

## **Appendix-7 Reference**

## Soil Survey

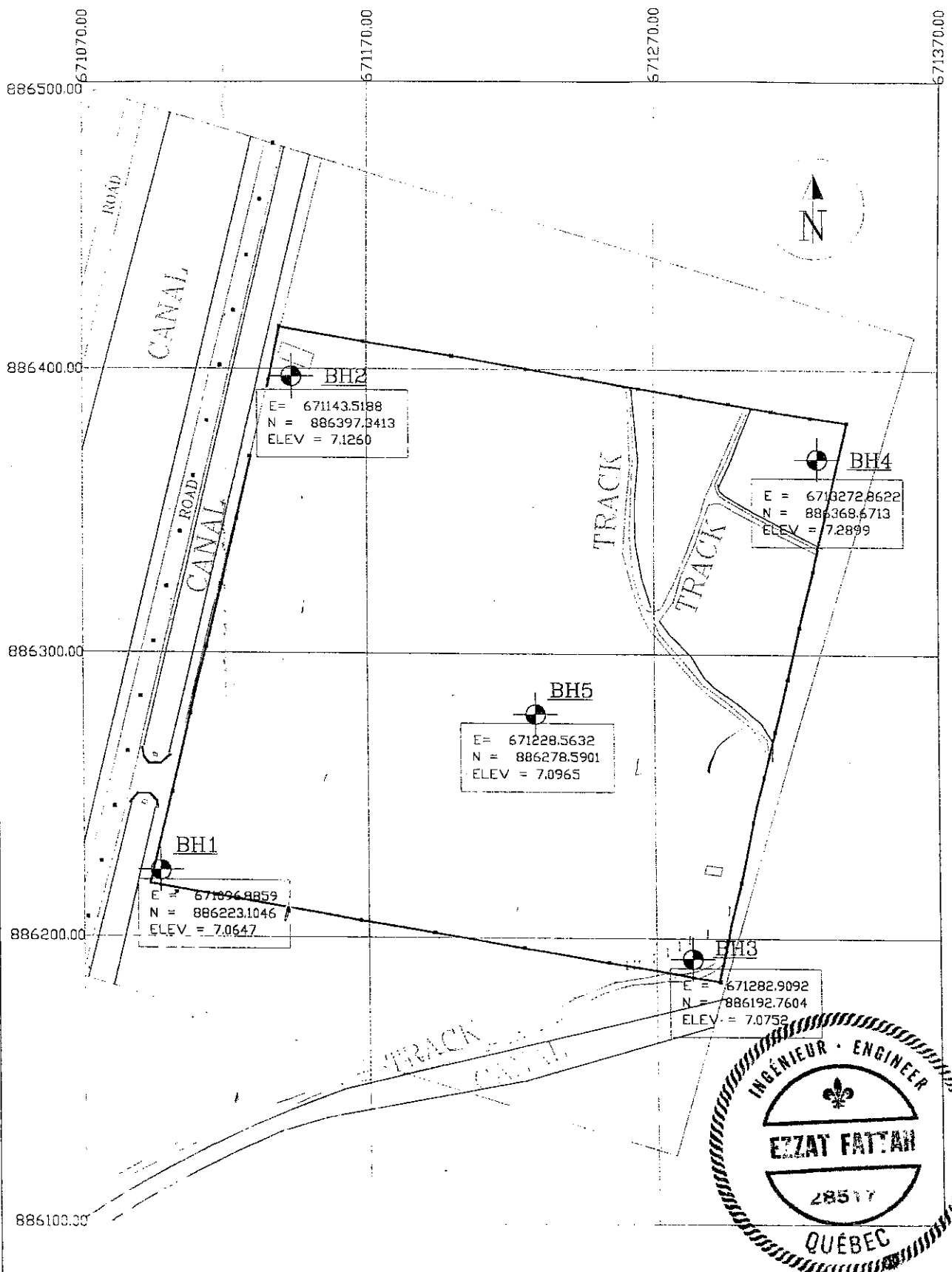


FIGURE (1) : SITE LAYOUT AND LOCATION OF BOREHOLE

## Borehole Log

**Project** : Water Supply Development in Northwest Part of Sharqiya Governorate  
**Location** : New Water Treatment Plant in Hehya  
**GWD** : Initial : 4.8 m      Final : 0.9 m  
**Coordinat** : N : 886223.1046      E : 671096.8859

**Figure No.** : 2  
**Borehole No.** : 1  
**Ground Level** : 7.0647  
**Date** : 31/5/03

Depth (m)	Sample	Legend	Soil Description	SPT	$q_p$ (kg/cm <sup>2</sup> )	$q_u$ (kg/cm <sup>2</sup> )	$\gamma_b$ (g/cm <sup>3</sup> )	Gs	Wc (%)	L.L. (%)	P.L. (%)	S.L. (%)
2.0	D		Stiff Silty <b>CLAY</b> , Very High Plasticity Brown	12	1.2							
4.0	U			15	1.3	1.6	1.95	2.62	34	94	25	12
6.0	US		Very Stiff Silty <b>CLAY</b> , Very High Plasticity Seams of Sand Dark Gray	14	1.4							
8.0	U			22	1.7							
10.0	U			43	2.0							
12.0	D		Firm Sandy <b>SILT</b> , Gray	50/15								
14.0	D			48								
16.0	U		Very Stiff Sandy <b>SILT</b> , Some Clay Gray to Yellow	50/14	1.7							
18.0	D		Very Dense Graded <b>SAND</b> , Traces of Silt Yellow to Gray	50/12								
20.0	D			50/4								
22.0	D			50/2								
24.0	D			50/2								
26.0	D			50/2								
28.0	D			50/1								
30.0	D			50/1								
			← Lenses of <b>SANDSTONE</b>									

