPWASCO • JICA expert team	SHAPWASCO
5	27th September 2011, 12:00-13:50	Kicking Off Seminar	- Current JICA Project and background of seminar (Presented by Head of Sector, HCWW) - Experience and plan of SOP activities (Presented by C/P team of GHAPWASCO, MCWW and SHAPWASCO) - Experience and plan of NRW reduction activities (Presented by C/P team of	• Water companies under HCWW • Authorities related to water supply services in Egypt • Foreign aid organizations involved in water sectors in Egypt • Project manager, Project co-manager • C/P team of GHAPWASCO • Engineers and operators in GHAPWASCO	Representatives of SHAPWASCO, GHAPWASCO and MCWW

	Date	Title	Program	Attendance	Trainer
			GHAPWASCO, MCWW and SHAPWASCO) - Plan of Water Distribution Management (WDM) activities (Presented by C/P team of SHAPWASCO) - Discussion	• C/P team of MCWW • Engineers and operators in MCWW • C/P team of SHAPWASCO • JICA expert team	
6	10th October 2011, 10:00-14:30	Site Tour for SOP and NRW Reduction Activity in SHAPWASCO	- Briefing of site tour (Presented by C/P team of SHAPWASCO) - Site tour in Zagazig WTP (Arranged by C/P team of SHAPWASCO) - Site tour for existing chamber for minimum night flow survey (Arranged by C/P team of SHAPWASCO) - Site tour in Hihya Training Yard (Arranged by C/P team of SHAPWASCO) - Site tour in Hihya WTP (Arranged by C/P team of SHAPWASCO)	• C/P team of GHAPWASCO • C/P team of MCWW • C/P team of SHAPWASCO • JICA expert team	SHAPWASCO
7	19th-20th, 22nd-23rd October 2011, 10:00-14:30	Conducting of Training for NRW Reduction	- Class room training - Learning principle of flow measurement, method of minimum night flow survey, etc. - Field training - Learning usage of flow meter and water leak detector, acrostic rod. - Learning method of data transfer from flow meter to computer.	• C/P team of GHAPWASCO • C/P team of MCWW • C/P team of SHAPWASCO • JICA expert team	SHAPWASCO
8	26th-30th October 2011, 10:00-12:30	3ACs Workshop for Action Plan NRW Reduction Activity	- Purpose and output of the Project (Presented by JICA expert team) - Project period (Presented by JICA expert team) - Contents of action plan (Presented by JICA expert team) - Flow of each action (Presented by JICA expert team) - Model Markaz and the pilot area (Presented by C/P team of GHAPWASCO, MCWW) - Next step (Explanation of each action) (Presented by C/P team of GHAPWASCO,	• C/P team of GHAPWASCO • Engineers and operators in GHAPWASCO • C/P team of MCWW • Engineers and operators in MCWW • C/P team of SHAPWASCO • JICA expert team	SHAPWASCO

	Date	Title	Program	Attendance	Trainer
			MCWW) - Schedule of NRW reduction activity (Presented by C/P team of GHAPWASCO, MCWW) - NRW reduction approach (Presented by JICA expert team)		
9	20th November 2011, 10:00-12:00	3ACs Workshop for Water Quality Management Activity	- What is water quality management (Presented by C/P team SHAPWASCO) - Case study of water quality management in SHAPWASCO (Presented by C/P team SHAPWASCO) - Relationship between SOP and ISO (Presented by C/P team GHAPWASCO) - Discussion	• C/P team of GHAPWASCO • Engineers and operators in GHAPWASCO • C/P team of MCWW • Engineers and operators in MCWW • C/P team of SHAPWASCO • JICA expert team	SHAPWASCO
	February 2012 – March 2013 (Phase-2)				
10	7th March 2012, 12:00-15:00	3ACs Workshop for NRW Reduction Activity in SHAPWASCO	Minimum Night Flow (MNF) Determining - Data logging and collect by pressure logger - Data logging and collect by flow meter logger Leak Detection Survey - Valve acoustic rod survey - Ground surface acoustic rod survey - Leak noise correlator survey	• C/P team of GHAPWASCO • C/P team of MCWW • JICA expert team	JICA expert team and each other of participants
11	22nd-24th April 2012, 10:00-14:30	3ACs Workshop for SOP Activity	- Presentation on operation records (Presented by C/P team of GHAPWASCO, MCWW) - Presentation on utilization & management methods of operation records (Presented by C/P team of SHAPWASCO) - Presentation on water quality management method (Presented by C/P team of GHAPWASCO, MCWW and SHAPWASCO) - Discussion - Comments by SHAPWASCO	• C/P team of GHAPWASCO • Engineers and operators in GHAPWASCO • C/P team of MCWW • Engineers and operators in MCWW • C/P team of SHAPWASCO • JICA expert team	SHAPWASCO
12	27th September 2012, 10:00-14:30	Site Tour for SOP Activity in MCWW	- Briefing of site tour (Presented by C/P team of MCWW) - Site tour in Mahatet El Sadat El Satheya	• C/P team of GHAPWASCO • Engineers and operators in GHAPWASCO • C/P team of MCWW	Each other by participants

	Date	Title	Program	Attendance	Trainer
			SWTP (Presented by C/P team of MCWW) - Discussion	• Engineers and operators in MCWW • JICA expert team	
13	30th September – 4th October 2012, 10:00-12:30	Special Workshop for NRW Reduction Activity in GHAPWASCO	- Introduction of the NRW reduction activity (Presented by C/P team of GHAPWASCO) - Discussion	• Authorities related to water supply services in Egypt • C/P team of GHAPWASCO • Engineers and operators in GHAPWASCO • JICA Expert Team • Utility & Positioning Systems Ltd. (Private Company)	GHAPWASCO
14	14th-18th October 2012	High Rank Exchange of Opinion with Water Authority of Jordan	- Presentation of NRW reduction activities in Jordan as well as achievement of JICA technical assistance - Presentation of SOP and NRW reduction activates in Egypt as well as achievement of JICA technical assistance - Site observation in Jordan - Opinion exchange	• Dr. Salah Bayoumi, Head of Project Sector, HCWW • Mr. Shaker Abdelfattah, Head of Project Sector, SHAPWASCO • Mr. Adel Attia, Head of O&M Sector • Mr. Ayman Bassuni, Head of O&M Sector • JICA expert team	Training each other by the participants, including the Jordanian side
15	14th November 2012, 11:00-14:00	3ACs Workshop in SHAPWASCO for SOP and NRW Reduction Activity	- Progress of NRW reduction activity (Presented by C/P team of GHAPWASCO, MCWW) - Progress of SOP activity (Presented by C/P team of GHAPWASCO, MCWW) - Discussion - Comments by SHAPWASCO	• C/P team of GHAPWASCO • Engineers and operators in GHAPWASCO • C/P team of MCWW • Engineers and operators in MCWW • C/P team of SHAPWASCO • JICA expert team	SHAPWASCO
16	22nd November 2012, 10:00-15:00	Open Seminar	- Current JICA Project and background of Seminar (Presented by Head of Sector, HCWW, HCWW and Chief Advisor, JICA expert team) - Interim results and plan of SOP activities (Presented by C/P team of GHAPWASCO and MCWW) - Interim results and plan of NRW reduction activities (Presented by C/P team of GHAPWASCO and MCWW)	• Minister of Water and Wastewater Utilities • Water companies in Nile Delta area under HCWW • Directors / Managers of HCWW • SHAPWASCO, GHAPWASCO and MCWW • Foreign aid organizations involved in water sectors in Egypt • JICA and JICA expert team	Representatives of SHAPWASCO, GHAPWASCO and MCWW

	Date	Title	Program	Attendance	Trainer
			- Interim results and plan of WDM activities (Presented by C/P team of SHAPWASCO) - Motivational words by the Minister of Water and Wastewater Utilities and Chairman of HCWW for the sustainability and dissemination to other companies. - Discussion		
17	9th December 2012, 10:00-14:30	3ACs Workshop for SOP Activity (Water Quality)	- Experiments of duplicate samples in SHAPWASCO laboratory. - Discussion	• C/P team of GHAPWASCO • C/P team of MCWW • C/P team of SHAPWASCO • JICA expert team	SHAPWASCO
18	9th January 2013, 12:00-15:00	3ACs Workshop for Water Quality Management Activity	- Standardization of water quality analytical method (Presented by C/P team SHAPWASCO) - Case study of water quality management in SHAPWASCO (Presented by C/P team SHAPWASCO) - Discussion	• C/P team of GHAPWASCO • Chemist of GHAPWASCO • C/P team of MCWW • Chemist of MCWW • C/P team of SHAPWASCO • JICA expert team	SHAPWASCO
19	15th January 2013, 11:00-15:00	Leak Detection Training in SHAPWASCO	- Leak detection survey using acoustic rod, water leak detector, and leak noise correlator (Training by C/P members of GHAPWASCO and SHAPWASCO). - Discussion	• NRW team of GHAPWASCO • NRW team of branches from GHAPWASCO • NRW team of SHAPWASCO • JICA expert team	SHAPWASCO
20	13th February 2013, 11:00-15:00	Leak Detection Training in SHAPWASCO	- Leak detection survey using acoustic rod, water leak detector, and leak noise correlator (Training by C/P members of MCWW and SHAPWASCO). - Discussion	• NRW team of MCWW • NRW team of branches from MCWW • NRW team of SHAPWASCO • JICA expert team • Staff members of Qalubya Water and Wastewater Company for observation and trial	SHAPWASCO
	April 2013 – April 2015 (Phase-3)				
21	2nd June 2013, 10:00-14:00	3ACs Workshop for SOP Activity in MCWW	- Interim results and plan of SOP activities (Presented by C/P team of GHAPWASCO and MCWW) - Discussion	• C/P team of GHAPWASCO • C/P team of MCWW • C/P team of SHAPWASCO • JICA expert team	Representatives of SHAPWASCO, GHAPWASCO and MCWW
22	6th March 2014,	Open Seminar	- Current JICA Project and background of	• Water companies in Nile Delta area under	Representatives of

	Date	Title	Program	Attendance	Trainer
	11:00-15:00		seminar (Presented by Vice Chairman of HCWW and Chief Advisor of JICA expert team) - Progress and achievements of SOP activities (Presented by C/P team of GHAPWASCO and MCWW) - Progress and achievements of NRW reduction activities (Presented by C/P team of GHAPWASCO and MCWW) - Progress and achievements of WDM activities (Presented by C/P team of SHAPWASCO) - Discussion	HCWW • Directors / Managers of HCWW • SHAPWASCO, GHAPWASCO and MCWW • Foreign aid organizations involved in water sectors in Egypt • JICA and JICA expert team	SHAPWASCO, GHAPWASCO and MCWW
23	28th August 2014, 10:00-14:00	Observation Tour for WDM Activity in SHAPWASCO	- Explanation of WDM system and outputs from the monitoring activities (Presented by C/P team of SHAPWASCO) - Site tour for WDM sites and equipment (Presented by C/P team of SHAPWASCO) - Discussion	• C/P team of GHAPWASCO • C/P team of MCWW • C/P team of SHAPWASCO • JICA expert team	SHAPWASCO

Source: JICA expert team

Table 9-4 List of Internal Workshops by Company

	Date	Title	Program	Attendance	Trainer
	April 2011 – January 2012 (Phase-1)				
1	21st September 2011, 9:30 to 12:00	Internal Workshop for Water Distribution Management (WDM)	- General explanation of the Project (Presented by JICA expert team) - General idea and policy for WDM activity in the Project (Presented by JICA expert team) - Outline of action plan for WDM (Presented by JICA expert team) - Activities done so far and selection of the pilot area for WDM activity by WDM team of SHAPWASCO (Presented by C/P team of SHAPWASCO)	• C/P team of SHAPWASCO • Engineers and operators in SHAPWASCO • JICA expert team	JICA expert team and each other of participants
	February 2012 – March 2013 (Phase-2)				
2	25th March 2012, 12:00-15:00	Internal Workshop for NRW reduction Activity in GHAPWASCO	- Presentation on water meter reading survey (Presented by JICA expert team) - Site tour in Tanta Markaz - Discussion	• C/P team of GHAPWASCO • JICA expert team	JICA expert team
3	27th March 2012, 12:00-15:00	Internal Workshop for NRW Reduction Activity in MCWW	- Presentation on water meter reading survey (Presented by JICA expert team) - Site tour in Shebeen El Kom Markaz - Discussion	• C/P team of MCWW • JICA expert team	JICA expert team
	April 2013 – April 2015 (Phase-3)				
4	24th-25th June 2013, 10:00-12:00	Internal Workshop for SOP Activity (Well Facility) in GHAPWASCO and MCWW	- Presentation on action policy in Phase-3 (Presented by JICA expert team) - Discussion	• C/P team of GHAPWASCO and MCWW • JICA expert team	JICA expert team
5	23rd September 2013, 10:00-12:30	1st Workshop for Five Years Plan for NRW Reduction Activity in MCWW	- Progress of Five Years Plan for NRW Reduction Activity (Presented by C/P team of MCWW) - Discussion	• NRW team of MCWW • NRW team of branches from MCWW	MCWW
6	30th September 2013, 10:00-14:00	Workshop for Five Years Plan for NRW Reduction Activity in GHAPWASCO	- Progress of Five Years Plan for NRW Reduction Activity (Presented by C/P team of GHAPWASCO) - Discussion	• NRW team of GHAPWASCO • NRW team of branches from GHAPWASCO	GHAPWASCO
7	24th November 2013,	2nd Workshop for Five	- Progress of Five Years Plan for NRW	• NRW team of MCWW	MCWW

	Date	Title	Program	Attendance	Trainer
	10:00-12:30	Years Plan for NRW Reduction Activity in MCWW	Reduction Activity (Presented by C/P team of MCWW) - Discussion	• NRW team of branches from MCWW	
8	1st-3rd, 8th-10th, 15th, 17th April 2014, 10:00 - 14:00	Internal Workshop for NRW Reduction Activities in MCWW	- Replacement of “Five Years Plan” with “One Year Plan” - Explanation and discussion of implementation process for each branch - Open discussion	• NRW department, C/P team, GIS department from Headquarter • 80 surveyors from all branches	MCWW HQ-C/P team
9	9th April 2014, 14:00 to 15:00	Internal Workshop for NRW Reduction Activities in MCWW	- Discussion on advantage and disadvantage between five years plan and one year plan	• NRW department, C/P team • Surveyors from branches under 5 years plan • JICA expert team	MCWW HQ-C/P team
10	4th June 2014, 10:00-15:00	Internal Workshop for SOP Activities	- SOP for filter back wash in SWTP	• C/P team of MCWW • JICA expert team (Local Expert)	MCWW HQ-C/P team
11	25th June 2014, 10:00-15:00	Internal Workshop for SOP Activities	- Expansion of SOP activities	• C/P team of GHAPWASCO • JICA expert team (Local Expert)	GHAPWASCO HQ-C/P team
12	7th July 2014, 10:00 - 12:00	Internal Workshop for SOP Activities	- Concept of the SOP in the water treatment plants	• C/P team of MCWW • JICA expert team (Local Expert)	MCWW HQ-C/P team
13	26th February 2015, 10:00 – 12:00	Internal Workshop for WDM Activities in SHAPWASCO	- Explanation of obtained results from WDM data and analysis. - Explanation to the WTP managers to utilize the existing ground reservoirs to cover the daily peak demand and keeping constant production.	SHAPWASCO • Chairman • Head of Technical Support Sector • Head of Northern Sector • Advisor • Zagazig WTP Manager • Manager of WDM Department • Engineer of WDM Department • Zagazig Networks Manager • Zeraa Wells Manager • Manager of Zagazig East • JICA expert team	Each other of participants
14	5th March 2015, 10:00 – 12:00	Internal Workshop for WDM Activities in SHAPWASCO	- Explanation of WDM system and outputs from the monitoring activities (Presented by C/P team of SHAPWASCO) - Site tour for WDM sites and equipment (Presented by C/P team of SHAPWASCO) - Discussion	• C/P team of SHAPWASCO • Engineers of Operators in Zagazig West • JICA expert team	SHAPWASCO

	Date	Title	Program	Attendance	Trainer
15	15th March 2015, 10:30 – 11:30	Workshop for Well Operators for WDM Activities in SHAPWASCO	- Explanation of WDM system and outputs from the monitoring activities (Presented by C/P team of SHAPWASCO) - Site tour for WDM sites and equipment (Presented by C/P team of SHAPWASCO) - Discussion	• C/P team of SHAPWASCO • Engineers of Operators in Zagazig Northern • JICA expert team	SHAPWASCO
16	16th March 2015, 10:30 – 11:30	Workshop for Well Operators for WDM Activities in SHAPWASCO	- Explanation of WDM system and outputs from the monitoring activities (Presented by C/P team of SHAPWASCO) - Site tour for WDM sites and equipment (Presented by C/P team of SHAPWASCO) - Discussion	• C/P team of SHAPWASCO • Engineers of Operators in Zagazig Southern • JICA expert team	SHAPWASCO

Source: JICA expert team

CHAPTER 10 TASK AND RECOMMENDATION

As mentioned in the Chapter 3 and the Chapter 8, the Project Purpose has been achieved. In addition, HCWW and the 3ACs are steadily taking steps toward the super goal, which is the dissemination of skills to the whole Nile Delta, by self-supporting effort. In order for the 3ACs to develop more operation and maintenance skills, following shall be tackled.

10.1 Common Task and Recommendation

Although described in Chapter 4, the common tasks for HCWW and the 3ACs are summarized below, including related recommendations to the tasks:

(1) Dissemination of Skills to the Nile Delta

HCWW and the 3ACs should disseminate the developed skills to the Nile Delta after expansion in the respective Governorate. The 3ACs have enough skills to offer the assistance to others.

Further systematic procedures, however, are recommended to be conducted under HCWW initiatives. To manage progress and to implement effectively the dissemination, targets and milestones are recommended to be proposed by HCWW as well as allocation of necessary budgets and technical assistances.

(2) Share of Information with NOPWASD

The requirements for design correction / modifications will be raised according to progress of disseminations of SOP, NRW reduction and WDM. Those are findings of users of facilities and to be reflected to design for the next facilities. Although HCWW has held meetings with NOPWASD periodically and as required, contents of the meetings are general matters for development policies, investment plan, etc. The meetings are not effective to discuss detail points of design. More effective system, therefore, should be established by HCWW with NOPWASD for information exchanges.

On the AC basis, the staff members of facilities should organize events at sites to explain the issues. It is able to be managed with Governorate branches of NOPWASD.

(3) Prompt Allocation of Budgets for Improvements

The 3ACs provided the necessary budgets for the pilot activities at model facilities / areas. Nevertheless, more budgets would be required when disseminating the activities in wider areas. It is an issue for the 3ACs to sustain the development of activity. Since the activities need repair / rehabilitation of facilities to recover the capacity and / or improve the metering devices, the budgets should be secured for a certain amount in advance by AC, not to manage (claim and approve) the budget per repair / per equipment and not to interrupt the improving activities.

The fiscal year of the Government of Egypt is from July to June. It is recommended, therefore,

that the 3ACs should prepare concrete activities plan and cost estimation by every January at least for the next fiscal year, and should start discussions for the plan with HCWW.

10.2 Task and Recommendation on SOP Activity

SOP shall be disseminated by mutual cooperation among HCWW and the 3ACs. The following are recommendations on SOP development and dissemination:

(1) Regular Workshop/ Seminar

It is indispensable for the continuous development of SOPs to disseminate the concepts of SOPs in daily and routine works. Regular workshops / seminars will be effective and help the continuity of the activities.

(2) Aging of Staff Members of Facilities

Average age of staff members of facilities in GHAPWASCO and MCWW is relatively high. It is concerned that the technical skills will not be succeeded to the next generation. In order to transfer the experience and knowledge of the existing staff members systematically, the regular recruitment of young generation is required.

(3) Management of Conditions of the Facilities

In order to utilize water treatment facilities effectively, the mechanical and electrical equipment shall be operated constantly. To do so, periodical maintenance is indispensable. Procurement schedules for spare parts also shall be prepared for sudden troubles / accidents.

(4) Periodical Calibration for Instrumentation Devices

One of the important activities of SOP is the management of operation efficiency based on the data. The data are measured and collected from instrumentation devices such as ultrasonic flow meter, electromagnetic flow meter, level meter, etc. In order to collect reliable and accurate data, the mentioned instrumentations should be calibrated precisely. Because the calibration is regulated by the international standard of ISO/IEC 17205, which is "General Requirements for the Competence of Testing and Calibration Laboratories", the periodical calibration for instrumentations shall be conducted according to the standard.

(5) Management and Utilization of As-Built Documents

As-Built documents such as design calculation, drawings, operation & equipment manuals, etc. are not arranged in any facilities in GHAPWASCO and MCWW. In addition, these were not handed over from NOPWASD or contactors. It is often unclear who has the documents.

Because As-Built documents are useful to operate and maintain the facilities, it is recommended to establish regulations or systems for proper and prompt delivery of the documents.

(6) Collaboration in AC

The water quality management activity in the Project was conducted by the collaboration of technicians, engineers and chemists. The collaboration led the Project to success. Establishment of the sustainable cooperation system among technician, engineer and chemist is required in SOP department.

10.3 Task and Recommendation on NRW Reduction Activity

In order to expand the NRW reduction activity to the whole Nile Delta, it is important to share successful practice and results. The following are recommendations to develop NRW reduction and disseminate the activities:

(1) Rules and Regulations for Plumbing

There are four (4) pillars to reduce NRW, 1) active leak detection, 2) speed and quality of repair, 3) pressure management, and 4) asset management. In the Project, the active leak detection survey has been mainly conducted in each model area. The speed and quality of repair is the next issue for the 2ACs. Some leaks have been still repaired by rubber band wrapping around the leak points. It is necessary to establish the standards, rules and regulations for plumbing and repair. It should include the excavation methods such as soil backfilling and tampering to prevent the leakage.

(2) Water Meter Ownership

The Project team found a lot of water meters with low accuracy, non-working and not-clear in the Project. A lot of meters should be replaced promptly. Meanwhile, the meters belong to customers in the current system for the property. It is, therefore, not easy for ACs to replace the water meters by their decision. And it is an obstacle for periodical replacement. It is recommended to change the ownership from the customers to ACs through new regulations or legislations. The replacement of meters will lead to accurate measurement of consumption and NRW.

(3) Collaboration of ACs

The cooperation between the HQ and the branch office members will bring further effects for the expansion of NRW reduction. The NRW reduction activity, furthermore, is expected to be expanded to the Nile Delta under the cooperative framework of the 3ACs. It will not be realized without the cooperation of the 3ACs. For the purpose to achieve the super goal, HCWW needs to take the initiatives for establishment of the following three (3) technical working groups, (hereinafter TWG), together with ACs to introduce rules and regulations based on the present conditions.

1. Plumbing management group: It is a TWG responsible for pipeline construction and repair methods, installation method of water meters and GIS update system.

2. Water tariff collection system group: It is a TWG responsible for water meter and water tariff collection system. They pay attentions for internal leaks in houses / flats and the leaks of float valve in toilet, and recommend necessary measures to plumbing management group. They also check the appropriate implementation of leak detection survey at the time of water meter reading. The water meter reading should be done with GIS data, and check if the GIS is updated properly.
3. Leak detection survey group: It is a TWG responsible for progress management of the leak detection survey and analysis to remove the causes of leaks. They also watch the volume of consumption and conditions of water meters at the time of house connection survey. The house connection survey should be done with GIS data, and check if the GIS is updated properly.

HCWW is able to take a leading organization to make rules and regulations through the three (3) technical working groups. This kind of involvement of HCWW to make rules and regulations, and the commitment as an organization, will accelerate the dissemination of the NRW reduction activity to the Nile Delta.

10.4 Task and Recommendation on WDM Activity

The following are tasks and recommendations for WDM. They are general ones but all contents are applicable for the development of SHAPWASCO in WDM.

(1) Rehabilitation of Facilities

In the pilot project, the Project team instructed the water treatment plant and wells to increase the distribution flows, according to the monitored data for the network pressure. The plant and wells are not able to response often to the increasing orders of flows due to unforeseen repair and maintenance of pumping equipment. The facilities should be maintained always to perform 100% of the design capacity. It is a base of the WDM.

(2) Distribution Capacity

The staff members of ACs evaluate often the distribution capacity by annual average or daily maximum supply, which is the design capacity of the treatment process. However, the hourly maximum demand is much higher than ones for average and daily maximum.

The Project team found the shortage of capacity for distribution in Zagazig City for peak hours. The water is not able to cover the city in the peak hours and it will not be solved by the operation of pumps and valves. It is recommended to check the distribution capacity before and in parallel of WDM.

(3) Capacity of Water Reservoir

As described in 10.5, the capacity of water reservoir is small. In case for Zagazig City, it is around for four (4) hours. Accordingly, the plant produces (treats) the water at the same rate of distribution flow. It is inappropriate and not effective for utilization of treatment plant. As the plant has excessive capacity in the early morning, the produced water should be stored in the reservoir and distributed in daytime. It will realize the more distribution capacity than the production (treatment) capacity.

In the Japanese Guideline, the storage capacity is for 12 hours. It is ideal but 8 hours storage is recommended at least.

(4) Block Management

Block management is the beginning of WDM. It is, however, sometimes difficult to divide the network into several blocks. Most of capital cities of Governorates are old and have been developed randomly for the urbanized area, and the water distribution networks also expanded randomly to connect pipelines to the network at the moment. Accordingly, the pipelines form one big network.

It is recommended to divide the network into several blocks and construct exclusive transmission lines per block. It will realize the demand calculation and flow management per block.

(5) Maintenance of Monitoring System

The monitoring system is one of complicated IT networks. Not only maintenance of metering devices but also system maintenance including software-upgrade is required. To realize it, the maintenance contract may be necessary with a system provider. The budget for such contract should be secured in the operation stage.

10.5 Recommendation for Improvement of Design of Facilities

SOP activity aims at improving water treatment efficiency by appropriate operation of facilities in accordance with design concepts. The water treatment efficiency was improved in the model facilities through the technical transfers, which include SOP activities such as P&ID, single line diagram, O&M manuals and operation record, and OJT based application of the above document.

However, points to be improved on facility design have been drawn out during the activities. Operation efficiency would be more, if the facilities were constructed by proper design for water treatment. Accordingly, the Project team proposes hereinafter the issues for design of water treatment facility.

- **Current Situation on Water Works Facility Plan & Design**

Various points and items to be improved on the facility design were found through the SOP activities in the Project. Especially in the iron and manganese removal plant in MCWW, the iron

and manganese removal process at Gezy is too complicated and excessive in treatment process. As an example, the oxidization process of iron and manganese consists of aeration and chemical treatments although soluble iron and manganese is oxidized enough in raw water. In addition, the pumping head of the well pump is too large for the requirement, so that the electricity is costly. The mentioned points are also found in other water treatment facilities. Points to be improved on the facility design are summarized in Table 10-1.

Furthermore, in the above iron and manganese removal facility, any documents mentioning operation concepts are not handed over. In addition, the operation and maintenance methods were not instructed enough by the contractor before handing over the facility. Accordingly, the facility may be operated without information of optimal method planned by a facility designer. Not only facility design but also handing over condition should be improved in the future.

- **Recommendation**

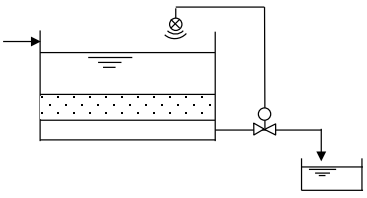
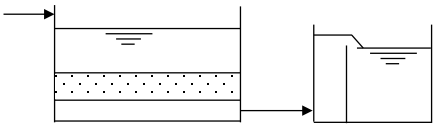
NOPWASD employs highly-skilled designers for the water treatment facility. However, they have few chances to become aware of points to be improved on facility operation and maintenance because the operation and maintenance for the facility is managed by an AC of HCWW. Accordingly, similar problems regarding facility design are found in several facilities. In order to plan and design optimal water treatment facilities, it is important to review the design relevancy by users' opinions (staffs of facility). It contributes to further improvements of design.

Because C/P teams of GHAPWASCO and MCWW are aware of some issues on the facility designs through the Project activity, they should initiate the exchanges of idea and opinions with NOPWASD. The periodical technical exchanges among the ACs and NOPWASD will contribute to optimal water treatment facilities in design, operation and maintenance in the future.

Table 10-1 Issues on the Facility Design to be Improved

No.	Objective Facility	Issues on the Facility Design to be Improved
1	Iron and Manganese Removal Plant	1) Reexamination of the Specification of Well Pump (Gezy IMRP) In Gezy IMRP, pumping head for the well pump is too large for the requirement. It was probably designed to supply the water directly from the well to water network. However, it is unnecessary because all the in-taken raw water should be treated, and a smaller pump is enough to transmit the water to the treatment plant. This situation causes the high consumption of electricity. Specification of Well Pump Current Spec. : 25 L/sec x 90m Proper Spec. : 25 L/sec x 15-20m
		2) Review of Water Treatment Process (Gezy IMRP) Several iron and manganese removal Plants, which are in similar design to Gezy IMRP, are under the construction or have been completed in construction. Iron and manganese concentration in the well water of Gezy IMRP is 2-3 mg/L for iron and 1 mg/L for manganese. For Kafr El batanon IMRP, which is located in Shebeen El Kom Markaz, the concentration is 0.7-1 mg/L for iron and 0.4 mg/L for manganese. According to the mentioned concentration, it is deemed that the iron and manganese treatment process in Gezy and Kafr El batanon is too complicated and excessive in

<table>
<tr><th>No.</th><th>Objective Facility</th><th>Issues on the Facility Design to be Improved</th></tr>
<tr><td></td><td></td><td>treatment process. The facility to be constructed in the future, should be appropriate in water treatment process taking into consideration the raw water quality in a well, in order to reduce costs for construction, operation and maintenance.</td></tr>
<tr><td></td><td></td><td><u>3) Sludge recirculation (Gezy IMRP)</u>
Sludge recirculation system from the sludge tank to the react chamber is introduced in Gezy IMRP. However, water is purified by chemical reaction in treatment process, and the recirculated sludge may not contribute to the treatment. Sludge recirculation system may be unnecessary. Sludge recirculation system, therefore, should be reexamined in future designs, in accordance with the trial results in Gezy.</td></tr>
<tr><td></td><td></td><td><u>4) Reexamination of Backwash Method (Gezy IMRP/Mahalet Marhoom IMRP)</u>
Elevated tank is built in most of IMRPs. Although the backwash water for sand filters is conducted by an exclusive pump in the current design, the pump is not necessary. The elevated tank is able to be utilized instead. The necessity of the pump should be reexamined.</td></tr>
<tr><td></td><td></td><td><u>5) Modification of the Installation Level for Drain Pipe (Gezy IMRP)</u>
Installation level of a drain pipe for the aeration tank, react chamber and sedimentation tank is more than 10 cm from the bottom slab in the current design. In order to drain the water completely in the periodical cleaning of tanks, the installation level should be less than the current ones.</td></tr>
<tr><td>2</td><td>Surface Water Treatment Plant</td><td><u>1) Filtration Flow Control (Tanta El Teraa El Melahia SWTP/ Mahatet El Sadat El Satheya SWTP)</u>
As filtration flow control system, the level control method is introduced in most of surface water treatment plants of GHAPWASCO and MCWW. This control system is complicated for mechanism, and it is often not utilized properly due to the malfunction of level meter and program trouble of PLC (programmable logic controller). The natural balance method is sufficient for requirement and recommended.</td></tr>
<tr><td></td><td></td><td><u>2) Drainage Recirculation System (Mahatet El Sadat El Satheya SWTP)</u></td></tr>
</table>

Item	Level Control Method	Natural Balance Method
		
Flow Control	In order to maintain a constant filtration rate, signal for surface water level of a filter, which is detected by an electrical level meter, is transmitted to treated water flow control system through the PLC unit. Treated water flow control valve adjusts the opening rate according to the calculation result in PLC unit.	In order to maintain a constant filtration rate, overflow weir is installed at higher level than sand level of a filter.
Feature	Control mechanism is complicated, and the periodical maintenance by manufacturer is required.	Filtration structure is simple. It is easy to maintain a constant rate filtration without any complicated mechanism.

No.	Objective Facility	Issues on the Facility Design to be Improved
		Drained water recirculation system in Mahatet El Sadat El Satheya SWTP redelivers the water, which is drained by drying beds and backwash system, from the dressing tank to the distribution chamber. In order to establish proper recirculation system, the drained water should be separated from sludge in the dressing tank, and only the water should be redelivered to the distribution chamber. However, in the current system, water is redelivered by the pump installed near the bottom slab of the dressing tank. Accordingly, effective recirculation system is a bit difficult because a lot of suspended solids contained in the water. In case that drainage recirculation system is planned in other facilities, a recirculation pump for the water and a drain pump of sludge should be separately installed.
		3) Storage Capacity of Clear Water Reservoir (Tanta El Teraa El Melahia SWTP/ Mahatet El Sadat El Satheya SWTP) The Clear water reservoir requires the function to absorb hourly fluctuations of water demand if no water reservoir is installed in the service area. "Design Criteria for Waterworks Facilities" published by JWWA (Japan Water Works Association) mentions that the water reservoir should have the storage capacity for 12 hours for the design daily maximum water demand. However, the storage capacity in the model facility in both GHAPWASCO and MCWW is approximately 3.5-5 hours. Accordingly facility operations have to be minutely controlled depending on the fluctuation of water demand. Reservoirs should be designed for enough capacity in hourly fluctuations.

Source: JICA expert team

Attachment

1. Record of Discussion
2. Minutes of Meeting for Inception Report
3. Minutes of Meeting for the Joint Coordinating Committee (JCC) Meeting
4. Minutes of Meeting for the Steering Committee (SC) Meeting
5. Minutes of Meeting of Project Team Meetings (PTM)
6. Minutes of Meeting for WDM activity
7. Minutes of Meeting for Mid-Term Review
8. Minutes of Meeting for Terminal Evaluation Study
9. Minutes of Meeting for Terminal Evaluation for the Extended Term Study

Attachment-1 Record of Discussion

RECORD OF DISCUSSIONS
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND AUTHORITIES CONCERNED OF THE GOVERNMENT OF
THE ARAB REPUBLIC OF EGYPT
ON JAPANESE TECHNICAL COOPERATION
FOR
THE PROJECT FOR IMPROVEMENT OF
MANAGEMENT CAPACITY OF OPERATION AND MAINTENANCE FOR
WATER SUPPLY FACILITIES IN NILE DELTA AREA

Japan International Cooperation Agency (hereinafter referred to as "JICA") and Egyptian authorities concerned worked out the details of the technical cooperation program concerning the Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area in the Arab Republic of Egypt.

JICA exchanged views and had a series of discussions with Egyptian authorities concerned with respect to desirable measures to be taken by JICA and the Government of the Arab Republic of Egypt for the successful implementation of the above-mentioned Project.

As a result of the discussions, and in accordance with the provisions of the Agreement on Technical Cooperation between the Government of Japan and the Government of the Arab Republic of Egypt, signed in Cairo on June 15, 1983 (hereinafter referred to as "the Agreement"), JICA and Egyptian authorities concerned agreed on the matters referred to in the document attached hereto.

Cairo, 19th August, 2010

Mr. Nobuhiro Ikuro
Chief Representative,
Egypt Office,
Japan International Cooperation Agency,
Japan

Dr. Abd El Kawi Khalifa
Chairman,
Holding Company for Water and Wastewater,
The Arab Republic of Egypt

Mr. Ibrahim Amasha
Chairman,
Sharkiya Potable Water and
Sanitation Company,
The Arab Republic of Egypt

Mr. Mohamed Osman Beshta
Chairman,
Gharbia Potable Water and
Sanitation Company,
The Arab Republic of Egypt

Mr. Ayman Abd Alkader Mahmoud
Chairman,
Minufia Potable Water and
Sanitation Company,
The Arab Republic of Egypt

HOLDING COMPANY FOR WATER AND WASTEWATER

A1-1

THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN JICA AND THE GOVERNMENT OF THE ARAB REPUBLIC OF EGYPT

1. The Government of the Arab Republic of Egypt will implement the Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area (hereinafter referred to as "the Project") in cooperation with JICA.

2. The Project will be implemented in accordance with the Master Plan which is given in Annex I.

II. MEASURES TO BE TAKEN BY JICA

In accordance with the laws and regulations in force in Japan and the provisions of the Article III of the Agreement, JICA, as the executing agency for technical cooperation by the Government of Japan, will take, at its own expense, the following measures according to the normal procedures of its technical cooperation scheme.

1. DISPATCH OF JAPANESE EXPERTS

JICA will provide the services of the Japanese experts as listed in Annex II. The provision of Article IV, V and VI of the Agreement will be applied to the above-mentioned experts.

2. PROVISION OF MACHINERY AND EQUIPMENT

JICA will provide such machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in Annex III. The provision of Article VII of the Agreement will be applied to the Equipment.

3. TRAINING OF EGYPTIAN PERSONNEL IN JAPAN

JICA will receive the Egyptian personnel connected with the Project for technical training in Japan.

HOLDING COMPANY FOR WATER AND WASTEWATER

III. MEASURES TO BE TAKEN BY THE GOVERNMENT OF THE ARAB REPUBLIC OF EGYPT

1. The Government of the Arab Republic of Egypt will take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and after the period of Japanese technical cooperation, through full and active involvement in the Project by all related authorities, beneficiary groups and institutions.

2. In accordance with the provision of Article III of the Agreement, the Government of the Arab Republic of Egypt will ensure that the technologies and knowledge acquired by the Egyptian nationals as a result of Japanese technical cooperation will contribute to the economic and social development of the Arab Republic of Egypt.

3. In accordance with the provision of Article IV, V and VI of the Agreement, the Government of the Arab Republic of Egypt will grant in the Arab Republic of Egypt privileges, exemptions and benefits to the Japanese experts referred to in II-1 above and their families.

4. In accordance with the provisions of Article VII of the Agreement, the Government of the Arab Republic of Egypt will take the measures necessary to receive and use the Equipment provided by JICA under II-2 above and equipment, machinery and materials carried in by the Japanese experts referred to in II-1 above.

5. The Government of the Arab Republic of Egypt will take necessary measures to ensure that the knowledge and experience acquired by the Egyptian personnel from technical training in Japan will be utilized effectively in the implementation of the Project.

6. In accordance with the provision of Article IV-(b) of the Agreement, the Government of the Arab Republic of Egypt will provide the services of the Egyptian counterpart personnel of the Project and administrative personnel as listed in ANNEX IV.

7. In accordance with the provision of Article IV-(a) of the Agreement, the Government of the Arab Republic of Egypt will provide the building and facilities necessary for the Project as listed in ANNEX V.

A1-2

8. In accordance with the laws and regulations in force in the Arab Republic of Egypt, the Government of the Arab Republic of Egypt will take necessary measures to supply or replace at its own expense machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment provided by JICA under II-2 above.

9. In accordance with the laws and regulations in force in the Arab Republic of Egypt, the Government of the Arab Republic of Egypt will take necessary measures to meet the running expenses necessary for the implementation of the Project.

IV. ADMINISTRATION OF THE PROJECT

1. Chairman of the Holding Company for Water and Wastewater (hereinafter referred to as "HCWW") as the Project Director, will bear overall responsibility for the administration of the Project.

2. Head of Projects Sector of HCWW as the Project Manager will be responsible for the managerial matters of the Project.

3. Chairman of Sharkiya Potable Water and Sanitation Company (hereinafter referred to as "SHAPWASCO"), Chairman of Gharbia Potable Water and Sanitation Company (hereinafter referred to as "GAPWASCO") and Chairman of Minufia Potable Water and Sanitation Company (hereinafter referred to as "MUPWASCO") as the Project Co-Manager, will be responsible for technical matters and day-to-day implementation of the Project. In case the Adjunct Member who is responsible for the day-to-day management of the company is assigned, he or she will also be appointed as the Project Co-Manager on behalf of each Chairman.

4. The Japanese Team Leader will provide necessary recommendations and advice to the Project Director and the Project Manager on any matters pertaining to the implementation of the Project.

5. The Japanese experts will give necessary technical guidance and advice to the Egyptian counterpart personnel on technical matters pertaining to the implementation of the Project.

6. For the effective and successful implementation of technical cooperation for the Project, Joint Coordinating Committee (hereinafter referred to as "JCC") and Steering Committee will be established whose functions and composition are described in Annex VI and VII.

V. JOINT EVALUATION

Evaluation of the Project will be conducted jointly by JICA and the Egyptian authorities concerned, at the middle and during the last six months of the cooperation term in order to examine the level of achievement.

VI. CLAIMS AGAINST JAPANESE EXPERTS

In accordance of the provision of Article VI of the Agreement, the Government of the Arab Republic of Egypt undertakes to bear claims, if any arises, against the Japanese experts engaged in technical cooperation for the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Arab Republic of Egypt except for those arising from the willful misconduct or gross negligence of the Japanese experts.

A1-3

VII. MUTUAL CONSULTATION

There will be mutual consultation between JICA and the Government of the Arab Republic of Egypt on any major issues arising from, or in connection with this Attached Document.

VIII. MESURES TO PROMOTE UNDERSTANDING OF AND SUPPORT FOR THE PROJECT

For the purpose of promoting support for the Project among the people of the Arab Republic of Egypt, the Government of the Arab Republic of Egypt will take appropriate measures to make the Project widely known to the people of the Arab Republic of Egypt.

IX. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be three (3) years from the date when the expert team arrives.

ANNEX I MASTER PLAN

1. Title of the Project

The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area

2. Super Goal

Management capacity of operation and maintenance of water supply facilities is improved in Nile Delta Area

3. Overall Goal

Management capacity of operation and maintenance of water supply facilities is improved in Sharkiya, Gharbia and Minufia Governorates

4. Project Purpose

Management capacity of operation and maintenance of water supply facilities is improved at the model areas/facilities in Sharkiya, Gharbia and Minufia Governorates

5. Outputs

1) Human Resource Development through collaboration among water supply companies in Sharkiya, Gharbia and Minufia Governorates is strengthened
2) Standard Operational Procedures (SOPs) are developed and utilized based on the experiences of SHAPWASCO at the model facilities in Gharbia and Minufia Governorates
3) The institutional skills and experiences of SHAPWASCO for Non-Revenue Water (NRW) reduction are transferred to NRW teams at the model areas in Gharbia and Minufia Governorates
4) The water distribution management capacity is improved in Sharkiya Governorate as an advanced model
0) The project is managed and coordinated properly

6. Activities

1) **Human Resource Development through collaboration among water supply companies in Sharkiya, Gharbia and Minufia Governorates is strengthened**

1-1 Conduct management training for the top management
1-2 Conduct Training of Trainers (TOT) for developing SOP
1-3 Conduct TOT for NRW reduction
1-4 Disseminate the contents, the manners and the results of the collaboration among SHAPWASCO, GAPWASCO and MUPWASCO to the water supply companies in Nile Delta Area through reports and workshops

2) **SOPs are developed and utilized based on the experiences of SHAPWASCO at the model facilities in Gharbia and Minufia Governorates**

2-1 Survey the current conditions of water supply facilities in Gharbia and Minufia Governorates
2-2 Select 3 model facilities in Gharbia and Minufia Governorates
2-3 Organize SOP teams
2-4 Conduct training for developing and applying SOPs at the facilities of Sharkiya Governorate
2-5 Revise SOPs of Sharkiya Governorate, if necessary
2-6 Develop SOPs for model facilities in Gharbia and Minufia Governorates based on SOPs for SHAPWASCO
2-7 Conduct On-the-Job Training for GAPWASCO and MUPWASCO to apply SOPs in operation and maintenance
2-8 Monitor the progress of SOP activities
2-9 Draft the policy/plan for disseminating SOP to the other Marakazes

3) **The institutional skills and experiences of SHAPWASCO for NRW reduction are transferred to NRW teams at the model areas in Gharbia and Minufia Governorates**

3-1 Analyze the current situation on NRW in Gharbia and Minufia Governorates
3-2 Select 3 model areas for NRW reduction
3-3 Organize NRW reduction teams
3-4 Formulate an action plan for NRW reduction activities based on the action plan for SHAPWASCO
3-5 Conduct training at Mostrod Training Center
3-6 Conduct training at the training yard in Sharkiya Governorate
3-7 Conduct training at model areas for water distribution management in Sharkiya Governorate

3-8 Prepare Geographical Information System (GIS) drawing for model areas in Gharbia and Minufia Governorates

3-9 Make water balance analysis at model areas

3-10 Conduct leakage detection survey at model areas

3-11 Make water balance analysis after repair works

3-12 Draft policy/plan for disseminating NRW reduction activities to the other Marakazes

4) The water distribution management capacity is improved in Sharkiya Governorate as an advanced model

4-1 Discuss methods and conduct survey for water distribution management

4-2 Conduct training for water distribution management

4-3 Formulate a plan for water distribution management

4-4 Install the equipment for water distribution management at the model area

4-5 Operate the system

4-6 Develop SOP for water distribution management

4-7 Evaluate the operation and SOP for water distribution management

0) The project is managed and coordinated properly

0-1 Establish Steering Committee, consisting of representative of HCWW, SHAPWASCO, GAPWASCO and MUPWASCO

0-2 Discuss the contents, the manners for the cooperation among SHAPWASCO, GAPWASCO and MUPWASCO through the Steering Committee

0-3 Organize Joint Coordinating Committee (JCC) at least once a year

0-4 Finalize the Indicators of the Project Design Matrix (PDM) for approval of the first JCC

0-5 Prepare a draft Annual Plan of Operations (APO) based on the Plan of Operations (PO) for approval of the first JCC

0-6 Monitor the progress of PO/APO and achievement of the Indicators of the PDM

ANNEX II LIST OF JAPANESE EXPERTS

1. Fields of Experts

1) Chief advisor/water supply planning
2) NRW reduction management
3) Leakage detection
4) Water treatment
5) Water quality
6) Electrical equipment
7) Mechanical equipment
8) Distribution network
9) Others (if necessary)

ANNEX III LIST OF MACHINERY AND EQUIPMENT

1. Machinery, equipment, tools and materials for NRW reduction and reinforcement of capacity of operation and maintenance for water supply facilities, as well as the machinery, equipment, tools and materials for water distribution management.

2. Other machinery, equipment and materials regarded as necessary for effective implementation of the Project by both sides.

Note:

1. The above mentioned equipment is limited to the equipment necessary for the transfer of technology by the Japanese experts.

2. The detailed specification of the above items will be decided through mutual consultations based on the annual plan of the Project, within the allocated budget of the Japanese fiscal year (start in April and end in March).

3. These machinery and equipment to be procured should be properly utilized and well maintained during and after the project period.

ANNEX IV LIST OF EGYPTIAN COUNTERPART AND ADMINISTRATIVE PERSONNEL

1. Project Director

Chairman, HCWW

2. Project Manager

Head of Projects Sector, HCWW

3. Project Co-Manager

a. Chairman, SHAPWASCO
b. Chairman, GAPWASCO
c. Chairman, MUPWASCO

4. Project Personnel

1) SHAPWASCO

a. Chairman
b. Staff in charge of NRW reduction at headquarter
c. Engineers and technicians, NRW team at selected branch
d. Staff in charge SOP at headquarter
e. Engineers and operators, SOP team at selected branch
f. Staff in charge of water distribution management at headquarter
g. Engineers and operators, water distribution management team at selected branch

2) GAPWASCO

a. Chairman
b. Engineers and technicians nominated for NRW teams
c. Engineers and operators nominated for SOP teams

3) MUPWASCO

a. Chairman
b. Engineers and technicians nominated for NRW teams
c. Engineers and operators nominated for SOP teams

Note:

1. The Project Director will bear overall responsibility for administration of the Project. The Project Manager will be responsible for the managerial matters. The Project Co-Managers will be responsible for technical matters as well as day-to-day implementation of the Project.

2. Counterpart personnel will be added as the need arises for the smooth and effective implementation of the Project.

3. In case the Adjunct Member who is responsible for the day-to-day management of the company is assigned, he or she will also be appointed as the Project Co-Manager on behalf of the Chairman.

A1-7

ANNEX V LIST OF BUILDINGS AND FACILITIES

1. Office space and facilities for the Japanese experts in SHAPWASCO, GAPWASCO and MUPWASCO

2. Rooms and facilities necessary for installation and storage of the equipment

3. Workshop and meeting rooms for the training

4. Other facilities mutually agreed upon as necessary

ANNEX VI JOINT COORDINATING COMMITTEE

1. Functions

The Joint Coordinating Committee will meet at least once in a year in order to fulfill the following functions:

1) To review the progress of the annual work plan;
2) To review and exchange opinions on major issues that may arise during the implementation of the Project;
3) To discuss any other issue(s) pertinent to the smooth implementation of the Project.

2. Composition

1) Chairperson:

Chairman, HCWW

2) Members of the Egyptian Side:

a. Head of Projects Sector, HCWW
b. Chairman, SHAPWASCO
c. Chairman, GAPWASCO
d. Chairman, MUPWASCO
e. Representative, Sharkiya Governorate
f. Representative, Gharbia Governorate
g. Representative, Minufia Governorate
h. Other personnel as required

3) Members of the Japanese Side:

a. Chief Representative, JICA Egypt Office
b. JICA Experts
c. Other personnel concerned, to be assigned by JICA, if necessary

Note:

1. Official(s) of the Embassy of Japan in the Arab Republic of Egypt may attend as observer(s).
2. In case the Adjunct Member who is responsible for the day-to-day management of the company is assigned, he or she can participate in the Joint Coordinating Committee on behalf of the Chairman.

ANNEX VII STEERING COMMITTEE

1. Functions

The Steering Committee will be organized in order to monitor/coordinate entire activities of the Project, and will be held whenever the necessity arises.

2. Composition

1) Chairperson:

Head of Projects Sector, HCWW

2) Members of the Egyptian Side:

a. Representative, HCWW
b. Chairman, SHAPWASCO
c. Chairman, GAPWASCO
d. Chairman, MUPWASCO
e. Other personnel as required

3) Members of the Japanese Side:

JICA Experts

Note:

In case the Adjunct Member who is responsible for the day-to-day management of the company is assigned, he or she can participate in the Steering Committee on behalf of the Chairman.

AMENDMET OF RECORD OF DISCUSSIONS

BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY AND AUTHORITIES CONCERNED OF THE GOVERNMENT OF THE ARAB REPUBLIC OF EGYPT ON JAPANESE TECHNICAL COOPERATION

FOR

THE PROJECT FOR IMPROVEMENT OF MANAGEMENT CAPACITY OF OPERATION AND MAINTENANCE FOR WATER SUPPLY FACILITIES IN NILE DELTA AREA

Cairo, 19 December, 2013

Mr. Hideki Matsunaga
Chief Representative,
Egypt Office,
Japan International Cooperation Agency,
Japan

Mr. Mamdouh Raslan
Chairman,
Holding Company for Water and Wastewater,
The Arab Republic of Egypt

Ahmed Abdeen

Mr. Ahmed Abdeen

Chairman,
Sharkiya Potable Water and Sanitation Company,
The Arab Republic of Egypt

Ayman abd elKader

Mr. Ayman Abd Alkader Mahmoud
Chairman,
Gharbia Potable Water and Sanitation Company,
The Arab Republic of Egypt

EZZAT ELSAYAD

Mr. Ezzat El Sayad

Chairman,
Minufia Potable Water and Sanitation Company,
The Arab Republic of Egypt

A1-9

AMENDMENT OF RECORD OF DISCUSSIONS

THIS AMENDMENT OF RECORD OF DISCUSSIONS, made and entered into on this 19 December, 2013 by and between the Japan International Cooperation Agency (hereinafter referred to as "JICA") and authorities concerned of the government of the Arab Republic of Egypt (hereinafter referred to as "Egyptian authorities") as the amendment of the original Record of Discussions on Japanese Technical Cooperation for the Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta (hereinafter referred to as "the Project").

WITNESSETH

NOW, THEREFORE, the parties hereto hereby agree as follows:

1. "Article IV ADMINISTRATION OF THE PROJECT" , "ANNEX IV LIST OF EGYPTIAN COUNTERPART AND ADMINISTRATIVE PERSONNEL", "ANNEX VI JOINT COORDINATING COMMITTEE" and "ANNEX VII STEERING COMMITTEE" in the original R/D shall be amended as follows;

   The words "Head of Projects Sector of HCWW" shall be deleted and "Vice Chairman of HCWW" shall be substituted in lieu thereof.

2. "Article IX. TERM OF COOPERATION" in the original R/D shall be amended as follows;

   The words "three (3) years" shall be deleted and "three (3) years and five (5) months" shall be substituted in lieu thereof.

3. All the other articles of the original record of discussion shall remain unchanged.

IN WITNESS WHEREOF, the parties hereto have caused this Amendment of Record of Discussions to be signed, as of the day and year first above written, in their respective names in duplicate, each party retaining one (1) copy thereof.

ABDEEN

(End)

E.E.
Ayman

SECOND AMENDMENT OF RECORD OF DISCUSSIONS

BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY AND AUTHORITIES CONCERNED OF THE GOVERNMENT OF THE ARAB REPUBLIC OF EGYPT ON JAPANESE TECHNICAL COOPERATION

FOR

THE PROJECT FOR IMPROVEMENT OF MANAGEMENT CAPACITY OF OPERATION AND MAINTENANCE FOR WATER SUPPLY FACILITIES IN NILE DELTA AREA

Cairo, 22th June , 2014

for

Mr. Hideki Matsunaga
Chief Representative,
Egypt Office,
Japan International Cooperation Agency,
Japan

Mr. Mamdouh Raslan
Chairman,
Holding Company for Water and Wastewater,
The Arab Republic of Egypt

AMENDMENT OF RECORD OF DISCUSSIONS

THIS AMENDMENT OF RECORD OF DISCUSSIONS, made and entered into on this 22 June, 2014 by and between the Japan International Cooperation Agency (hereinafter referred to as "JICA") and authorities concerned of the government of the Arab Republic of Egypt (hereinafter referred to as "Egyptian authorities") as the amendment of the Record of Discussions on Japanese Technical Cooperation for the Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta (hereinafter referred to as "the Project").

WITNESSETH

NOW, THEREFORE, the parties hereto hereby agree as follows:

"Article IX. TERM OF COOPERATION" in the original R/D shall be amended as follows;

The words "three (3) years and five (5) months" shall be deleted and "four (4) years and one (1) month" shall be substituted in lieu thereof.

All the other articles of the original record of discussion shall remain unchanged.

IN WITNESS WHEREOF, the parties hereto have caused this Amendment of Record of Discussions to be signed, as of the day and year first above written, in their respective names in duplicate, each party retaining one (1) copy thereof.

(End)

Attachment-2 Minutes of Meeting for Inception Report

Minutes of Meeting
on
Inception Report
for
The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area

Cairo, 25th of May 2011

Mr. El Sayed Nasr	Dr. Salah Bayoumi	Mr. Katsumi Fujii
Project Director	Project Manager	Chief Advisor
Chairman	Head of Project Sector	The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area,
Holding Company for Water and Wastewater (HCWW)	Holding Company for Water and Wastewater (HCWW)	Japan International Coopcration Agency (JICA)

Mr. Ahmed Abdeen	Mr. Ayman Abd El Kader	Mr. Mohamed Abu El Khair
Project Co-Manager	Project Co-Manager	Project Co-Manager
Chairman	Chairman	Chairman
Sharkiya Potable Water and Sanitation Company (SHAPWASCO)	Gharbia Potable Water and Sanitation Company (GHAPWASCO)	Minufia Company for Water and Wastewater (MCWW)

A2-1

Upon the commencement of the Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area (hereinafter referred to as "the Project"), Japan International Cooperation Agency (hereinafter referred to as JICA) expert team (hereinafter referred to as JET) headed by Mr. Katsumi Fujii, Chief Advisor of the Project, submitted an inception report (hereinafter referred to as IC/R). Concerned parties, which are shown on the cover page, discussed implementation plan of the Project from the 16th to 25th of May 2011 based on the presented IC/R. The all concerned parties agreed basically to the IC/R and prepared this document for confirmation.

The major points of discussion and agreement are summarized as follows:

1. Confirmation of Purpose and Schedule of the Project

All parties confirmed purpose and schedule of the Project as shown in Attachment-2 (Project Design Matrix: PDM) and Attachment-3 (Plan of Operation: PO), which are prepared based on Record of Discussion (hereinafter referred to as R/D) and Minutes of Meetings (hereinafter referred to as M/M) signed on the 19th of August 2010 between JICA and the Egyptian sides. All parties confirmed that contents of the mentioned R/D and M/M compose a base of the Project.

2. Names and Abbreviations of Companies

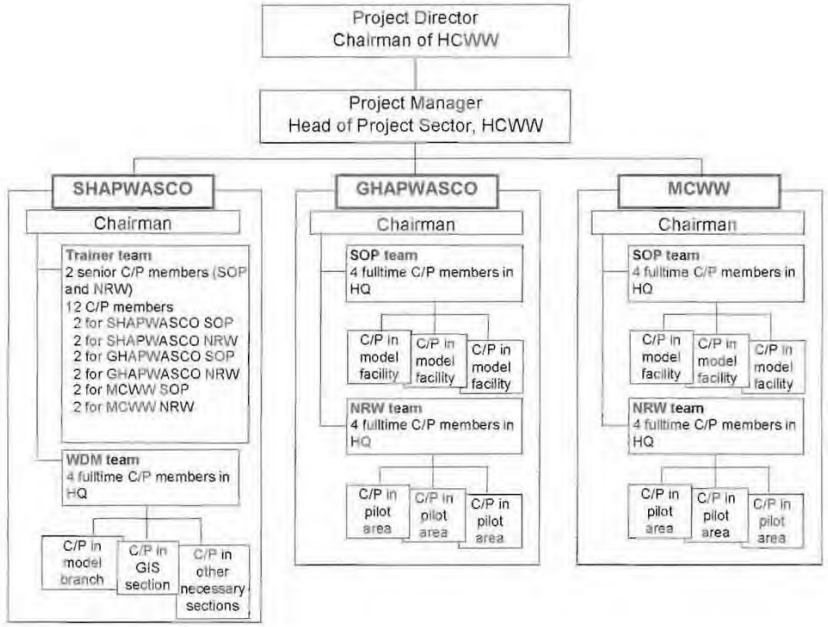
All parties confirmed that the following names and abbreviations should be used, instead of ones described in R/D:

Description in R/D	To be used
Gharbia Potable Water and Sanitation Company (GAPWASCO)	Gharbia Potable Water and Sanitation Company **(GHAPWASCO)**
Minufia Potable Water and Sanitation Company (MUPWASCO)	**Minufia Company for Water and Wastewater (MCWW)**

3. Organization of the Project

All parties confirmed that the Egyptian side will establish the following counterpart (hereinafter referred to as C/P) organization:

1) Project Director: Chairman of HCWW
2) Project Manager: Head of Project Sector, HCWW
3) Project Co-Managers: Chairmen of SHAPWASCO, GHAPWASCO and MCWW
4) Other C/P personnel



Remarks; SOP: Standard Operational Procedures
NRW: Non-Revenue Water
HQ: Headquarters
WDM: Water Distribution Management

4. Key Members in the C/P Team

All parties confirmed that key members of the C/P personnel are as shown below:

Organization	Leader for SOP	Leader for NRW Reduction	Leader of water distribution management
SHAPWASCO	Mr. Abd El Shafi Mohamed Mesafer	Mr. Saeed Mohamed Attia	Mr. Ahmed Maher El Bahnasawy
GHAPWASCO	Mr. Basiouny Essa	Mr. Ahmed Rabea	
MCWW	Mr. Ayman Bassuni	Mr. Belal Khalaf	

5. Project team

All parties confirmed that JET and C/P team will compose the Project team as follows:

Project team	JICA expert team (JET)	JICA experts Local experts employed by JICA expert Facilitators employed by JICA expert Supporting staff members employed by JICA expert
	Counterpart team (C/P team)	Selected staff members of SHAPWASCO, GHAPWASCO, MCWW

HCWW will play a role of coordinator for the Project to establish inter-company cooperation and to complete the Project successfully.

6. Principles of the Project Execution

All parties confirmed that the following are principles to execute the Project:

1) JET and the mentioned C/P organization will conduct the Project jointly.
2) JET will undertake facilitation and assistance for the Project through dispatching experts and providing necessary equipment.
3) The Project will be managed by Joint Coordinating Committee (hereinafter referred to as JCC) and Steering Committee, which are described in R/D, M/M and IC/R.
4) To improve activity of SOP and NRW reduction for GHAPWASCO and MCWW, SHAPWASCO will provide trainers, lectures, etc. with JET.
5) To have model activity of water distribution management, SHAPWASCO will improve system of water distribution management under facilitation and assistance of JET.
6) To develop inter-company cooperation, HCWW will coordinate activities of Potable Water and Sanitation Companies in Egypt and facilitate information exchange.
7) To conduct the mentioned activity smoothly, JET will provide facilitation works and technical assistances.

7. Capacity Development through Model Facilities/Area

The Project team will conduct capacity development through model/pilot projects system. The Project team will select model facilities/areas for SOP and NRW reduction in each of GHAPWASCO and MCWW and a pilot project area for water distribution management in SHAPWASCO. The model/pilot facilities/areas will be selected by the Project team in a process of field survey and discussions to be conducted in the Project. All parties agreed basically the number of model/pilot facilities/areas as follows:

Companies	SOP	NRW reduction	Water Distribution Management
SHAPWASCO	-	-	To be decided later
GHAPWASCO	3	3	-
MCWW	3	3	-

8. Selection Criteria of SOP model facilities

All parties agreed on the following items as selection criteria of SOP model facilities and to consider lessons learnt in the previous project for SHAPWASCO:

1) Variety of types for facilities such as treatment plant, iron-manganese removal, well, etc.

2) Easiness to evaluate current efficiency.
3) Easiness to determine target efficiency.
4) Willingness of staff members to improve efficiency.
5) Applicability to other facilities.
6) Distance between model facilities to keep better accessibility for SOP team members.

9. Selection Criteria of model areas for NRW reduction

All parties agreed on the following items as selection criteria of model areas for NRW reduction activities and to consider lessons learnt in the previous project for SHAPWASCO:

1) Minimum night flow representing candidate areas.
2) Having diverse customers (for example, governmental offices, schools and hospitals).
3) Number of water connections (approximately 500 - 1,500).
4) Number of mal-functioning meters is not expected in large.
5) The average service pressure is at least 1.5 bars.
6) Easiness to construct chambers for equipment installation.
7) Easiness to isolate by valves.

10. Selection Criteria of pilot area for water distribution management

All parties agreed on the following items as selection criteria of pilot area for water distribution management:

1) Distribution volume and demand are balanced.
2) An area can be hydraulically isolated by valves.
3) Applicability to other areas.
4) An area where NRW reduction activity was conducted.
5) Easiness to install equipment.
6) Distance from Zagazig.

11. Cooperation of SHAPWASCO to GHAPWASCO and MCWW

All parties agreed that SHAPWASCO will provide the following to GHAPWASCO and MCWW. Details of the provision, as well as cost sharing, will be discussed in the Project team and at the Steering Committee. SHAPWASCO will submit a plan of provisions by the 1st JCC.

1) To hold presentation lectures on experience of SOP and NRW reduction activities.
2) To disclose all procedures until improvement achieved.
3) To dispatch trainers to GHAPWASCO and MCWW for SOP and NRW reduction.
4) To receive trainees form GHAPWASCO and MCWW for SOP and NRW reduction.

12. Utilization of Mostrod Training Center

HCWW will facilitate utilization of the Mostrod training center, Cairo Potable Water Company, if necessary.

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13. Issue of Water Distribution Management

All parties agreed that the following issues should be taken into consideration for activities in

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SHAPWASCO:

1) To monitor flow, pressure, quality, etc. of distributed water in water distribution networks.
2) To analyze data of distributed water and consumption in order to grasp water balance in water distribution networks.
3) To modify operation of water distribution according to the analysis.

14. Annual Plan of Operations

JET proposed a draft Annual Plan of Operations (hereinafter referred to as APO) for Phase-1. Discussion was held on the draft APO. As a result of discussion, the draft APO was accepted as Tentative APO, which will be finally approved by the 1st JCC. It is shown in Attachment-6.

15. Indicators to Monitor/Evaluate the Project

The Project team will propose indicators to monitor/evaluate the Project in a process of field survey to be conducted in the Project. It will be presented in the 1st JCC for approval. Approved indicators will be revised at the 2nd JCC, if necessary.

16. Securing Smooth Implementation of the Project

As mentioned in PDM, for the smooth implementation of the Project, it is important that "Employees who received trainings by the Project will continuously work for SHAPWASCO, GHAPWASCO, and MCWW" and "Personnel transfer of executive management will not affect the implementation of the Project". To overcome these issues, the Egyptian side agreed to conduct the following:

1) To keep assignment of C/P members for the Project period.
2) To assign plural staff members for the same activity.
3) To assign responsible persons to the JCC and the Steering Committee, in addition to Chairman.

It is mentioned in PDM as a pre-condition that "Budget for human resources development (HRD) is allocated properly to SHAPWASCO, GHAPWASCO and MCWW by HCWW". In this regard, the Egyptian side agreed to make the following efforts:

1) To provide necessary budget for HRD as well as for the Project.
2) To keep each other informed on cost sharing.
3) To disclose information of budget allocation to the Japanese side.

17. Undertakings by the Egyptian side

All parties agreed on, as a result of discussion, the items shown in Attachment-4 as undertakings to be conducted by the Egyptian side.

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18. Equipment

All parties agreed items and numbers of the equipment to be provided by JICA and JET as shown in Attachment-5. The following are particular results of the discussions.

1) The equipment for NRW activities is basically the same as previous technical cooperation project in SHAPWASCO to keep training by SHAPWASCO easier. However, JET will check specifications of the equipment, especially water pressure recorder, and submit a final list to the

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Steering Committee for approval.

2) The details of equipment for water distribution network management in Sharkiya will be discussed during Phase-1 of the Project and will be finally determined by JICA HQ.

19. Counterpart Training in Japan

JICA is planning to conduct C/P training in Japan, dividing into four categories, i.e. 1) Management, 2) SOP, 3) NRW reduction and 4) Water distribution management. All parties agreed preliminary plan and to consider it further on the following points:

1) Availability of Japanese agencies of water sector, which can extend assistance in training.
2) The participants of the course for Management training will be Chairmen of the companies. When a Chairman is not available to participate in the training, he will assign a substitute considering the sustainability of the Project.
3) Training needs of C/P agencies, including HCWW, and candidate participants of the training courses.
4) Steering Committee will evaluate candidates and approves participants of the training courses.
5) For sustainability of the Project, JICA expressed its request that a training courses participant should be expected to be engaged in organization for a long time to perform the training results.
6) The Egyptian side requested JET to increase number of trainees from two to four persons for the course of Water distribution management.

20. The 1st JCC

All parties agreed that the 1st JCC is scheduled for September 2011 to confirm and discuss the following:

1) To present status of SOP, NRW and water distribution management
2) To confirm the progress until the JCC and to discuss activities to be made in later stages.
3) To discuss and approve APO.
4) To discuss and determine indicators for the Project monitoring and evaluation.
5) To discuss revision of PDM and PO.
6) Other necessary topics.

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ATTACHMENT

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Draft Project Design Matrix (PDM$_1$)

Dated August 11,

Project Name : The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area — Duration : FY2010-FY201

Project Site : Sharkiya Governorate, Gharbia Governorate, Minufia Governorate (Nile Delta Area) — Target Group : Staff of SHAPWASCO, GAPWASCO, MUPWA

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumpt
[Super Goal] Management capacity of operation and maintenance of water supply facilities is improved in Nile Delta Area	Performance Indicators (PIs) in the fields of management capacity of operation and maintenance are improved in Nile Delta Area	Quarterly Reports of all water supply companies in Nile Delta Area submitted to HCWW	
[Overall Goal] Management capacity of operation and maintenance of water supply facilities is improved in Sharkiya, Gharbia and Minufia Governorates	PIs in the fields of management capacity of operation and maintenance are improved in Sharkiya, Gharbia and Minufia Governorates	Quarterly reports of SHAPWASCO, GAPWASCO and MUPWASCO	Central and local gover budget for development of supply facilities is allo appropriately
[Project Purpose] Management capacity of operation and maintenance of water supply facilities is improved at the model areas/facilities in Sharkiya, Gharbia and Minufia Governorates	PIs in the fields of management capacity of operation and maintenance are improved at the model areas/facilities	Quarterly reports of SHAPWASCO, GAPWASCO and MUPWASCO	Governmental policy on supply sector does not c significantly.
[Output] 1) Human Resource Development through collaboration among water supply companies in Sharkiya, Gharbia and Minufia Governorates is strengthened	a. More than ** members each of SOP/NRW teams in SHAPWASCO・GAPWASCO・MUPWASCO are certified as trainers by Steering Committee b. More than ** % of participants rates satisfaction and understanding of workshops more than ** on the 5-scale evaluation	a. Certification of Training b,c. Reports of workshops	
2) Based on the experiences of SHAPWASCO, SOPs are developed and utilized at the model facilities in Gharbia and Minufia Governorates	a. More than ** % of SOP team members rates understanding of trainings more than ** on the 5-scale evaluation b. The model facilities are operated and maintained based on SOP	a, b. Project Progress Reports	Employees who re trainings by the Projec continuously work SHAPWASCO, GAPW and MUPWASCO
3) The institutional skills and experiences of SHAPWASCO for NRW reduction are transferred to NRW teams at the model areas in Gharbia and Minufia Governorates	a. More than ** % of NRW teams members rates understanding of trainings more than ** on the 5-scale evaluation b. Water balance analysis is conducted properly for the 3 model areas c. ** % of detected leakage is repaired at the model area	a,b. c Project Progress Report	
4) The water distribution management capacity is improved in Sharkiya Governorate as an advanced model	Water distribution is managed based on SOP at the model areas	Project Progress Reports	Personnel transfer of exe management will not affe implementation of the Proj
5) The project is managed and coordinated properly	a. Agreement on the cooperation among SHAPWASCO・GAPWASCO・MUPWASCO is prepared b. Project activities are regularly monitored based on PO/APO	a. Agreement Document b. Project Progress Reports	

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List of Participant

[Egyptian side]	
Mr. El Sayed Nasr	Chairman of HCWW
Mr. Maudouh Raslan	Vice Chairman of HCWW
Dr. Salah Bayoumi	Head of Project Sector of HCWW
Mr. Ahaed Abdeen	Chairman of SHAPWASCO
Mr. Mohamed Abd El Aleem	Vice Chairman of SHAPWASCO
Mr. Ayman Abd El Kader	Chairman of GHAPWASCO
Mr. Abd Alla El Liethy	Vice Chairman of GHAPWASCO
Mr. Mohamed Abu El Khair	Chairman of MCWW
Mr. Mohamed Nageb Saleh	Vice Chairman of MCWW
[Japanese side]	
Mr. Katsumi Fujii	Chief Advisor / Water supply planning
Mr. Masahiro Takeuchi	Distribution Network (1)
Mr. Tomohiro Shimizu	Water treatment system
Mr. Atsushi Kato	Coordinator / Assistant for NRW Reduction Activity
Mr. Mohamed Nagi Gaber	Facilitator of the Project team
Mr. Yoshiki Omura	Leader, Monitoring mission of JICA
Mr. Ryusuke Ikeda	Study planning, Monitoring mission of JICA
Mr. Shigeru Otake	Senior Representative, JICA Egypt office
Mr. Nour El-Din Hussein	Senior Program Officer, JICA Egypt office

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Activities	Inputs	Important Assump
1-1 Conduct management training for the top management 1-2 Conduct Training of Trainers (TOT) for developing SOP 1-3 Conduct TOT for NRW reduction 1-4 Disseminate the contents, the manners and the results of the collaboration among SHAPWASCO, GAPWASCO and MUPWASCO to the water supply companies in Nile Delta Area through reports and workshops	**Japanese side** 1) Japanese Experts • Chief advisor/water supply planning • NRW reduction management • Leakage detection • Water treatment • Water quality • Electrical equipment • Mechanical equipment • Distribution network • Others (if necessary) 2) Local Experts 3) Equipment 4) Training in Japan 5) Local Cost	
2-1 Survey the current conditions of water supply facilities in Gharbia and Minufia Governorates 2-2 Select 3 model facilities in Gharbia and Minufia Governorates each 2-3 Organize SOP teams 2-4 Conduct training for developing and applying SOPs at the facilities of Sharkiya Governorate 2-5 Revise SOPs of Sharkiya Governorate, if necessary 2-6 Develop SOPs for model facilities in Gharbia and Minufia Governorates based on SOPs for SHAPWASCO 2-7 Conduct On-the-Job Training for GAPWASCO and MUPWASCO to apply SOPs in operation and maintenance 2-8 Monitor the progress of SOP activities 2-9 Draft the policy/plan for disseminating SOP to the other Marakazes		
3-1 Analyze the current situation on NRW in Gharbia and Minufia Governorates 3-2 Select 3 model areas for NRW reduction in Gharbia and Minufia Governorates each 3-3 Organize NRW reduction teams 3-4 Formulate an action plan for NRW reduction activities based on the action plan for SHAPWASCO 3-5 Conduct training at Mostrod Training Center 3-6 Conduct training at the training yard in Sharkiya Governorate 3-7 Conduct training at model areas for water distribution management in Sharkiya Governorate 3-8 Prepare GIS drawing for model areas in Gharbia and Minufia Governorates 3-9 Make water balance analysis at model areas 3-10 Conduct leakage detection survey at model areas 3-11 Make water balance analysis after repair works 3-12 Draft policy/plan for disseminating NRW reduction activities to the other Marakazes	**Egyptian Side** 1) Counterpart Personnel • Project Director : Chairman, HCWW • Project Manager : Chairman, SHAPWASCO • Co-Project Manager : Chairman, GAPWASCO Chairman, MUPWASCO • NRW Team • SOP Team 2) Office space and facilities for experts 3) Equipment 4) Necessary information 5) Local Cost	【Pre-condition】 Budget for HRD is all properly to SHAPWA GAPWASCO and MUPW by HCWW
4-1 Discuss methods and conduct survey for water distribution management 4-2 Conduct training for water distribution management 4-3 Formulate a plan for water distribution management 4-4 Install the equipment for water distribution management at the model area 4-5 Operate the system 4-6 Develop SOP for water distribution management 4-7 Evaluate the operation and SOP for water distribution management		
0-1 Establish Steering Committee, consisting of representative of HCWW, SHAPWASCO, GAPWASCO and MUPWASCO 0-2 Discuss the contents, the manners for the cooperation among SHAPWASCO, GAPWASCO and MUPWASCO through the Steering Committee 0-3 Organize JCC at least once a year 0-4 Finalize the Indicators of the Project Design Matrix (PDM) for approval of the first Joint Coordinating Committee (JCC) 0-5 Prepare a draft Annual Plan of Operations (APO) based on the Plan of Operations (PO) for approval of the first JCC 0-6 Monitor the progress of PO/APO and achievement of the Indicators of the PDM		

Attachment-3

Dated August 11, 2

Tentative Plan of Operation (PO)

Item	Year 1				Year 2				Year 3				Person in Charge	Major Input		Remarks
	1	2	3	4	1	2	3	4	1	2	3	4		Japan	Egypt	
1. Human Resource Development through coordination among water supply companies in Sharkiya, Gharbia and Minufia Governorates is strengthened																
1-1 Conduct management training for the top management			★										HC, SH, G, M	☆Training in Japan		
1-2 Conduct Training of Trainers (TOT) for developing SOP		■		☆							■		SH, G, M	JICA Experts Local Experts ☆Training in Japan		Year 1: Mainly for SH
1-3 Conduct TOT for NRW reduction		■		☆							■		SH, G, M	JICA Experts Local Experts ☆Training in Japan		Year 3: Mainly for G, M
1-4 Disseminate the contents, the manners and the results of the collaboration among SHAPWASCO, GAPWASCO and MUPWASCO to the water supply companies in Nile Delta Area through reports and workshops	■						■		■		■		HC, SH, G, M	JICA Experts		
2. Based on the experiences of SHAPWASCO, SOPs are developed and utilized at the model facilities in Gharbia and Minufia Governorates																
2-1 Survey the current conditions of water supply facilities in Gharbia and Minufia Governorates			■	■									G, M	JICA Experts	SH	
2-2 Select 3 model facilities in Gharbia and Minufia Governorates each			■	■									G, M	JICA Experts	SH	
2-3 Organize SOP teams			■	■									G, M	JICA Experts	SH	
2-4 Conduct training for developing and applying SOPs at the facilities of Sharkiya Governorate			■	☆			■						G, M	JICA Experts ☆Training in Japan	SH	
2-5 Revise SOPs of Sharkiya Governorate, if necessary			■	■	■								G, M	JICA Experts	SH	
2-6 Develop SOPs for model facilities in Gharbia and Minufia Governorates based on SOPs for SHAPWASCO			■	■	■	■	■	■	■	■	■		G, M	JICA Experts	SH	
2-7 Conduct On-the-Job Training for GAPWASCO and MUPWASCO to apply SOPs in operation and maintenance						■		■		■			G, M	JICA Experts	SH	

2-8	Monitor the progress of SOP activities	G, M	JICA Experts	SH	
2-9	Draft the policy/plan for disseminating SOP to the other Marakazes	G, M	JICA Experts	SH	
3.	**The institutional skills and experiences of SHAPWASCO for NRW reduction are transferred to NRW teams at the model areas in Gharbia and Minuf Governorates**				
3-1	Analyze the current situation on NRW in Gharbia and Minufia Governorates	G, M	JICA Experts	SH	
3-2	Select 3 model areas in Gharbia and Minufia Governorates each	G, M	JICA Experts	SH	
3-3	Organize NRW reduction teams	G, M	JICA Experts	SH	
3-4	Formulate an action plan for NRW reduction activities based on the action plan for SHAPWASCO	G, M	JICA Experts	SH	
3-5	Conduct training at Mostrod Training Center	G, M	JICA Experts	Mostrod Training Center	
3-6	Conduct training at the training yard in Sharkiya Governorate	G, M	JICA Experts ☆Training in Japan	SH	
3-7	Conduct training at model areas for water distribution management in Sharkiya Governorate	G, M	JICA Experts	SH	
3-8	Prepare GIS drawing for model areas in Gharbia and Minufia Governorates	G, M	JICA Experts	SH	
3-9	Make water balance analysis at model areas	G, M	JICA Experts	SH	
3-10	Conduct leakage detection survey at model areas	G, M	JICA Experts	SH	
3-11	Make water balance analysis after repair works	G, M	JICA Experts	SH	
3-12	Draft policy/plan for disseminating NRW reduction activities to the other Marakazes	G, M	JICA Experts	SH	

4.	**The water distribution management capacity is improved in Sharkiya Governorate as an advanced model**				
4-1	Discuss methods and conduct survey for water distribution management	SH	JICA Experts		
4-2	Conduct training for water distribution management	SH	JICA Experts ☆Training in Japan		
4-3	Formulate a plan for water distribution management	SH	JICA Experts		
4-4	Install the equipment for water distribution management at the model area	SH	JICA Experts		
4-5	Operate the system	SH	JICA Experts		
4-6	Develop SOP for water distribution management	SH	JICA Experts		
4-7	Evaluate the operation and SOP for water distribution management	SH	JICA Experts		
0.	**The project is managed and coordinated properly**				
0-1	Establish Steering Committee, consisting of representative of HCWW, SHAPWASCO, GAPWASCO and MUPWASCO	HC, SH, G, M	JICA Experts		
0-2	Coordinate among SHAPWASCO, GAPWASCO and MUPWASCO through the Steering Committee	HC, SH, G, M	JICA Experts		
0-3	Organize the Joint Coordinating Committee (JCC) meeting at least once a year	HC, SH, G, M	JICA Experts		
0-4	Finalize the Indicators of the Project Design Matrix (PDM) for approval of the first JCC	HC, SH, G, M	JICA Experts		
0-5	Draft Annual Plan of Operations (APO) based on the Plan of Operations (PO) for approval of the JCC	HC, SH, G, M	JICA Experts		
0-6	Monitor the progress of PO/APO and achievement of the Indicators of the PDM	HC, SH, G, M	JICA Experts		●Mid-Term Review ▲Final Evaluation

Attachment-4 : Undertakings by the Egyptian Side

The following are items to be undertaken by the Egyptian side, in addition or in detailed to items listed in R/D signed on the 19th of August 2010.

1) The Egyptian side should provide enough office space for the Project and necessary office facilities such as furniture, telephone set and telephone line including cost for installation.

2) The Egyptian side should bear necessary costs of NRW reduction activities such as repair of leakage, replacement of water meters, installation of flow meters, construction of chambers, night job allowances for leakage detection survey, etc. The Egyptian side should provide necessary labors, equipment and materials for the mentioned works, other than provided by JICA and/or JET.

3) The Egyptian side should bear necessary costs of SOP activities such as installation of flow meters, construction of chambers and upgrading facilities in case of necessity. The Egyptian side should provide necessary labors, equipment and materials for the mentioned works, other than provided by JICA and/or JET.

4) The Egyptian side should bear necessary costs of distribution management activities such as installation (civil/electrical/mechanical works) of monitoring system instruments and/or equipment provided by JICA and/or JET. The Egyptian side should provide necessary labors, equipment and materials for the mentioned works, other than provided by JICA and/or JET.

5) The Egyptian side should bear necessary costs of trausportation, accommodation and daily allowances for C/P members when they conduct the activities at the other water companies.

6) The Egyptian side should bear necessary costs of pickup operation, driver's allowances and fuel. The Egyptian side should also provide the parking space of the pickup cars for the Project.

7) The Egyptian side should undertake customs clearance and in-land transportation of the equipment, at own budget, for the equipment to be provided by JICA and/or JET, if requested by JICA and/or JET.

8) The Egyptian side should manage all the equipment to be provided by JICA and/or JET after delivery and utilize it effectively for the Project and SOP/NRW/Distribution management business for future. The cost for consumables and spare parts of the equipment including operation after the providing to the Egyptian side should be borne by the Egyptian side at own budget. The Egyptian side should also provide the storage space of the equipment for the Project.

9) The Egyptian side should secure halls/places for meetings, seminars, workshops, water saving campaign, etc. The Egyptian side should bear necessary cost for public relations such as media and printing of newsletter.

10) The Egyptian side should arrange appointments with officials, permissions, etc.

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Attachment-5 : Provision of Equipment

A. Equipment to be provided by JET

	Name of Equipment	Specification / Reference brand	Quantity			Procurement Location
			SHAP	GHAP	MCWW	
1	Water leak detector	1. Specification (Frequency range) 100Hz to 1200Hz or equivaleut 2.Reference brand Fuji Tecom HG-10AII	-	3	3	Japan
2	Digital sound detector	1.Specification (Frequency range) 100Hz to 2000Hz or equivalent 2.Reference brand Fuji Tecom FSB-8D	-	2	2	Japan
3	Acoustic rod	1.Specification (Length) approx 1,500mm 2.Reference brand Fuji Tecom LS-1.5	-	4	4	Japan
4	Water pressure recorder	1.Specification (Measurement pressure) 1.0MPa 2.Reference brand Fuji Tecom FJN501	-	3	3	Japan
5	Pipe and cable locator	1.Specification (Detection depth) approx 5m 2.Reference brand Fuji Tecom PL-960	-	2	2	Japan
6	Metal pipe locator	1.Specification (Detection depth) approx 40cm 2.Reference brand Fuji Tecom F-90M	-	2	2	Japan
7	Non metallic pipe vibrator	1.Specification (Composition) Cylinder, hose, hammer 2.Reference brand Tokio Rhythm	-	2	2	Japan
8	Hammer drill	1.Specification (Drill bit) Max., (Voltage) 200V 2.Reference brand Hitachi PR-38E	-	2	2	Japan
9	Drill bid	1.Specification (Length) more than 800mm, (Edge diameter) 19mm 2.Reference brand Yunika 19mm x 800mm	-	8	8	Japan
10	Boring bar	1.Specification (Diameter) 16mm, (Material) Metal 2.Reference brand Fuji Tecom boring bar L=1m	-	2	2	Japan
11	Generator	1.Specification (Power) approx 4kW 2.Reference brand Kubota 3.8kW	-	2	2	Egypt
12	Water level indicator	1.Specification (Data storage) Memory card type, (Display) Digital type 2.Reference brand CTI Science RT510-W	-	3	3	Japan

Note : SHAP: SHAPWASCO, GHAP: GHAPWASCO

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Attachment-5 : Provision of Equipment

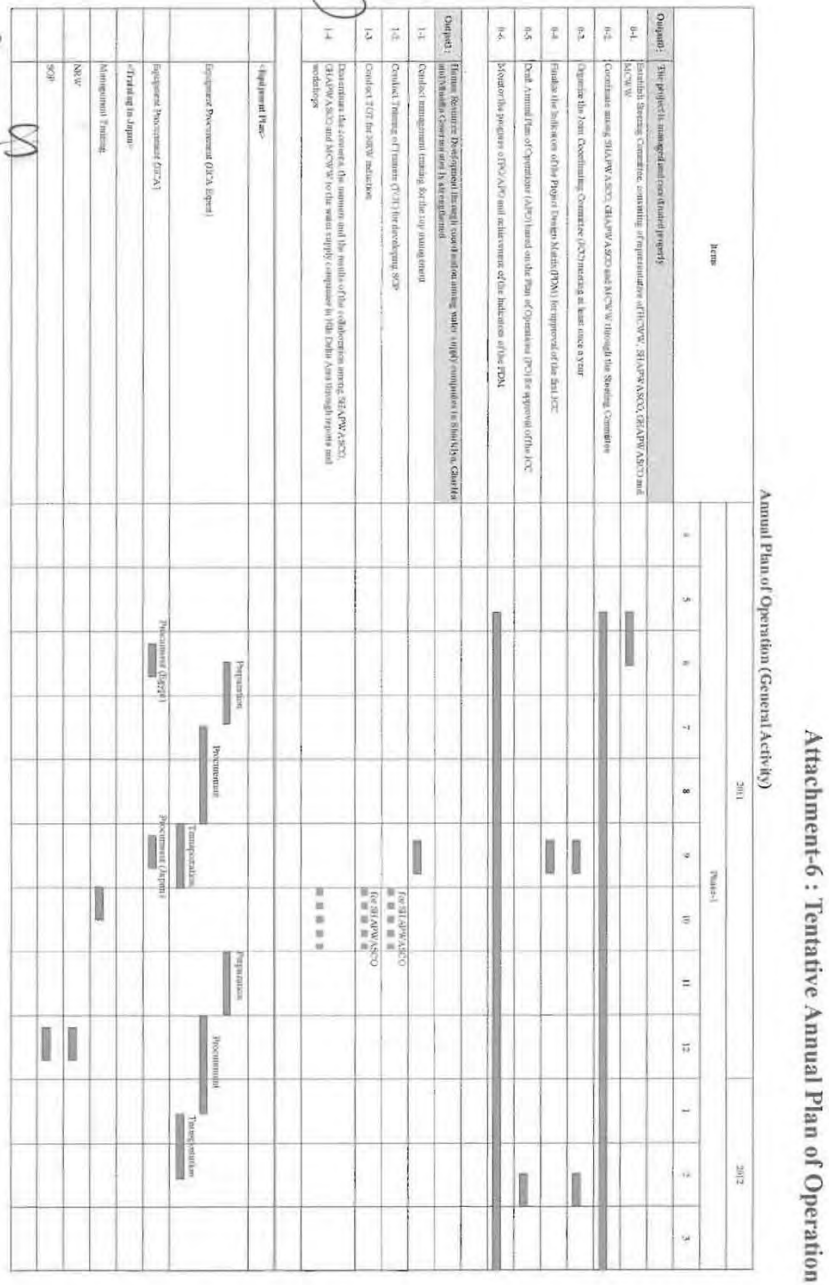
B. Equipment to be provided by JICA

	Name of Equipment	Specification/ Reference brand	Quantity			Procurement Location
			SHAP	GHAP	MCWW	
1	Leak sound detector	1.Specification (Composition) Main body, preamplifier, pickup censer 2.Reference brand Fuji Tecom FSB-LC-2500	-	2	2	Japan
2	Portable ultrasonic flow meter (For large diameters)	1.Specification (Diameter) 300-2000mm or equivalent (Pipe material) steel, stainless steel, cast iron, PVC, etc. 2.Reference brand Tokyo Keiki UF-30	-	3	3	Japan
3	Portable ultrasonic flow meter (For normal diameters)	1.Specification (Diameter) 20-500mm or equivalent (Pipe material) steel, stainless steel, cast iron, PVC, etc. 2.Reference brand Tokyo Keiki UF-20	-	2	2	Japan
4	Ultrasonic flow meter for distribution management	Under consideration (Specification will be set in Phase-1)	See remark	-	-	Japan
5	Water pressure recorder for distribution management	Under consideration (Specification will be set in Phase-1)	See remark	-	-	Japan
6	Turbidity meter for distribution management	Under consideration (Specification will be set in Phase-1)	See remark	-	-	Japan
7	Residual chlorine measurement for distribution management	Under consideration (Specification will be set in Phase-1)	See remark	-	-	Japan
8	Instrumentation monitoring system	Under consideration (Specification will be set in Phase-1)	See remark	-	-	Japan
9	Pickup	1.Specification (Type) 2500CC Diesel 4Cylender 2.Reference brand Chevrolet TFR Model 2010 2WD	-	1	1	Egypt
10	Personal computer (Desk top)	1.Specification (Type) CPU: core-i5, memory:4GB, Hard disk:500GB, including software (MS offices, security soft) 2.Reference brand HP Elite	-	1	1	Egypt
11	Personal computer (Notebook)	1.Specification (Type) CPU: core-i5, memory:4GB, Hard disk:320GB, including software (MS offices, security soft) 2.Reference brand DELL Inspiron 1564	-	2	2	Egypt
12	Copy and Fax machine	1.Specification (Type) Black and white, Paper maximum A3, Network printer/scan 2.Reference brand Xerox Work Centre 5225	-	1	1	Egypt
13	Ultrasonic flow meter	1.Specification (Diameter) 200-6000mm or equivalent (Pipe material) steel, stainless steel, cast iron, vinyl-chloride, etc 2.Reference brand GE AT868	-	See remark	See remark	Japan
14	Software (Water CAD)	1.Specification (Type) Stand alone, (Max pipe number) unlimited 2.Reference brand Bentley Water CAD	-	1	1	Japan

Note : SHAP: SHAPWASCO, GHAP: GHAPWASCO
Remark : To be decided later.

Attachment-6 : Tentative Annual Plan of Operation

Annual Plan of Operation (General Activity)



Annual Plan of Operation (Development of SOP)

Item	2011									2012		
	Phase-I											
	4	5	6	7	8	9	10	11	12	1	2	3
Based on the experiences of SHAPWASCO, SOPs are developed and utilized at the model facilities in Gharbia and Minufia Governorates												
Action-1 Survey the current conditions of water supply facilities in Gharbia and Minufia Governorates												
1-1 Survey for the water treatment facilities												
1-2 Survey for the iron/ manganese removal facilities												
1-3 Survey for well facilities												
Action-2 Select 3 model facilities in Gharbia and Minufia Governorates each												
2-1 Discussion on the selection criteria												
2-2 Compiling the survey report and long list												
2-3 Selection of model facilities (Discussion with OP)												
2-4 Final selection of model facilities												
Action-3 Organize SOP teams												
3-1 Selection of fulltime SOP member in SHAPWASCO and MCWW												
3-2 Selection of OP member in model facilities												
3-3 Selection of trainee in SHAPWASCO												
Action-4 Conduct training for developing and applying SOPs at the facilities of Sharkiya Governorate												
4-1 Assessment of the effectiveness of SOPs in Sharkiya Governorate												
Action-5 Revise SOPs of Sharkiya Governorate, if necessary												
5-1 Revision of SOPs of Sharkiya Governorate												
Action-6 Develop SOPs for model facilities in Gharbia and Minufia Governorates based on SOPs for SHAPWASCO												
6-1 Preparation of basic system drawings (P&ID, Single line diagram)												
6-2 Examination of water quality management												
6-3 Preparation of draft SOPs with site training												
6-4 Preparation of unified forms of O&M records and reports												
6-5 Trial operation with the use of draft SOPs												

Problem analysis
Formulation of activity plan

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Annual Plan of Operation (NRW Reduction)

Items	2011									2012		
	Phase-I											
	4	5	6	7	8	9	10	11	12	1	2	3
The facilitation skills and experiences of SHAPWASCO for NRW reduction are transferred to NRW teams in the model areas in GhariMa and Minufia Governorates												
Action-1 Analyze the current situation on NRW in Gharbia and Minufia Governorates												
1-1 Survey for the actual condition regarding water distribution network (data collecting)												
1-2 Analysis of the balance between water distribution amount and water consumption												
1-3 Compiling the result of analysis												
Action-2 Select 3 model areas in Gharbia and Minufia Governorates each												
2-1 Discussion on the selection criteria												
2-2 Arrangement of long list												
2-3 Selection of model area (Discussion with OP)												
2-4 Final selection of model area												
Action-3 Organize NRW reduction teams												
3-1 Selection of fulltime NRW member in SHAPWASCO and MCWW												
3-2 Selection of OP member in model area												
3-3 Selection of trainee in SHAPWASCO												
Action-4 Formulate an action plan for NRW reduction activities based on the action plan for SHAPWASCO												
4-1 Re-examination of action plan in Sharkiya Governorate												
4-2 Planning of action plan												
4-3 Finishing of action plan												
Action-5 Conduct training at Monfred Training Center												
5-1 Training at Monfred Training Center												
Action-6 Conduct training at the training yard in Sharkiya Governorate												
6-1 Training on water leakage survey and water leakage detection equipments at the training yard in Sharkiya Governorate												
Action-7 Prepare GIS drawing for model areas in Gharbia and Minufia Governorates												
7-1 Preparation of GIS drawing on model area-1												
7-2 Preparation of GIS drawing on model area-2												
Action-8 Make water balance analysis at model areas												
8-1 Minimum night flow survey												
8-2 Data analysis												

Problem analysis
Verification of action plan

A-12

Annual Plan of Operation (Distribution Management for SHAPWASCO)

Items		2011									2012		
		Phase-I											
		4	5	6	7	8	9	10	11	12	1	2	3
The water distribution management capacity is improved in Shwekyin Corporate as an advanced model													
Action-1	Discuss methods and conduct survey for water distribution management												
1-1	Organizing project team												
1-2	Analysis of present data regarding distribution management (Flow rate, pressure, water quality and etc.)												
1-3	Study and evaluation of systems for Red Hi-Pump, South Okn and Dehahla												
1-4	Discussion of suitable distribution management system in SHAPWASCO												
Action-2	Conduct training on water distribution management												
2-1	Training on water distribution management methods												
Action-3	Formulate a plan for water distribution management												
3-1	Planning of action plan												
3-2	Discussion on the selection criteria												
3-3	Selection of pilot project area												
3-4	Verification of equipment plan												

Attachment-3 Minutes of Meeting for the Joint Coordinating Committee (JCC) Meeting

Minutes of Meeting
on
The 1st JCC
for
The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area

The 30th of September 2011

Mr. El Sayed Nasr	Dr. Salah Bayoumi	Mr. Katsumi Fujii
Project Director	Project Manager	Chief Advisor
Chairman	Head of Project Sector	The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area,
Holding Company for Water and Wastewater (HCWW)	Holding Company for Water and Wastewater (HCWW)	Japan International Cooperation Agency (JICA)
Mr. Ahmed Abdeen	Mr. Ayman Abd El Kader	Mr. Mohamed Abu El Khair
Project Co-Manager	Project Co-Manager	Project Co-Manager
Chairman	Chairman	Chairman
Sharkiya Potable Water and Sanitation Company (SHAPWASCO)	Gharbia Potable Water and Sanitation Company (GHAPWASCO)	Minufia Company for Water and Wastewater (MCWW)

Annex : List of Participant

List of Participant

[Egyptian side]	
Mr. El Sayed Nasr	Chairman of HCWW
Mr. Mamdouh Raslan	Vice Chairman of HCWW
Dr. Salah Bayoumi	Head of Project Sector of HCWW
Mr. Ahmed Abdeen	Chairman of SHAPWASCO
Mr. Ayman Abd El Kader	Chairman of GHAPWASCO
Mr. Mohamed Abu El Khair	Chairman of MCWW
[Japanese side]	
Mr. Katsumi Fujii	Chief Advisor / Water supply planning
Mr. Mitsuhito Omori	Deputy Chief Advisor / NRW Reduction
Mr. Hiroki Niimura	Leakage Detection
Mr. Kenji Yamada	Hydraulic Analysis for Network
Mr. Kiyoshi Kiyama	Distribution Network (2)
Mr. Mohamed Nagi Gaber	Facilitator of the Project team
Mr. Nobuhiro Ikuro	Chief Representative, JICA Egypt office
Mr. Koichi Mizukusa	Representative, JICA Egypt office
Mr. Nour El-Din Hussein	Senior Program Officer, JICA Egypt office

In the course of Phase-1 of the Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area (hereinafter referred to as "the Project"), the first meeting for Joint Coordinating Committee (hereinafter referred to as "JCC") was held on the 27th of September 2011.

The following were confirmed in the meeting:

1. Progress of the Project

Dr. Salah Bayoumi, the Project Manager, explained the progress of the Project. The participants confirmed it.

2. APO, PO and PDM

Mr. Katsumi Fujii, the Chief Advisor, proposed to improve the Annual Plan of Operation (hereinafter referred to as "APO"), the Plan of Operation (hereinafter referred to as "PO") and the Project Design Matrix (hereinafter referred to as "PDM") as the results of the steering committee meeting held on the 12th September 2011.

The words "**certified** as trainers by Steering Committee", which was mentioned in the PDM as objectively verified indicators of output-1) were proposed in the JCC to be modified to "**approved** as trainers by Steering Committee". The participants agreed on the proposal and confirmed the improved/modified APO, PO and PDM as shown in attachment-1, 2 and 3.

3. Additional Activities for Promotion of Public Awareness

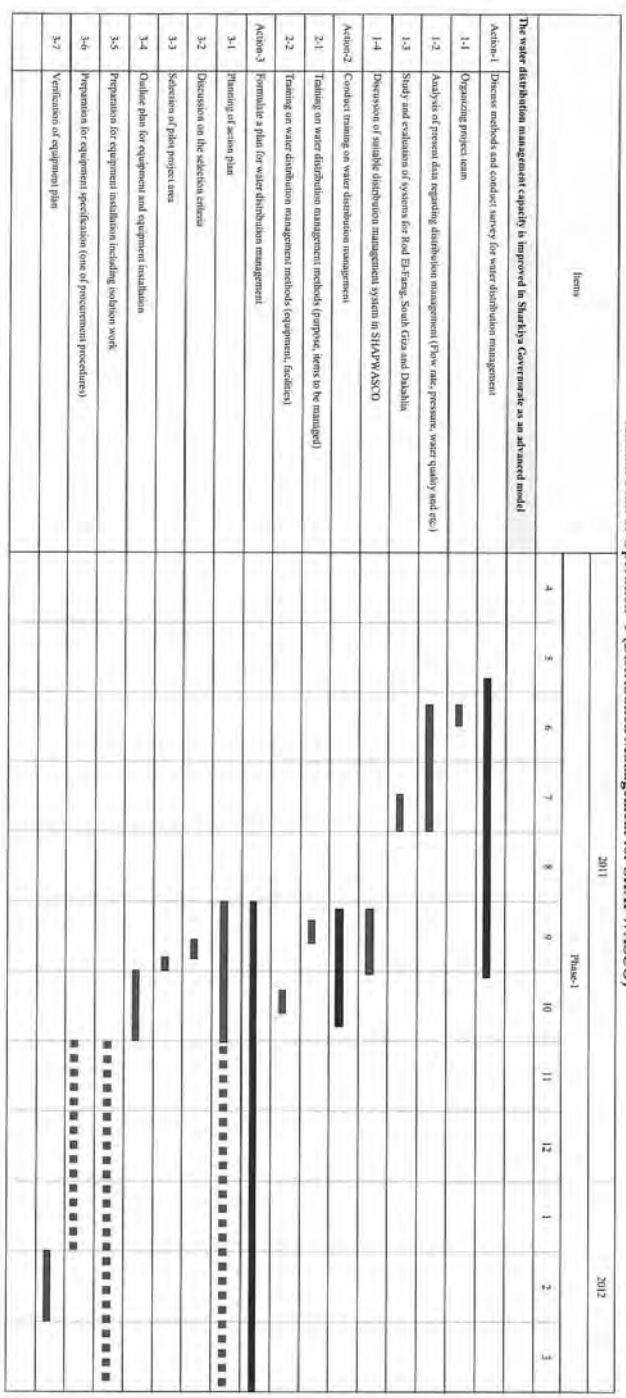
As a result of the steering committee meeting held on the 12th September 2011, the Chief Advisor proposed to add activities to promote public awareness to the Project. The participants agreed on the proposal and confirm the following:

(1) To study necessary activities to be conducted in the Project.
(2) To study capable input by JICA and the Egyptian side.
(3) To identify necessary activities.
(4) To discuss/approve in the next JCC for modification of PDM.
(5) To have the next JCC in the end of February 2012 or in the beginning of March 2012.
(6) Not to reduce the budget for SOP and NRW.
(7) To take overall plan of HCWW into consideration.
(8) To include some new activities/ideas.

(end)

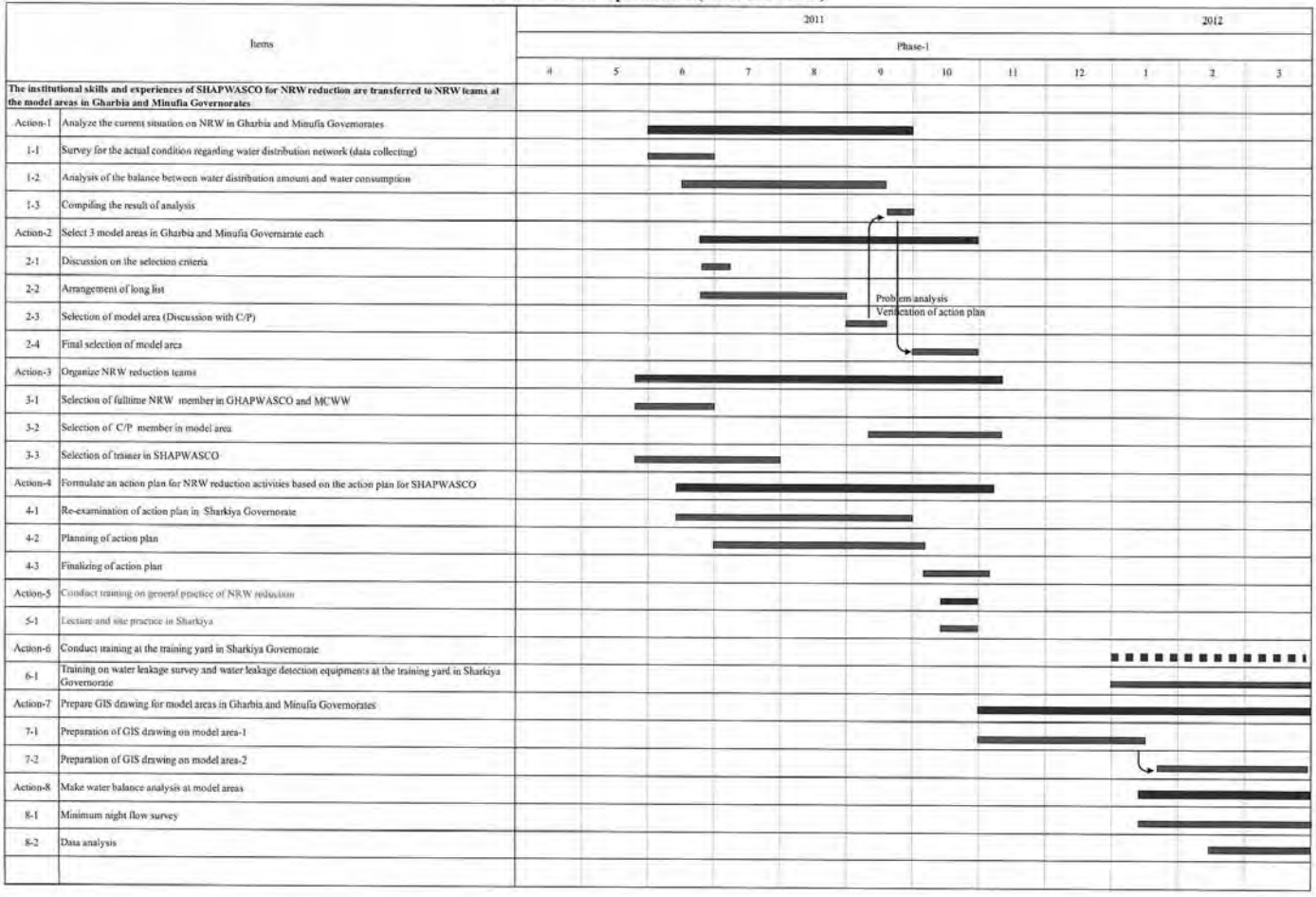
Attachment-1

Annual Plan of Operation -1 (Distribution Management for SHAPWASCO)



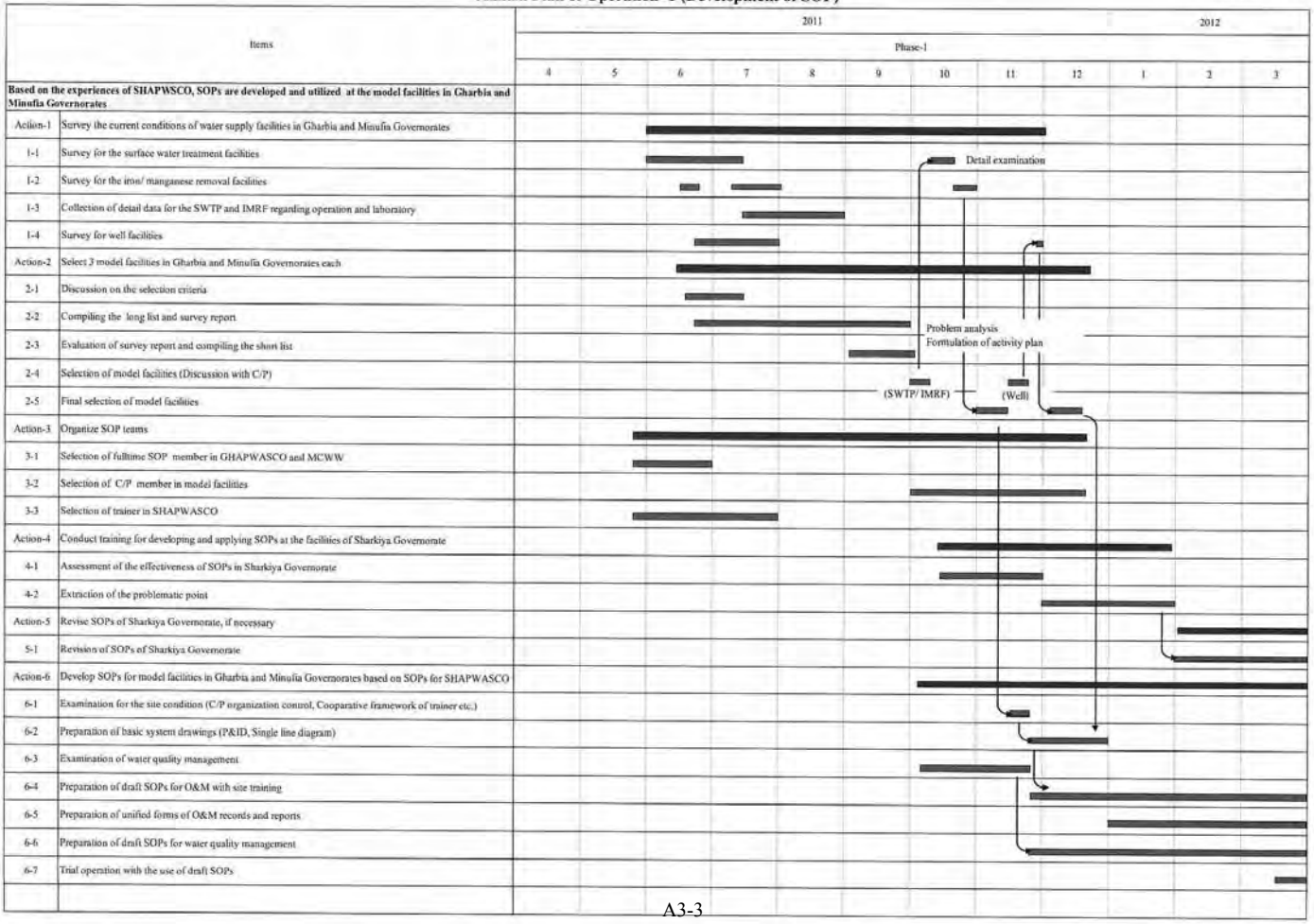
Attachment-1

Annual Plan of Operation -1 (NRW Reduction)



Attachment-1

Annual Plan of Operation -1 (Development of SOP)



Attachment-2

The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area

Plan of Operation (PO-1)

27 September 2011

Items		Year1				Year2				Year3				Person in Charge	Major Input		Remarks
		1	2	3	4	1	2	3	4	1	2	3	4		Japan	Egypt	
1. Human Resource Development through collaboration among water supply companies in Sharkiya, Gharbia and Minufia Governorates in strengthened																	
1-1.	Conduct management training for the top management			☆										HC, SH, G.M	☆ Training in Japan		
1-2.	Conduct Training of Trainers (TOT) for developing SOP			☆										SH, G.M	JICA Experts Local Exerts ☆ Training in Japan		Year 1: Mainly for SH Year 3: Mainly for G. M
1-3.	Conduct TOT for NRW reduction			☆										SH, G.M	JICA Experts Local Exerts ☆ Training in Japan		
1-4.	Disseminate the contents, the manners and the results of the collaboration among SHAPWASCO, GAPWASCO and MUPWASCO to the water supply companies in Nile Delta Area through reports and workshops													HC, SH, G.M	JICA Experts		
2. Based on the experiences of SHAPWASCO, SOPs are development and utilized at the model facilities in Gharbia and Minufia Governorates																	
2-1.	Survey the current conditions of water supply facilities in Gharbia and Minufia Governorates													G.M	JICA Experts	SH	
2-2.	Select 3 model facilities in Gharbia and Minufia Governorates each													G.M	JICA Experts	SH	
2-3.	Organize SOP teams													G.M	JICA Experts	SH	
2-4.	Conduct training for developing and applying SOPs at the facilities of Sharkiya Governorate													G.M	JICA Experts	SH	
2-5.	Revise SOPs of Sharkiya Governorate, if necessary													G.M	JICA Experts	SH	
2-6.	Develop SOPs for model facilities in Gharbia and Minufia Governorates based on SOPs for SHAPWASCO													G.M	JICA Experts	SH	
2-7.	Conduct On-the-Job Training for GAPWASCO and MUPWASCO to apply SOPs in operation and maintenance													G.M	JICA Experts	SH	
2-8.	Monitor the progress of SOP activities													G.M	JICA Experts	SH	
2-9.	Draft the policy/plan for disseminating SOP to the other Marakazes													G.M	JICA Experts	SH	
3. The institutional skills and experiences of SHAPWASCO for NRW reduction are transferred to NRW teams at the model areas in Gharbia and Minufia Governorates																	
3-1.	Analyze the current situation on NRW in Gharbia and Minufia Governorates													G.M	JICA Experts	SH	
3-2.	Select 3 model areas in Gharbia and Minufia Governorates each													G.M	JICA Experts	SH	
3-3.	Organize NRW reduction teams													G.M	JICA Experts	SH	
3-4.	Formulate an action plan for NRW reduction activities based on the action plan for SHAPWASCO													G.M	JICA Experts	SH	
3-5.	Conduct training on general practice of NRW reduction													G.M	JICA Experts	Mostrod Training Center	
3-6.	Conduct training at the training yard in Sharkiya Governorate													G.M	JICA Experts ☆ Training in Japan	SH	
3-7.	Conduct training at model areas for water distribution management in Sharkiya Governorate													G.M	JICA Experts	SH	
3-8.	Prepare GIS drawing for model areas in Gharbia and Minufia Governorates													G.M	JICA Experts	SH	
3-9.	Make water balance analysis at model areas													G.M	JICA Experts	SH	
3-10.	Conduct leakage detection survey at model areas													G.M	JICA Experts	SH	
3-11.	Make water balance analysis after repair works													G.M	JICA Experts	SH	
3-12.	Draft policy/plan for disseminating NRW reduction activities to the other Marakazes													G.M	JICA Experts	SH	
4. The water distribution management capacity is improved in Sharkiya governorate as an advanced model																	
4-1.	Discuss methods and conduct survey for water distribution management													SH	JICA Experts		
4-2.	Conduct training for water distribution management													SH	JICA Experts ☆ Training in Japan		
4-3.	Formulate a plan for water distribution management													SH	JICA Experts		
4-4.	Install the equipment for water distribution management at the model area													SH	JICA Experts		
4-5.	Operate the system													SH	JICA Experts		
4-6.	Develop SOP for water distribution management													SH	JICA Experts		
4-7.	Evaluate the operation and SOP for water distribution management													SH	JICA Experts		
0. The project is managed and coordinated properly																	
0-1.	Establish Steering Committee, consisting of representative of HCWW, SHAPWASCO, GAPWASCO and MUPWASCO													HC, SH, G. M	JICA Experts		
0-2.	Coordinate among SHAPWASCO, GAPWASCO and MUPWASCO through the Steering Committee													HC, SH, G. M	JICA Experts		
0-3.	Organize the Joint Coordination Committee (JCC) meeting at least once a year													HC, SH, G. M	JICA Experts		
0-4.	Finalize the Indicators of the Project Design Matrix (PDM) for approval of the first JCC													HC, SH, G. M	JICA Experts		
0-5.	Draft Annual Plan of Operations (APO) based on the Plan of Operations (PO) for approval of the JCC													HC, SH, G. M	JICA Experts		
0-6.	Monitor the progress of PO/APO and achievement of the Indicators of the PDM							●				▲		HC, SH, G. M	JICA Experts		● Mid-Term Review ▲ Final Evaluation

Annual Plan of Operation -1 (General Activity)

Attachment-1

Items	2011												2012			
	Phase-1															
	4	5	6	7	8	9	10	11	12	1	2	3				
Output0 : The project is managed and coordinated properly																
0-1. Establish Steering Committee, consisting of representative of HCWW, SHAPWASCO, GHAPWASCO and MCWW																
0-2. Coordinate among SHAPWASCO, GHAPWASCO and MCWW through the Steering Committee																
0-3. Organize the Joint Coordinating Committee (JCC) meeting at least once a year																
0-4. Finalize the Indicators of the Project Design Matrix (PDM) for approval of the first JCC																
0-5. Draft Annual Plan of Operations (APO) based on the Plan of Operations (PO) for approval of the JCC																
0-6. Monitor the progress of PO/APO and achievement of the Indicators of the PDM																
Output1 : Human Resource Development through coordination among water supply companies in Sharkiya, Gharbia and Minufia Governorates is strengthened																
1-1. Conduct management training for the top management							Lecture in Egypt	Training in Japan								
1-2. Conduct Training of Trainers (TOT) for developing SOP								for SHAPWASCO								
1-2-1. OJT for training							OJT through SOP assessment									
1-2-2. Special training								TOT for lecture	Training in Japan							
1-3. Conduct TOT for NRW reduction								for SHAPWASCO								
1-3-1. OJT for training							OJT through training practices		for SHAPWASCO							
1-3-2. Special training								TOT for lecture	Training in Japan							
1-4. Disseminate the contents, the manners and the results of the collaboration among SHAPWASCO, GHAPWASCO and MCWW to the water supply companies in Nile Delta Area through reports and workshops																
1-4-1. Seminars / workshops to be conducted by SHAPWASCO								Seminar for Site NRW Meter Nile Delta tour practice workshop	Training for leak detection							
<Equipment Plan>																
Equipment Procurement (JICA Expert)			Preparation		Procurement			Procurement (generator) Transportation								
Equipment Procurement (JICA)							Procurement (Egypt)	Procurement (Japan)	Procurement (Japan)							
<Training in Japan>																
Management Training																
NRW																
SOP																

Attachment-3

Activities		Inputs	Important Assumption
1-1	Conduct management training for the top management	**Japanese side** 1) Japanese Experts · Chief advisor/water supply planning · NRW reduction management · Leakage detection · Water Treatment · Water quality · Electrical equipment · Mechanical equipment · Distribution network · Others (if necessary) 2) Local Expert 3) Equipment 4) Training in Japan 5) Local Cost **Egyptian side** 1) Counterpart Personnel · Project Director: Chairman, HCWW · Project Manager: Chairman, SHAPWASCO · Co-Project Manager: Chairman, GHAPWASCO Chairman, MCWW · SOP Team · NRW Team 2) Office space and facilities for the experts 3) Equipment 4) Necessary Information 5) Local Cost	Budget for the Project is allocated as planed by HCWW, SHAPWASCO, GHAPWASCO, and MCWW **【Pre-condition】** Budget for HRD is allocated properly to SHAPWASCO, GHAPWASCO and MCWW by HCWW
1-2	Conduct Training of Trainers (TOT) for developing SOP		
1-3	Conduct TOT for NRW reduction		
1-4	Disseminate the contents, the manners and the results of the collaboration among SHAPWASCO, GHAPWASCO and MCWW to the water supply companies in Nile Delta Area through reports and workshops		
2-1	Survey the current conditions of water supply facilities in Gharbia and Minufia Governorates		
2-2	Select 3 model facilities in Gharbia and Minufia Governorates each		
2-3	Organize SOP teams		
2-4	Conduct training for developing and applying SOPs at the facilities of Sharkiya Governorate		
2-5	Revise SOPs of Sharkiya Governorate, if necessary		
2-6	Develop SOPs for model facilities in Gharbia and Minufia Governorates based on SOPs for SHAPWASCO		
2-7	Conduct On-the-Job Training for GHAPWASCO and MCWW to apply SOPs in operation and maintenance		
2-8	Monitor the progress of SOP activities		
2-9	Draft the policy/plan for disseminating SOP to the other Marakazes		
3-1	Analyze the current situation on NRW in Gharbia and Minufia Governorates		
3-2	Select 3 model areas for NRW reduction in Gharbia and Minufia Governorates each		
3-3	Organize NRW reduction teams		
3-4	Formulate an action plan for NRW reduction activities based on the action plan for SHAPWASCO		
3-5	Conduct training on general practice of NRW reduction		
3-6	Conduct training at the training yard in Sharkiya Governorate		
3-7	Conduct training at model areas for water distribution management in Sharkiya Governorate		
3-8	Prepare GIS drawing for model areas in Gharbia and Minufia Governorates		
3-9	Make water balance analysis at model areas		
3-10	Conduct leakage detection survey at model areas		
3-11	Make water balance analysis after repair works		
3-12	Draft policy/plan for disseminating NRW reduction activities to the other Marakazes		
4-1	Discuss methods and conduct survey for water distribution management		
4-2	Conduct training for water distribution management		
4-3	Formulate a plan for water distribution management		
4-4	Install the equipment for water distribution management at the model area		
4-5	Operate the system		
4-6	Develop SOP for water distribution management		
4-7	Evaluate the operation and SOP for water distribution management		
0-1	Establish Steering Committee, consisting of representative of HCWW, SHAPWASCO, GHAPWASCO and MCWW		
0-2	Discuss the contents, the manners for the cooperation among SHAPWASCO, GHAPWASCO and MCWW through the Steering Committee		
0-3	Organize JCC at least once a year		
0-4	Finalize the Indicators of the Project Design Matrix (PDM) for approval of the first Joint Coordination Committee (JCC)		
0-5	Prepare a draft Annual Plan of Operations (APO) based on the Plan of Operations (PO) for approval of the first JCC		
0-6	Monitor the progress of PO/APO and achievement of the Indicators of the PDM		

Attachment-3

Project Design Matrix (PDM1)

Dated September 27,2011

Project Name : The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area

Duration : FY2011-FY2013

Project Site : Sharkiya Governorate, Gharbia Governorate, Minufia Governorate (Nile Delta Area)

Target Group : Staff of SHAPWASCO, GHAPWASCO, MCWW

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
【Super Goal】 Management capacity of operation and maintenance of water supply facilities is improved in Nile Delta Area	Performance Indicators (PIs) in the fields of management capacity of operation and maintenance are improved in Nile Delta Area	Quarterly Reports of all water supply companies in Nile Delta Area submitted to HCWW	
【Overall Goal】 Management capacity of operation and maintenance of water supply facilities is improved in Sharkiya, Gharbia and Minufia Governorates	PIs in the fields of management capacity of operation and maintenance are improved in Sharkiya, Gharbia, and Minufia Governorates	Quarterly reports of SHAPWASCO, GHAPWASCO, MCWW	Central and local government budget for development of water supply facilities is allocated appropriately
【Project Purpose】 Management capacity of operation and maintenance of water supply facilities is improved at the model areas/facilities in Sharkiya, Gharbia and Minufia Governorates	PIs in the fields of management capacity of operation and maintenance are improved at the model areas/facilities	Quarterly reports of SHAPWASCO, GHAPWASCO, MCWW	Governmental policy on water supply sector does not change significantly
【Output】 1) Human Resource Development through collaboration among water supply companies in Sharkiya, Gharbia and Minufia Governorates in strengthened	a. More than 3 members each of SOP/NRW teams in SHAPWASCO · GHAPWASCO · MCWW are approved as trainers by Steering Committee b. More than 20 times of seminars/workshops are organized under inter-company cooperation by the Project team	a. Certification of Training b. Reports of workshops	Employees who received trainings by the Project will continuously work for SHAPWASCO, GHAPWASCO, MCWW Personnel transfer of executive management will not affect the implementation of the Project
2) Based on the experiences of SHAPWSCO, SOPs are developed and utilized at the model facilities in Gharbia and Minufia Governorates	a. More than 80% of SOP team members rates understanding of trainings more than 3 on the 5-scale evaluation b. The model facilities are operated and maintained based on SOP c. Improvement of PIs for the model facilities are evaluated based on SOP	a, b, c. Project Progress Reports	
3) The institutional skills and experiences of SHAPWASCO for NRW reduction are transferred to NRW teams at the model areas in Gharbia and Minufia Governorates	a. More than 80% of NRW teams members rates understanding of trainings more than 3 on the 5-scale evaluation b. Water balance analysis is conducted properly for the 3 model areas c. 100% of detected leakage is repaired at the model area	a, b, c. Project Progress Reports	
4) The water distribution management capacity is improved in Sharkiya Governorate as an advanced model	a. Water distribution is managed based on SOP at the model areas b. Issues on water distribution capacity are reported to top management of SHAPWASCO	a, b. Project Progress Reports	
0) The project is managed and coordinated properly	a. Agreement on the coordination among SHAPWASCO · GHAPWASCO · MCWW is prepared b. Project activities are regularly monitored based on PO/APO	a. Agreement Document b. Project Progress Reports	

A3-6

Minutes of Meeting
on
The 2nd JCC
for
The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area

The 11th of March 2012

Mr. Mamdouh Raslan	Dr. Salah Bayoumi	Mr. Katsumi Fujii
Vice Chairman	Project Manager	Chief Advisor
Holding Company for Water and Wastewater (HCWW)	Head of Project Sector Holding Company for Water and Wastewater (HCWW)	The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area, Japan International Cooperation Agency (JICA)

Mr. Ahmed Abdeen	Mr. Ayman Abd El Kader	Mr. Mohamed Abu El Khair
Project Co-Manager	Project Co-Manager	Project Co-Manager
Chairman	Chairman	Chairman
Sharkiya Potable Water and Sanitation Company (SHAPWASCO)	Gharbia Potable Water and Sanitation Company (GHAPWASCO)	Minufia Company for Water and Wastewater

To start Phase-2 of the Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area (hereinafter referred to as "the Project"), the second meeting for Joint Coordinating Committee (hereinafter referred to as "JCC") was held on the 11th of March 2012.

The following were confirmed in the meeting:

1. Progress of the Project

Dr. Salah Bayoumi, the Project Manager, explained the progress of the Project. The participants confirmed it.

2. APO

Mr. Katsumi Fujii, the Chief Advisor, explained activities' plan for the Phase 2 and proposed the Annual Plan of Operation (hereinafter referred to as "APO") as the results of the steering committee meeting held on the 26th February 2012 (Attachment-1). The APO was approved by the participants.

3. Other Discussions

In the course of the meeting, the following are commented / discussed by the participants.

(1) Schedule for SOP and NRW activities

The participant confirmed that the Project team tries to finish the planned activities as early as possible for SOP and NRW, so that the team adds other model facilities/areas for the Project. Since the preparation works such as chambers construction is one of the critical items for management of scheduling and financing, the three companies (SHAPWASCO, GHAPWASCO and MCWW) requested HCWW to support financially.

(2) More Closed Communication between the Project Co-Managers and members of the Project Team

MCWW requested the Project team to provide more detailed schedules (monthly) for the Project Co-Manager to enable follow-up of the programs / activities. JICA expert team (hereinafter referred to as "JET") will consider providing such schedules and more meeting than the current Project Team Meetings (PTMs), especially for less available cases of JICA experts.

JET requested MCWW to provide the head of the Project team, who direct both SOP and NRW teams as a responsible for the whole activities. MCWW answered that the nomination was finished but under examination for appropriateness.

(3) Person in HCWW to promote Communication among ACs and to Publicize the Project Activities

JET requested HCWW to provide a staff member in charge of communication/publicity for/of the Project. The purposes are as follows:

- Collect the Project's information timely and periodically (including site visits) and disclose it in meetings of Affiliated Companies (hereinafter referred to as "ACs") and newsletters of HCWW, under HCWW initiatives.

- Promote inter-company cooperation in Nile Delta and Egypt for water supply service.
- Promote sustainability of the Project outputs through monitoring the 3 ACs' activities after the Project, for the inter-company cooperation and the continuous activities on SOP, NRW and WDM.
- Publicize the Project and activities to other donors and share the information by HCWW newsletters.
- Publicize the Project and activities to the general public by the homepage of HCWW (in both English and Arabic).

HCWW agreed to assign someone soon for the mentioned purpose.

(4) Training in Japan for WDM

Training in Japan for WDM is planned to be in September 2012. Although JICA had a plan initially to receive two trainees for WDM, four trainees would be acceptable. The increase of trainees' number will be approved by JICA after confirmation of the candidates' skills, experiences, activities in the Project, current positions, future activities in WDM, etc. JET requested the Egyptian side to nominate the candidates and prepare the application forms within 10 days at least by the end of March 2012 for approval.

(end)

A3-7

Annex : List of Participant

List of Participant

[Egyptian side]	
Mr. Mamdouh Raslan	Vice Chairman of HCWW
Dr. Salah Bayoumi	Head of Project Sector of HCWW
Mr. Ahmed Abdeen	Chairman of SHAPWASCO
Mr. Ayman Abd El Kader	Chairman of GHAPWASCO
Mr. Mohamed Abu El Khair	Chairman of MCWW
[Japanese side]	
Mr. Katsumi Fujii	Chief Advisor / Water supply planning
Mr. Hiroki Niimura	Leakage Detection
Mr. Ryoji Nagao	Mechanical Equipment
Mr. Nagi Gaber	Facilitator
Mr. Shigeru Otake	Senior Representative, JICA Egypt office
Mr. Koichi Mizukusa	Representative, JICA Egypt office
Ms. Heba Hamdy	Program Officer

Attacment-1 Phase-2: Annual Plan of Operation (General Activity)

	Items	2012 Phase-2 2	3	4	5	6	7	8	9	10	11	12	2013 1	2	3
Output0 :	**The project is managed and coordinated properly**														
0-2.	Coordinate among SHAPWASCO, GHAPWASCO and MCWW through the Steering Committee	■	■	■	■	■	■	■	■	■	■	■	■	■	■
0-3.	Organize the Joint Coordinating Committee (JCC) meeting at least once a year		■												■
0-5.	Draft Annual Plan of Operations (APO) based on the Plan of Operations (PO) for approval of the JCC		■											■	
0-6.	Monitor the progress of PO/APO and achievement of the Indicators of the PDM	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Output1:	**Human Resource Development through coordination among water supply companies in Sharkiya, Gharbia and Minufia Governorates is strengthened**														
1-2.	Conduct Training of Trainers (TOT) for developing SOP	for SHAPWASCO													
1-2-1.	OJT for training	OJT through SOP assessment													
1-3.	Conduct TOT for NRW reduction	for SHAPWASCO													
1-3-1.	OJT for training	OJT through training practice													
1-4	Disseminate the contents, the manners and the results of the collaboration among SHAPWASCO, GHAPWASCO and MCWW to the water supply companies in Nile Delta Area through reports and workshops	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1-4-1.	Seminars / workshops to be conducted by SHAPWASCO				SOP				SOP	NRW	SOP			SOP	WDM
1-4-2.	Training on water leakage survey and water leakage detection equipment at the training yard in Sharkiya Governorate	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1-4-3.	Open seminars									■					
	<Equipment Plan>														
	Equipment Procurement (JICA Expert)	Procurement	■	■	■	Transport ■									
						Delivery ■									
	Equipment Procurement (JICA)	Procurement (Water CAD) ■									Procurement (WDM) ■				
	<Training in Japan>														
	WDM								■						

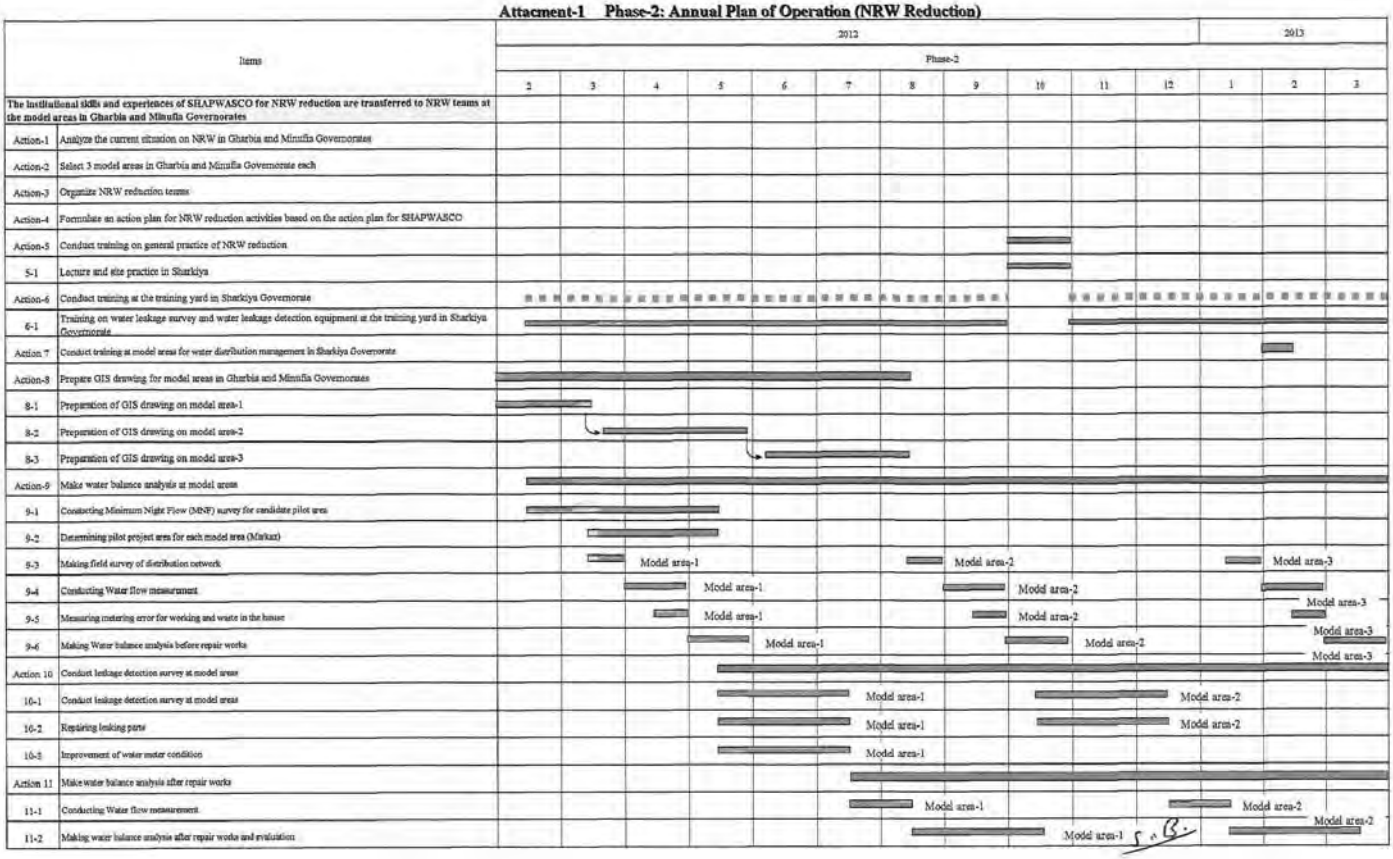
S.B.

Attacment-1 Phase-2: Annual Plan of Operation (Development of SOP)

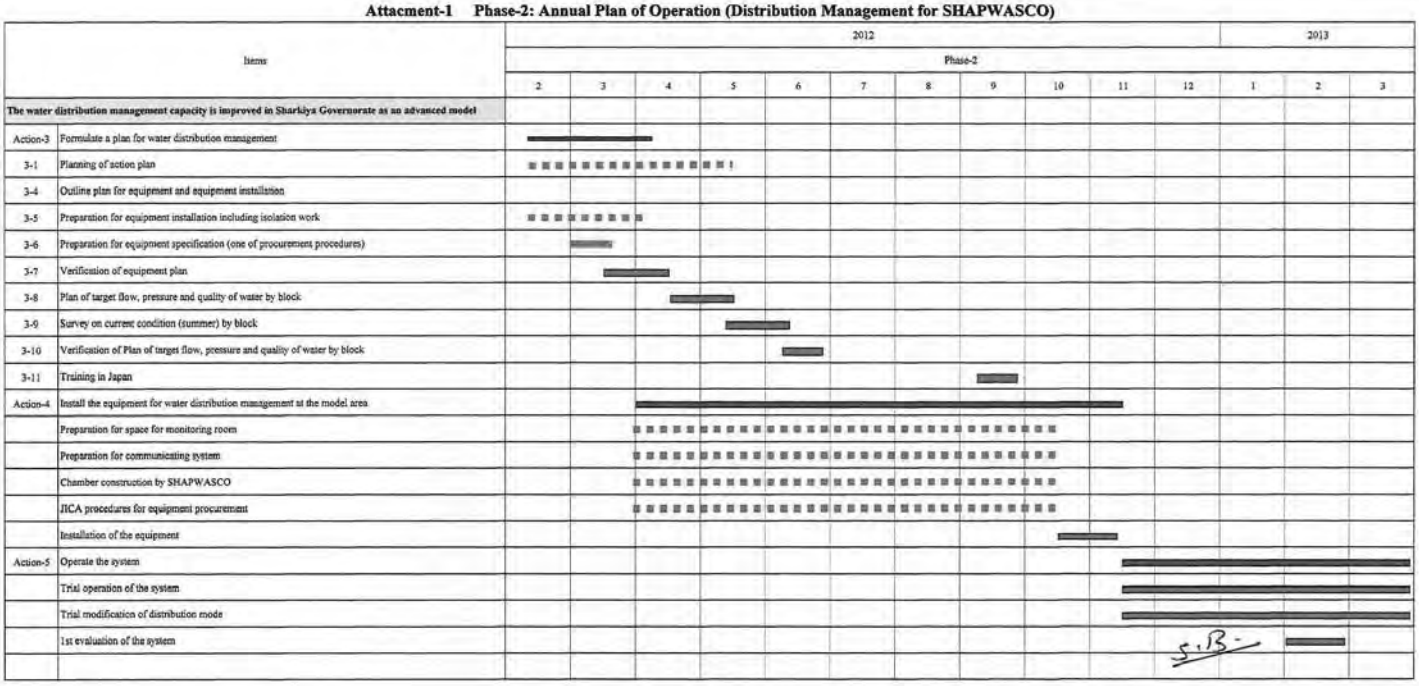
	Items	2012 Phase-2 2	3	4	5	6	7	8	9	10	11	12	2013 1	2	3
Based on the experiences of SHAPWSCO, SOPs are developed and utilized at the model facilities in Gharbia and Minufia Governorates															
Action-1	Survey the current conditions of water supply facilities in Gharbia and Minufia Governorates														
Action-2	Select 3 model facilities in Gharbia and Minufia Governorates each														
Action-3	Organize SOP teams														
Action-4	Conduct training for developing and applying SOPs at the facilities of Sharkiya Governorate								■	■	■	■			
4-1	Assessment of the effectiveness of SOPs in Sharkiya Governorate		■	■	■	■									
4-2	Extraction of the problematic point					■	■								
Action-5	Revise SOPs of Sharkiya Governorate, if necessary		■	■	■	■	■								
5-1	Revision of SOPs of Sharkiya Governorate								■	■	■	■			
Action-6	Develop SOPs for model facilities in Gharbia and Minufia Governorates based on SOPs for SHAPWASCO	■	■	■	■	■	■	■	■	■	■	■	■	■	■
6-1	Examination for the site condition (C/P organization control, Cooperative framework of trainer etc.)														
6-2	Preparation of basic system drawings (P&ID, Single line diagram)	■	■	■	■										
6-3	Preparation of draft SOPs for O&M with site training		■	■	■	■	■								
6-4	Preparation of unified forms of O&M records and reports		■	■	■	■				■	■	■			
6-5	Examination of water quality management				■	■									
6-6	Preparation of draft SOPs for water quality management					■	■	■	■	■	■	■			
Action-7	Conduct On-the-Job Training for GHAPWASCO and MCWW to apply SOPs in operation and maintenance	■	■	■	■	■	■	■	■	■	■	■	■	■	■
7-1	Applying of SOP on On-the-Job Training		■	■	■	■	■	■	■	■	■	■	■	■	■
Action-8	Monitor the progress of SOP activities												■	■	■
8-1	Monitoring of activity condition on On-the-Job Training								■	■				■	■

S.B.

Attacment-1 Phase-2: Annual Plan of Operation (NRW Reduction)



Attacment-1 Phase-2: Annual Plan of Operation (Distribution Management for SHAPWASCO)



Minutes of Meeting
on
The 3rd JCC
for
The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area

The 26th of November 2012

A3-10

Mr. El Sayed Nasr	Dr. Salah Bayoumi	Mr. Katsumi Fujii
Project Director	Project Manager	Chief Advisor
Chairman	Head of Project Sector	The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area, Japan International Cooperation Agency (JICA)
Holding Company for Water and Wastewater (HCWW)	Holding Company for Water and Wastewater (HCWW)	
Mr. Ahmed Abdeen	Mr. Ayman Abd El Kader	Mr. Ezzat El Sayad
Project Co-Manager	Project Co-Manager	Project Co-Manager
Chairman	Chairman	Chairman
Sharkiya Potable Water and Sanitation Company (SHAPWASCO)	Gharbia Potable Water and Sanitation Company (GHAPWASCO)	Minufia Company for Water and Wastewater (MCWW)

The third meeting of the Joint Coordinating Committee (hereinafter referred to as "JCC") was held on the 26th of November 2012 for the Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply (hereinafter referred to as "the Project"). The following were confirmed in the meeting:

1. Modification of Model Facilities

(1) SWTP in GHAPWASCO

In the 4th steering committee, GHAPWASCO requested to replace the SOP model facility (the old Tanta treatment plant: Gedeeda) with the new one (Melahia) for SWTP. It was approved by the JCC and the participants confirmed the following:

1) Gedeeda should be replaced with Melahia for the model facility of SWTP.
2) SOP of Gedeeda should be developed by GHAPWASCO. JICA Expert Team (JET) will assist it unofficially for the SOP development.

(2) Well in MCWW

MCWW requested to replace Dekma with Ashama for the model well, due to the following reasons:

1) Groundwater level is decreasing. Accordingly, the well should be closed soon.
2) An alternative well is not allowed by Ministry of Health to be drilled in the well field, in a view of environmental conditions.

The JCC approved the replacement and the participants confirmed the following:

- MCWW will install a new flow meter.
- MCWW will repair a flow meter, which is not functioning.

2. PIs to evaluate the Project Achievements

The participants agreed on the PIs to be applied for the Project evaluation as follows:

2-1 PIs to be monitored officially by the Project

(1) SOP

1) Energy consumption per cubic meter of water produced (kWh/m^3)

"Energy consumption in SWTP / Fe-Mn facility (kWh)" / "Water production (m^3)"

It should be monitored monthly.

2) Unit consumption of alum sulfate / chlorine / potassium permanganate used per one cubic meter of water produced (g/m^3)

"Consumption of alum sulfate / chlorine / potassium permanganate in SWTP / Fe-Mn facility (g)" / "Water production (m^3)"

It should be monitored monthly.

3) Ratio of effective utilization of raw water (%)

"Production volume of plant (m^3)" / "Intake volume of plant (m^3)"

It should be monitored monthly.

(2) NRW

1) NRW ratio (%)

"NRW (m^3)" / "System input volume (m^3)"

"NRW (m^3)" = "System input volume (m^3)" – "Billed water (m^3)"

2) Reduction rate of NRW

Reduction rate of NRW (%)

("NRW ratio before improvement (%)" - "NRW ratio after improvement (%)) / "NRW ratio before improvement (%)"

(3) WDM

1) Number of complaints per 1000 connections on water suspension and low pressure (Nos)

"Number of complaints on water suspension and low pressure" / 1000 connections

It should be monitored monthly. The Project team will propose improvement of record and/or confirmation system of complaints during the Project period, such as screening in accordance with causes of troubles.

2) Ratio of low service pressure (%)

("Total hours of low pressure recorded at all continuous monitoring points" / ("Number of points for continuous pressure monitoring" x 30 days x 24hours)

It should be monitored monthly. The pressure level to be recorded as low pressure was defined as less than 1 bar. However, WDM team will provide analysis for other cases such as 1.5 bars, 2 bars, etc.

2-2 PIs to be monitored as reference indicators by ACs for self-evaluation

(1) SOP

Suspension hours of SWTP or Fe/Mn facilitiy (Hours)

"Suspension hours of SWTP or Fe/Mn facilitiy (Hours)"

It is only for complete suspension of water treatment facility due to damages / troubles of plant.

It should be monitored by MCWW at three months interval.

(2) WDM

Ratio of Public Opinion mentioning enough pressure (%)

"Number of interviewees mentioning enough and/or improved pressure" / "Total number of interviewees"

Ayman SB Abdeen

It is a subject to be conducted by SHAPWASCO in Area-4 only. It should be conducted before and after the pilot Project. Prior to the survey as well as the pilot project, SHAPWASCO will check the actual pressures in Area-4.

3. Dissemination in the Governorate

In order to disseminate the skills for SOP and NRW, the commencement of dissemination is expected to be conducted in the next half period of the Project. The participants confirmed that the following are to be started by the Egyptian C/P members without or less input of JICA experts.

SOP

- To select next model facilities.
- To survey the system of treatment.
- To make drawings such as P&ID, single line diagram.
- To undertake necessary calibration / installation of meters.
- To prepare draft SOP as well as commencement of data acquisition and record.

NRW

- To select next model areas.
- To construct chambers for flow meters as well as arrangement of isolation.
- To conduct MNF survey.
- To conduct water balance survey.
- To conduct initial survey for leakage.

In parallel, GHAPWASCO and MCWW will reform the organization to have permanent department for SOP and NRW having full-time staff members in the course of the Project.

4. Recommendation for NRW activities

JET recommends the following to be conducted by the Project after completion of activities in the current three model areas, in order to promote leak detection capacity. It should be conducted together with members of branch offices. The participant agreed with the recommendation. However, detail plan should be discussed more with each of GHAPWASCO and MCWW.

Activities

1) To choose model areas (3 – 5ha) regardless of possibility of isolation.
2) To make survey for leakage in the area.
3) To estimate the leak volume during the repair works.
4) To calculate the estimated leak volume per ha. (To estimate the reduction volume of NRW / ha.)
5) To evaluate the efficiency of leak detection / repair.
6) To commence the other model area.

Ayman SB Abdeen

5. Modification of PDM and PO

Taking into account the current progress (including delays) and discussion on PIs, JET recommended modifying the PDM and PO as shown in Annex-2 and 3. The participants agreed on the modification.

(end)

A3-12

ANNEX

Project Design Matrix (PDM2)

Dated November 26, 2012

Project Name : The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area

Duration : FY2011-FY2013

Project Site : Sharkiya Governorate, Gharbia Governorate, Minufia Governorate (Nile Delta Area)

Target Group : Staff of SHAPWASCO, GHAPWASCO, MCWW

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
【Super Goal】 Management capacity of operation and maintenance of water supply facilities is improved in Nile Delta Area	Performance Indicators (PIs) in the fields of management capacity of operation and maintenance are improved in Nile Delta Area	Quarterly Reports of all water supply companies in Nile Delta Area submitted to HCWW	
【Overall Goal】 Management capacity of operation and maintenance of water supply facilities is improved in Sharkiya, Gharbia and Minufia Governorates	PIs in the fields of management capacity of operation and maintenance are improved in Sharkiya, Gharbia, and Minufia Governorates	Quarterly reports of SHAPWASCO, GHAPWASCO, MCWW	Central and local government budget for development of water supply facilities is allocated appropriately
【Project Purpose】 Management capacity of operation and maintenance of water supply facilities is improved at the model areas/facilities in Sharkiya, Gharbia and Minufia Governorates	PIs (*1) in the fields of management capacity of operation and maintenance are improved at the model areas/facilities	Quarterly reports of SHAPWASCO, GHAPWASCO, MCWW	~~Governmental policy on water supply sector does not change significantly~~
【Output】 1) Human Resource Development through collaboration among water supply companies in Sharkiya, Gharbia and Minufia Governorates in strengthened	a. More than 3 members each of SOP/NRW teams in SHAPWASCO・GHAPWASCO・MCWW are approved as trainers by Steering Committee b. More than 20 times of seminars/workshops are organized under inter-company cooperation by the Project team	a. Certification of Training b. Reports of workshops	Employees who received trainings by the Project will continuously work for SHAPWASCO, GHAPWASCO, MCWW Personnel transfer of executive management will not affect the implementation of the Project
2) Based on the experiences of SHAPWSCO, SOPs are developed and utilized at the model facilities in Gharbia and Minufia Governorates	a. More than 80% of SOP team members rates understanding of trainings more than 3 on the 5-scale evaluation b. The model facilities are operated and maintained based on SOP c. Improvement of PIs (*1) for the model facilities are evaluated based on SOP	a, b, c. Project Progress Reports	
3) The institutional skills and experiences of SHAPWASCO for NRW reduction are transferred to NRW teams at the model areas in Gharbia and Minufia Governorates	a. More than 80% of NRW teams members rates understanding of trainings more than 3 on the 5-scale evaluation b. Water balance analysis is conducted properly for the 3 model areas c. 100% of detected leakage is repaired at the model area	a, b, c. Project Progress Reports	
4) The water distribution management capacity is improved in Sharkiya Governorate as an advanced model	a. Water distribution is managed based on SOP at the model areas b. Issues on water distribution capacity are reported to top management of SHAPWASCO	a, b. Project Progress Reports	
0) The project is managed and coordinated properly	a. Agreement on the coordination among SHAPWASCO・GHAPWASCO・MCWW is prepared b. Project activities are regularly monitored based on PO/APO	a. Agreement Document b. Project Progress Reports	

*1 PIs

SOP: a. Energy consumption per m^3 of water production (kWh/m^3) b. Unit consumption of alum sulfate/ chlorine / potassium permanganate used per m^3 of water production (g/m^3)
c. Ratio of effective utilization of raw water (%)

NRW: a. NRW ratio (%) b. Reduction ratio of NRW (%)

WDM: a. Number of complaints per 1000 connections on water suspension and low pressure (%) b. Ratio of low service pressure (%)

Ayman Abdeen

A-2A7-8

Annex-1 : List of Participant

List of Participant

[Egyptian Side]

Mr. El Sayed Nasr	Chairman of HCWW
Mr. Mamdouh Raslan	Vice Chairman of HCWW
Dr. Salah Bayoumi	Head of Project Sector of HCWW
Mr. Ahmed Abdeen	Chairman of SHAPWASCO
Mr. Ayman Abd El Kader	Chairman of GHAPWASCO
Mr. Ezzat El Sayad	Chairman of MCWW
Mr. Alae El Din Mohamed	Head of C/P Team/Headquarters of SHAPWASCO
Mr. Mohamed Atef Abdel Hamid	Assistant for head of WDM team/Headquarters of SHAPWASCO
Mr. Ahmed Abdel Maaboud El Maleh	SOP team leader of GHAPWASCO
Mr. Ahmed El Said Rabea	NRW team leader of GHAPWASCO

[Japanese Side]

Mr. Katsumi FUJII	Chief Advisor/Water Supply Planning
Mr. Hiroki NIIMURA	Leakage Detection
Mr. Ryoji NAGAO	Mechanical Equipment
Mr. Kenji YAMADA	Hydraulic Analysis for Network
Mr. Masahiro TAKEUCHI	Distribution Network(1)
Mr. Nobuyuki IIJIMA	Well Monitoring
Mr. Atsushi KATO	Coordinator
Mr. Nagi GABER	Facilitator of Project Team
Mr. Mohamed ABOU ZEKRY	Facilitator of Project Team
Mr. Mohammed ABD El-KADER	Facilitator of Project Team
Mr. Yoshiki OMURA	JICA Senior Advisor
Mr. Satoshi HAMANO	JICA Global Environment Department
Mr. Nobuhisa IWASE	JICA Mid-term Review Team
Mr. Shigeru OTAKE	Senior Representative, JICA Egypt Office
Mr. Koichi MIZUKUSA	Representative, JICA Egypt Office
Ms. Sally Abdel Aziz	Project Assistant, JICA Egypt Office

Abdeen

Ayman

A-1

A7-7

Annex-3 : PO2

The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area

Plan of Operation (PO-2)

26 November 2012

Items	Year1				Year2				Year3				Person in Charge	Major Input		Remarks
	1	2	3	4	1	2	3	4	1	2	3	4		Japan	Egypt	
1. Human Resource Development through collaboration among water supply companies in Sharkiya, Gharbia and Minufia Governorates is strengthened																
1-1. Conduct management training for the top management			☆										HC, SH, G.M	☆ Training in Japan		
1-2. Conduct Training of Trainers (TOT) for developing SOP			☆										SH, G.M	JICA Experts Local Experts ☆ Training in Japan		Year 1: Mainly for SH Year 3: Mainly for G.M
1-3. Conduct TOT for NRW reduction			☆										SH, G.M	JICA Experts Local Experts ☆ Training in Japan		
1-4. Disseminate the contents, the manners and the results of the collaboration among SHAPWASCO, GHAPWASCO and MCWW to the water supply companies in Nile Delta Area through reports and workshops													HC, SH, G.M	JICA Experts		
2. Based on the experiences of SHAPWASCO, SOPs are developed and utilized at the model facilities in Gharbia and Minufia Governorates																
2-1. Survey the current conditions of water supply facilities in Gharbia and Minufia Governorates													G.M	JICA Experts	SH	
2-2. Select 3 model facilities in Gharbia and Minufia Governorates each													G.M	JICA Experts	SH	
2-3. Organize SOP teams													G.M	JICA Experts	SH	
2-4. Conduct training for developing and applying SOPs at the facilities of Sharkiya Governorate													G.M	JICA Experts	SH	
2-5. Revise SOPs of Sharkiya Governorate, if necessary													G.M	JICA Experts	SH	
2-6. Develop SOPs for model facilities in Gharbia and Minufia Governorates based on SOPs for SHAPWASCO													G.M	JICA Experts	SH	
2-7. Conduct On-the-Job Training for GHAPWASCO and MCWW to apply SOPs in operation and maintenance													G.M	JICA Experts	SH	
2-8. Monitor the progress of SOP activities													G.M	JICA Experts	SH	
2-9. Draft the policy/plan for disseminating SOP to the other Marakazes													G.M	JICA Experts	SH	
3. The institutional skills and experiences of SHAPWASCO for NRW reduction are transferred to NRW teams at the model areas in Gharbia and Minufia Governorates																
3-1. Analyze the current situation on NRW in Gharbia and Minufia Governorates													G.M	JICA Experts	SH	
3-2. Select 3 model areas in Gharbia and Minufia Governorates each													G.M	JICA Experts	SH	
3-3. Organize NRW reduction teams													G.M	JICA Experts	SH	
3-4. Formulate an action plan for NRW reduction activities based on the action plan for SHAPWASCO													G.M	JICA Experts	SH	
3-5. Conduct training on general practice of NRW reduction													G.M	JICA Experts	SH	
3-6. Conduct training at the training yard in Sharkiya Governorate													G.M	JICA Experts ☆ Training in Japan	SH	
3-7. Conduct training at model areas for water distribution management in Sharkiya Governorate													G.M	JICA Experts	SH	
3-8. Prepare GIS drawing for model areas in Gharbia and Minufia Governorates													G.M	JICA Experts	SH	
3-9. Make water balance analysis at model areas													G.M	JICA Experts	SH	
3-10. Conduct leakage detection survey at model areas													G.M	JICA Experts	SH	
3-11. Make water balance analysis after repair works													G.M	JICA Experts	SH	
3-12. Draft policy/plan for disseminating NRW reduction activities to the other Marakazes													G.M	JICA Experts	SH	
4. The water distribution management capacity is improved in Sharkiya governorate as an enhanced model																
4-1. Discuss methods and conduct survey for water distribution management													SH	JICA Experts		
4-2. Conduct training for water distribution management													SH	JICA Experts ☆ Training in Japan		
4-3. Formulate a plan for water distribution management													SH	JICA Experts		
4-4. Install the equipment for water distribution management at the model area													SH	JICA Experts		
4-5. Operate the system													SH	JICA Experts		
4-6. Develop SOP for water distribution management													SH	JICA Experts		
4-7. Evaluate the operation and SOP for water distribution management													SH	JICA Experts		
0. The project is managed and coordinated properly																
0-1. Establish Steering Committee, consisting of representative of HCWW, SHAPWASCO, GHAPWASCO and MCWW													HC, SH, G.M	JICA Experts		
0-2. Coordinate among SHAPWASCO, GHAPWASCO and MCWW through the Steering Committee													HC, SH, G.M	JICA Experts		
0-3. Organize the Joint Coordination Committee (JCC) meeting at least once a year													HC, SH, G.M	JICA Experts		
0-4. Finalize the Indicators of the Project Design Matrix (PDM) for approval of the first JCC													HC, SH, G.M	JICA Experts		
0-5. Draft Annual Plan of Operations (APO) based on the Plan of Operations (PO) for approval of the JCC													HC, SH, G.M	JICA Experts		
0-6. Monitor the progress of PO&APO and achievement of the Indicators of the PDM													HC, SH, G.M	JICA Experts		● Mid-Term Review ▲ Final Evaluation

A7-10
A-4

	Activities	Inputs	Important Assumption
1-1	Conduct management training for the top management	Japanese side 1) Japanese Experts ・ Chief advisor/water supply planning ・ NRW reduction management ・ Leakage detection ・ Water Treatment ・ Water quality ・ Electrical equipment ・ Mechanical equipment ・ Distribution network ・ Others (if necessary) 2) Local Expert 3) Equipment 4) Training in Japan 5) Local Cost Egyptian side 1) Counterpart Personnel ・ Project Director: Chairman, HCWW ・ Project Manager: Chairman, SHAPWASCO ・ Co-Project Manager: Chairman, GHAPWASCO Chairman, MCWW ・ SOP Team ・ NRW Team 2) Office space and facilities for the experts 3) Equipment 4) Necessary Information 5) Local Cost	Budget for the Project is allocated as planed by HCWW, SHAPWASCO, GHAPWASCO, and MCWW 【Pre-condition】 Budget for HRD is allocated properly to SHAPWASCO, GHAPWASCO and MCWW by HCWW
1-2	Conduct Training of Trainers (TOT) for developing SOP		
1-3	Conduct TOT for NRW reduction		
1-4	Disseminate the contents, the manners and the results of the collaboration among SHAPWASCO, GHAPWASCO and MCWW to the water supply companies in Nile Delta Area through reports and workshops		
2-1	Survey the current conditions of water supply facilities in Gharbia and Minufia Governorates		
2-2	Select 3 model facilities in Gharbia and Minufia Governorates each		
2-3	Organize SOP teams		
2-4	Conduct training for developing and applying SOPs at the facilities of Sharkiya Governorate		
2-5	Revise SOPs of Sharkiya Governorate, if necessary		
2-6	Develop SOPs for model facilities in Gharbia and Minufia Governorates based on SOPs for SHAPWASCO		
2-7	Conduct On-the-Job Training for GHAPWASCO and MCWW to apply SOPs in operation and maintenance		
2-8	Monitor the progress of SOP activities		
2-9	Draft the policy/plan for disseminating SOP to the other Marakazes		
3-1	Analyze the current situation on NRW in Gharbia and Minufia Governorates		
3-2	Select 3 model areas for NRW reduction in Gharbia and Minufia Governorates each		
3-3	Organize NRW reduction teams		
3-4	Formulate an action plan for NRW reduction activities based on the action plan for SHAPWASCO		
3-5	Conduct training on general practice of NRW reduction		
3-6	Conduct training at the training yard in Sharkiya Governorate		
3-7	Conduct training at model areas for water distribution management in Sharkiya Governorate		
3-8	Prepare GIS drawing for model areas in Gharbia and Minufia Governorates		
3-9	Make water balance analysis at model areas		
3-10	Conduct leakage detection survey at model areas		
3-11	Make water balance analysis after repair works		
3-12	Draft policy/plan for disseminating NRW reduction activities to the other Marakazes		
4-1	Discuss methods and conduct survey for water distribution management		
4-2	Conduct training for water distribution management		
4-3	Formulate a plan for water distribution management		
4-4	Install the equipment for water distribution management at the model area		
4-5	Operate the system		
4-6	Develop SOP for water distribution management		
4-7	Evaluate the operation and SOP for water distribution management		
0-1	Establish Steering Committee, consisting of representative of HCWW, SHAPWASCO, GHAPWASCO and MCWW		
0-2	Discuss the contents, the manners for the cooperation among SHAPWASCO, GHAPWASCO and MCWW through the Steering Committee		
0-3	Organize JCC at least once a year		
0-4	Finalize the Indicators of the Project Design Matrix (PDM) for approval of the first Joint Coordination Committee (JCC)		
0-5	Prepare a draft Annual Plan of Operations (APO) based on the Plan of Operations (PO) for approval of the first JCC		
0-6	Monitor the progress of PO/APO and achievement of the Indicators of the PDM		

A7-9
A-3

Minutes of Meeting
on
The 4th JCC
for
The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area

The 30th of October 2013

Mr. Mamdouh Raslan	Dr. Salah Bayoumi	Mr. Katsumi Fujii
Project Director	Project Manager	Chief Advisor
Chairman	Vice Chaiman	The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area, Japan International Cooperation Agency (JICA)
Holding Company for Water and Wastewater (HCWW)	Holding Company for Water and Wastewater (HCWW)	

Mr. Ahmed Abdeen	Mr. Ayman Abd El Kader	Mr. Ezzat El Sayad
Project Co-Manager	Project Co-Manager	Project Co-Manager
Chairman	Chairman	Chairman
Sharkiya Potable Water and Sanitation Company (SHAPWASCO)	Gharbia Potable Water and Sanitation Company (GHAPWASCO)	Minufia Company for Water and Wastewater (MCWW)

The forth meeting of the Joint Coordinating Committee (hereinafter referred to as "JCC") was held on the 30th of October 2013 for the Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply (hereinafter referred to as "the Project"). It was planned to be the 7th steering committee. However, the participants confirmed to be managed as the 4th JCC since the Project Director attended it and confirmed the modification of PDM and PO. The following were confirmed in the meeting:

1. Modification of PDM and PO

The Project Manager explained a schedule of the Project to cover the suspension period of the expert assignment from July to October 2013, utilizing the modification drafts for PDM and PO, which were presented by JICA Expert Team (JET). The participants agreed on the draft to be new schedule. Through the discussion, the following are confirmed;

(1) Final evaluation is planned to be conducted in February 2014.
(2) The Project is planned to be ended in August 2014.

2. Confirmation of Project Director and Project Manager

Based on the modified assignment of top management for HCWW, the participants confirmed the management staff of the Project as follows;

Project Director:	Mr. Mamdouh Raslan,	Chairman of HCWW
Project Manager:	Dr. Salah Bayoumi,	Vice Chairman of HCWW

(end)

ANNEX

List of Participant

[Egyptian Side]

Mr. Mamdouh Raslan	Chairman of HCWW
Dr. Salah Bayoumi	Vice Chairman of HCWW
Mr. Ahmed Abdeen	Chairman of SHAPWASCO
Mr. Ayman Abd El Kader	Chairman of GHAPWASCO
Mr. Ezzat El Sayad	Chairman of MCWW
Mr. Alae El Din Mohamed	Head of C/P Team/Headquarters of SHAPWASCO
Mr. Ahmed Maher	WDM team/Headquarters of SHAPWASCO
Mr. Abd El Rahim Mohamed	WDM team/Headquarters of SHAPWASCO
Mr. Mostafa Ibrahim	WDM team/Headquarters of SHAPWASCO
Mr. Ahmed El Maleh	Head of SOP Team of GHAPWASCO
Mr. Ahmed Rabee'	Head of NRW Team of GHAPWASCO
Mr. Ayman Bassyouni	Head of SOP Team of MCWW
Mr. Mohamed El Shafee	NRW Team of MCWW

[Japanese Side]

Mr. Katsumi Fujii	Chief Advisor/Water Supply Planning
Mr. Nagi Gaber	Facilitator of Project Team
Mr. Mohamed Abouzekry	Facilitator of Project Team
Mr. Mohammed Abd El-Kader	Facilitator of Project Team
Mr. Shiro Nakasone	Senior Representative, JICA Egypt Office
Ms. Sally Abdel Aziz	Program Officer, JICA Egypt Office

Annex-2: Project Design Matrix (PDM3)

Dated October 30, 2013

Project Name : The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area Duration : FY2011-FY2014

Project Site : Sharkiya Governorate, Gharbia Governorate, Minufia Governorate (Nile Delta Area) Target Group : Staff of SHAPWASCO, GHAPWASCO, MCWW

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
【Super Goal】 Management capacity of operation and maintenance of water supply facilities is improved in Nile Delta Area	Performance Indicators (PIs) in the fields of management capacity of operation and maintenance are improved in Nile Delta Area	Quarterly Reports of all water supply companies in Nile Delta Area submitted to HCWW	
【Overall Goal】 Management capacity of operation and maintenance of water supply facilities is improved in Sharkiya, Gharbia and Minufia Governorates	PIs in the fields of management capacity of operation and maintenance are improved in Sharkiya, Gharbia, and Minufia Governorates	Quarterly reports of SHAPWASCO, GHAPWASCO, MCWW	Central and local government budget for development of water supply facilities is allocated appropriately
【Project Purpose】 Management capacity of operation and maintenance of water supply facilities is improved at the model areas/facilities in Sharkiya, Gharbia and Minufia Governorates	PIs (*1) in the fields of management capacity of operation and maintenance are improved at the model areas/facilities	Quarterly reports of SHAPWASCO, GHAPWASCO, MCWW	
【Output】 1) Human Resource Development through collaboration among water supply companies in Sharkiya, Gharbia and Minufia Governorates in strengthened	a. More than 3 members each of SOP/NRW teams in SHAPWASCO・GHAPWASCO・MCWW are approved as trainers by Steering Committee b. More than 20 times of seminars/workshops are organized under inter-company cooperation by the Project team	a. Certification of Training b. Reports of workshops	Employees who received trainings by the Project will continuously work for SHAPWASCO, GHAPWASCO, MCWW Personnel transfer of executive management will not affect the implementation of the Project
2) Based on the experiences of SHAPWSCO, SOPs are developed and utilized at the model facilities in Gharbia and Minufia Governorates	a. More than 80% of SOP team members rates understanding of trainings more than 3 on the 5-scale evaluation b. The model facilities are operated and maintained based on SOP c. Improvement of PIs for the model facilities are evaluated based on SOP	a, b, c. Project Progress Reports	
3) The institutional skills and experiences of SHAPWASCO for NRW reduction are transferred to NRW teams at the model areas in Gharbia and Minufia Governorates	a. More than 80% of NRW teams members rates understanding of trainings more than 3 on the 5-scale evaluation b. Water balance analysis is conducted properly for the 3 model areas c. 100% of detected leakage is repaired at the model area	a, b, c. Project Progress Reports	
4) The water distribution management capacity is improved in Sharkiya Governorate as an advanced model	a. Water distribution is managed based on SOP at the model areas b. Issues on water distribution capacity are reported to top management of SHAPWASCO	a, b. Project Progress Reports	
0) The project is managed and coordinated properly	a. Agreement on the coordination among SHAPWASCO・GHAPWASCO・MCWW is prepared b. Project activities are regularly monitored based on PO/APO	a. Agreement Document b. Project Progress Reports	

*1 PIs

SOP: a. Energy consumption per m^3 of water production (kWh/m^3) b. Amount of alum sulfate/ chlorine / potassium permanganate used per m^3 of water production (g/m^3)
c. Ratio of effective utilization of raw water (%)

NRW: a. NRW ratio (%) b. Reduction ratio of NRW (%)

WDM: a. Number of complaints per 1000 connections on water suspension and low pressure b. Ratio of inappropriate pressure of water distribution (%) c. Ratio of public opinion mentioning enough pressure (%)

Activities		Inputs	Important Assumption
1-1	Conduct management training for the top management	**Japanese side** 1) Japanese Experts ・Chief advisor/water supply planning ・NRW reduction management ・Leakage detection ・Water Treatment ・Water quality ・Electrical equipment ・Mechanical equipment ・Distribution network ・Others (if necessary) 2) Local Expert 3) Equipment 4) Training in Japan 5) Local Cost **Egyptian side** 1) Counterpart Personnel ・Project Director: Chairman, HCWW ・Project Manager: Vice Chairman, HCWW ・Co-Project Manager: Chairman, SHAPWASCO Chairman, GHAPWASCO Chairman, MCWW ・SOP Team ・NRW Team 2) Office space and facilities for the experts 3) Equipment 4) Necessary Information 5) Local Cost	Budget for the Project is allocated as planed by HCWW, SHAPWASCO, GHAPWASCO, and MCWW 【Pre-condition】 Budget for HRD is allocated properly to SHAPWASCO, GHAPWASCO and MCWW by HCWW
1-2	Conduct Training of Trainers (TOT) for developing SOP		
1-3	Conduct TOT for NRW reduction		
1-4	Disseminate the contents, the manners and the results of the collaboration among SHAPWASCO, GHAPWASCO and MCWW to the water supply companies in Nile Delta Area through reports and workshops		
2-1	Survey the current conditions of water supply facilities in Gharbia and Minufia Governorates		
2-2	Select 3 model facilities in Gharbia and Minufia Governorates each		
2-3	Organize SOP teams		
2-4	Conduct training for developing and applying SOPs at the facilities of Sharkiya Governorate		
2-5	Revise SOPs of Sharkiya Governorate, if necessary		
2-6	Develop SOPs for model facilities in Gharbia and Minufia Governorates based on SOPs for SHAPWASCO		
2-7	Conduct On-the-Job Training for GHAPWASCO and MCWW to apply SOPs in operation and maintenance		
2-8	Monitor the progress of SOP activities		
2-9	Draft the policy/plan for disseminating SOP to the other Marakazes		
3-1	Analyze the current situation on NRW in Gharbia and Minufia Governorates		
3-2	Select 3 model areas for NRW reduction in Gharbia and Minufia Governorates each		
3-3	Organize NRW reduction teams		
3-4	Formulate an action plan for NRW reduction activities based on the action plan for SHAPWASCO		
3-5	Conduct training on general practice of NRW reduction		
3-6	Conduct training at the training yard in Sharkiya Governorate		
3-7	Conduct training at model areas for water distribution management in Sharkiya Governorate		
3-8	Prepare GIS drawing for model areas in Gharbia and Minufia Governorates		
3-9	Make water balance analysis at model areas		
3-10	Conduct leakage detection survey at model areas		
3-11	Make water balance analysis after repair works		
3-12	Draft policy/plan for disseminating NRW reduction activities to the other Marakazes		
4-1	Discuss methods and conduct survey for water distribution management		
4-2	Conduct training for water distribution management		
4-3	Formulate a plan for water distribution management		
4-4	Install the equipment for water distribution management at the model area		
4-5	Operate the system		
4-6	Develop SOP for water distribution management		
4-7	Evaluate the operation and SOP for water distribution management		
0-1	Establish Steering Committee, consisting of representative of HCWW, SHAPWASCO, GHAPWASCO and MCWW		
0-2	Discuss the contents, the manners for the cooperation among SHAPWASCO, GHAPWASCO and MCWW through the Steering Committee		
0-3	Organize JCC at least once a year		
0-4	Finalize the Indicators of the Project Design Matrix (PDM) for approval of the first Joint Coordination Committee (JCC)		
0-5	Prepare a draft Annual Plan of Operations (APO) based on the Plan of Operations (PO) for approval of the first JCC		
0-6	Monitor the progress of PO/APO and achievement of the Indicators of the PDM		

The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area

Annex-3

Plan of Operation (PO-3)

30 October 2013

Items		Year1				Year2				Year3				Year3				Person in Charge	Major Input		Remarks
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		Japan	Egypt	
1. Human Resource Development through collaboration among water supply companies in Sharkiya, Gharbia and Minufia Governorates in strengthened																					
1-1.	Conduct management training for the top management			☆														HC, SH, G,M	☆ Training in Japan		
1-2.	Conduct Training of Trainers (TOT) for developing SOP			☆														SH, G,M	JICA Experts Local Exerts ☆ Training in Japan		Year 1: Mainly for SH Year 3: Mainly for G, M
1-3.	Conduct TOT for NRW reduction			☆														SH, G,M	JICA Experts Local Experts ☆ Training in Japan		
1-4.	Disseminate the contents, the manners and the results of the collaboration among SHAPWASCO, GHAPWASCO and MCWW to the water supply companies in Nile Delta Area through reports and workshops																	HC, SH, G,M	JICA Experts		
2. Based on the experiences of SHAPWASCO, SOPs are development and utilized at the model facilities in Gharbia and Minufia Governorates																					
2-1.	Survey the current conditions of water supply facilities in Gharbia and Minufia Governorates																	G,M	JICA Experts	SH	
2-2.	Select 3 model facilities in Gharbia and Minufia Governorates each																	G,M	JICA Experts	SH	
2-3.	Organize SOP teams																	G,M	JICA Experts	SH	
2-4.	Conduct training for developing and applying SOPs at the facilities of Sharkiya Governorate																	G,M	JICA Experts	SH	
2-5.	Revise SOPs of Sharkiya Governorate, if necessary																	G,M	JICA Experts	SH	
2-6.	Develop SOPs for model facilities in Gharbia and Minufia Governorates based on SOPs for SHAPWASCO																	G,M	JICA Experts	SH	
2-7.	Conduct On-the-Job Training for GHAPWASCO and MCWW to apply SOPs in operation and maintenance																	G,M	JICA Experts	SH	
2-8.	Monitor the progress of SOP activities																	G,M	JICA Experts	SH	
2-9.	Draft the policy/plan for disseminating SOP to the other Marakazes																	G,M	JICA Experts	SH	
3. The institutional skills and experiences of SHAPWASCO for NRW reduction are transferred to NRW teams at the model areas in Gharbia and Minufia Governorates																					
3-1.	Analyze the current situation on NRW in Gharbia and Minufia Governorates																	G,M	JICA Experts	SH	
3-2.	Select 3 model areas in Gharbia and Minufia Governorates each																	G,M	JICA Experts	SH	
3-3.	Organize NRW reduction teams																	G,M	JICA Experts	SH	
3-4.	Formulate an action plan for NRW reduction activities based on the action plan for SHAPWASCO																	G,M	JICA Experts	SH	
3-5.	Conduct training on general practice of NRW reduction																	G,M	JICA Experts	SH	
3-6.	Conduct training at the training yard in Sharkiya Governorate																	G,M	JICA Experts ☆ Training in Japan	SH	
3-7.	Conduct training at model areas for water distribution management in Sharkiya Governorate																	G,M	JICA Experts	SH	
3-8.	Prepare GIS drawing for model areas in Gharbia and Minufia Governorates																	G,M	JICA Experts	SH	
3-9.	Make water balance analysis at model areas																	G,M	JICA Experts	SH	
3-10.	Conduct leakage detection survey at model areas																	G,M	JICA Experts	SH	
3-11.	Make water balance analysis after repair works																	G,M	JICA Experts	SH	
3-12.	Draft policy/plan for disseminating NRW reduction activities to the other Marakazes																	G,M	JICA Experts	SH	
4. The water distribution management capacity is improved in Sharkiya governorate as an advanced model																					
4-1.	Discuss methods and conduct survey for water distribution management																	SH	JICA Experts		
4-2.	Conduct training for water distribution management							☆										SH	JICA Experts ☆ Training in Japan		
4-3.	Formulate a plan for water distribution management																	SH	JICA Experts		
4-4.	Install the equipment for water distribution management at the model area																	SH	JICA Experts		
4-5.	Operate the system																	SH	JICA Experts		
4-6.	Develop SOP for water distribution management																	SH	JICA Experts		
4-7.	Evaluate the operation and SOP for water distribution management																	SH	JICA Experts		
0. The project is managed and coordinated properly																					
0-1.	Establish Steering Committee, consisting of representative of HCWW, SHAPWASCO, GHAPWASCO and MCWW																	HC, SH, G, M	JICA Experts		
0-2.	Coordinate among SHAPWASCO, GHAPWASCO and MCWW through the Steering Committee																	HC, SH, G, M	JICA Experts		
0-3.	Organize the Joint Coordination Committee (JCC) meeting at least once a year																	HC, SH, G, M	JICA Experts		
0-4.	Finalize the Indicators of the Project Design Matrix (PDM) for approval of the first JCC																	HC, SH, G, M	JICA Experts		
0-5.	Draft Annual Plan of Operations (APO) based on the Plan of Operations (PO) for approval of the JCC																	HC, SH, G, M	JICA Experts		
0-6.	Monitor the progress of PO/APO and achievement of the Indicators of the PDM							●					▲					HC, SH, G, M	JICA Experts		● Mid-Term Review ▲ Final Evaluation

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Minutes of Meeting
on
The 5th JCC
for
The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area

The 2nd of March 2014

Mr. Mamdouh Raslan
Project Director
Chairman
Holding Company for Water and Wastewater (HCWW)

Dr. Salah Bayoumi
Project Manager
Vice Chairman
Holding Company for Water and Wastewater (HCWW)

Mr. Katsumi Fujii
Chief Advisor
The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area,
Japan International Cooperation Agency (JICA)

Mr. Ayman Abd El Kader
Project Co-Manager
Chairman
Sharkiya Potable Water and Sanitation Company (SHAPWASCO)

Mr. Mahmoud Zaki
Project Co-Manager
Chairman
Gharbia Potable Water and Sanitation Company (GHAPWASCO)

Mr. Mohamed Naguib
Project Co-Manager
Chairman
Minufia Company for Water and Wastewater (MCWW)

The fifth meeting of the Joint Coordinating Committee (JCC) was held on the 2nd of March 2014 for the Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply (hereinafter referred to as "the Project"). The following were confirmed in the meeting:

1. Results of Terminal Evaluation

The JICA Evaluation Team for terminal evaluation of the Project, headed by Mr. Omura, presented results of evaluation and encouraged the Egyptian side for technology dissemination and continuous improvement of activities. A submitted report by the evaluation team was confirmed by the Egyptian side and JICA Expert Team (JET) through the separated Minutes of Meeting for the evaluation and further activities of the Project Team, HCWW, SHAPWASCO, GHAPWASCO and MCWW.

2. Schedule for WDM

Due to delay of WDM activities, it may be difficult to promote the skills of C/P members for WDM especially for data analysis, production control and recommendation of facilities modification. The Project Manager, therefore, requested JICA to extend the period for WDM. JICA side will convey the request to JICA headquarters for examination.

(end)

Annex : List of Participant

List of Participant

[Egyptian Side]

Mr. Mamdouh Raslan	Chairman of HCWW
Dr. Salah Bayoumi	Vice Chairman of HCWW
Dr.Rifaat Abdel Wahaab	Head, Research & Development (R & D) Sector, HCWW
Mr. Ayman Abd El Kader	Chairman of SHAPWASCO
Mr. Mahmoud Zaki	Chairman of GHAPWASCO
Mr. Mohamed Naguib	Chairman of MCWW
Mr. Alae El Din Mohamed	Head of C/P Team/Headquarters of SHAPWASCO
Mr. Mostafa Ibrahim	WDM team/Headquarters of SHAPWASCO
Mr. Adel Attia	Vice Chairman of GHAPWASCO
Mr. Ahmed El Maleh	Head of SOP Team of GHAPWASCO
Mr. Ahmed Rabee'	Head of NRW Team of GHAPWASCO
Mr. Omar Salah	NRW Team of GHAPWASCO
Mr. Ayman Bassyouni	Head of SOP Team of MCWW
Mr. Mohamed Fawzy	SOP Team of MCWW
Mr. Mohamed El Shafee	Head of NRW Team of MCWW
Mr. Ahmed El-Shony	NRW Team of MCWW

[Japanese Side]

Mr. Yoshiki Omura	Senior Advisor, JICA
Ms. Momo Fukushima	Global Environment Department, JICA
Mr. Shiro Nakasone	Senior Representative, JICA Egypt Office
Mr. Koichi Mizukusa	Representative, JICA Egypt Office
Mr. kenji Takada	Representative, JICA Egypt Office
Ms. Emi Yoshinaga	JICA Evaluation Team
Mr. Katsumi Fujii	Chief Advisor/Water Supply Planning
Mr. Mitsuhito Omori	Deputy Chief Advisor / NRW Reduction Activity
Mr. Tomohiro Shimizu	Water Treatment System
Mr. Atsushi Kato	Coordinator / Assistant for NRW Reduction Activity
Mr. Nagi Gaber	Facilitator of Project Team
Mr. Mohamed Abouzekry	Facilitator of Project Team
Mr. Mohammed Abd El-Kader	Facilitator of Project Team

Minutes of Meeting
on
The 6th JCC
for
The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area

The 1st of April 2015

Mr. Mamdouh Raslan Project Director Chairman Holding Company for Water and Wastewater (HCWW)	Dr. Salah Bayoumi Project Manager Vice Chairman Holding Company for Water and Wastewater (HCWW)	Mr. Katsumi Fujii Chief Advisor The Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply Facilities in Nile Delta Area, Japan International Cooperation Agency (JICA)
Mr. Ayman Abd El Kader Project Co-Manager Chairman Sharkiya Potable Water and Sanitation Company (SHAPWASCO)	Mr. Mahmoud Zaki Project Co-Manager Chairman Gharbia Potable Water and Sanitation Company (GHAPWASCO)	Mr. Mohamed Naguib Project Co-Manager Chairman Minufia Company for Water and Wastewater (MCWW)

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The sixth meeting of the Joint Coordinating Committee (JCC) was held on the 1st of April 2015 for the Project for Improvement of Management Capacity of Operation and Maintenance for Water Supply (hereinafter referred to as "the Project"). The following were confirmed in the meeting:

1. Results of Terminal Evaluation

The JICA Evaluation Team for terminal evaluation of the Project, headed by Mr. Omura, presented the results of evaluation and encouraged the Egyptian side for technology dissemination and continuous improvement of activities. The report separately submitted by the evaluation team was confirmed by the Egyptian side and JICA Expert Team (JET).

2. Termination of the Project

The Project will be terminated in April 2015 for the field activities in Egypt. JET will prepare and submit the Project final report by the beginning of May 2015, based on discussions with the Egyptian side which have been made so far.

JICA will deliver the report after confirmation as follows:

- Main Report (in English); 12 copies
- Supporting Report (in English); 12 copies
- Main Report (Arabic Translation); 20 copies

(end)

Annex : List of Participant

List of Participant

[Egyptian Side]

Mr. Mamdouh Raslan	Chairman of HCWW
Dr.Rifaat Abdel Wahaab	Head, Research & Development (R & D) Sector, HCWW
Mr. Ayman Abd El Kader	Chairman of SHAPWASCO
Mr. Mahmoud Zaki	Chairman of GHAPWASCO
Mr. Mohamed Naguib	Chairman of MCWW
Mr. Alaa El Din Mohamed	Head of C/P Team/Headquarters of SHAPWASCO
Mr. Mostafa Ibrahim	WDM team/Headquarters of SHAPWASCO
Mr. Tamer Kamel Hussein	WDM team/Headquarters of SHAPWASCO
Mr. Omar Mohamed Salah	NRW Team of GHAPWASCO
Mr. Ayman Bassyouni	Head of SOP Team of MCWW
Mr. Mohamed Fawzy	SOP Team of MCWW
Mr. Ahmed El-Shony	NRW Team of MCWW

[Japanese Side]

Mr. Yoshiki Omura	Senior Advisor, JICA
Ms. Tomoko Kashihara	Global Environment Department, JICA
Mr. Shiro Nakasone	Senior Representative, JICA Egypt Office
Mr. Mariam Yousry	Program Officer
Mr. Katsumi Fujii	Chief Advisor/Water Supply Planning
Mr. Atsushi Kato	Coordinator / Assistant for NRW Reduction Activity
Mr. Nagi Gaber	Facilitator of Project Team