**END OF BORING**

**Key**

U : Undisturbed Sample	qu : Unconfined Compressive Strength	L.L. : Liquid Limit
Us : Shelby Sample	qp : Pocket penetrometer	P.L. : Plastic Limit
D : Disturbed Sample	Gs : Specific Gravity	S.L. : Shrinkage Limit
GWD : Ground water Depth	SPT : Standard Penetration Test	Wc : Natural Water Content

## Borehole Log

<b>Project</b> :	Water Supply Development in Northwest Part of Sharqiya Governorate	<b>Figure No.</b> :	3
<b>Location</b> :	New Water Treatment Plant in Hehya	<b>Borehole No.</b> :	2
<b>GWD</b> :	<b>Initial</b> : 4.70 m <b>Final</b> : 0.90 m	<b>Ground Level</b> :	7.126
<b>Coordinat</b> :	<b>N</b> : 886397.3413 <b>E</b> : 671143.5188	<b>Date</b> :	1/6/03

Depth (m)	Sample	Legend	Soil Description	SPT	$q_p$ (kg/cm <sup>2</sup> )	$q_u$ (kg/cm <sup>2</sup> )	$\gamma_b$ (kg/cm <sup>3</sup> )	Gs	Wc (%)	L.L. (%)	P.L. (%)	S.L. (%)
2.0	U		Stiff Silty CLAY, High plasticity Brown	12	1.3							
4.0	US			16	1.4	1.15	1.94	2.57	34	83	26	13
6.0	U			50/15	2.2							
8.0	D		Very Dense Graded SAND, with thin Seams of Stiff Silty Clay	50/14								
10.0	U		Yellow to Gray	46	1.2							
12.0	U		Stiff Silty CLAY with Interbedded Sand	50/12	1.5							
14.0	D		Gray	50/6								
16.0	D		Very Dense Graded SAND, Traces of Silt	50/6								
18.0	D		Yellow to Gray	50/6								
20.0	D		Very Dense Graded SAND Yellow	50/6								
22.0	D			50/4								
24.0	D			50/5								
26.0	D			50/3								
28.0	D			50/3								
30.0	D			50/3								
	D			50/3								
	D			50/2								
	D			50/3								

END OF BORING

## Key

U : Undisturbed Sample	qu : Unconfined Compressive Strength	L.L. : Liquid Limit
Us : Shelby Sample	qp : Pocket penetrometer	P.L. : Plastic Limit
D : Disturbed Sample	Gs : Specific Gravity	S.L. : Shrinkage Limit
GWD : Ground water Depth	SPT : Standard Penetration Test	Wc : Natural Water Content

## Borehole Log

**Project** : Water Supply Development in Northwest Part of Sharqiya Governorate  
**Location** : New Water Treatment Plant in Hehya  
**GWD** : Initial : 3.5 m Final : 1.0 m  
**Coordinat** : N : 886192.7604 E : 671282.9092

**Figure No.** : 4  
**Borehole No.** : 3  
**Ground Level** : 7.0752  
**Date** : 2/6/03

Depth (m)	Sample	Legend	Soil Description	SPT	$q_p$ (kg/cm <sup>2</sup> )	$q_u$ (kg/cm <sup>2</sup> )	$\gamma_b$ (g/cm <sup>3</sup> )	Gs	Wc (%)	L.L. (%)	P.L. (%)	S.L. (%)
2.0	U		Firm Clayey <b>SILT</b> , Traces of Fine Sand	9	0.6							
	D		Brown									
4.0	US		Very Dense Graded <b>SAND</b>	48								
			Light Gray									
6.0	D		Stiff Silty <b>CLAY</b> , High Plasticity	12	1.5							
8.0	D		Brown to Gray	15	1.3	0.46	1.79	2.58	45	93	34	16.4
10.0	D			50/8								
12.0	D		Very Dense Graded <b>SAND</b>	50/7								
14.0	D		Traces of Silt	50/5								
16.0	D		Yellow to Gray	50/5								
18.0	D			50/4								
20.0	D			50/2								
22.0	D		Very Dense Silty <b>SAND</b> , Cemented	50/2								
24.0	D		Yellow to Gray	50/1								
26.0	D		Very Dense Silty <b>SAND</b>	50/2								
28.0	D		Traces of Fine Gravel	50/2								
30.0	D		Yellow to Gray	50/1								

END OF BORING

Key

U : Undisturbed Sample	$q_u$ : Unconfined Compressive Strength	L.L. : Liquid Limit
Us : Shelby Sample	$q_p$ : Pocket penetrometer	P.L. : Plastic Limit
D : Disturbed Sample	Gs : Specific Gravity	S.L. : Shrinkage Limit
GWD : Ground water Depth	SPT : Standard Penetration Test	Wc : Natural Water Content

## Borehole Log

<b>Project</b> :	Water Supply Development in Northwest Part of Sharqiya Governorate				<b>Figure No.</b> :	5
<b>Location</b> :	New Water Treatment Plant in Hehya				<b>Borehole No.</b> :	4
<b>GWD</b> :	<b>Initial</b> :	4.90 m	<b>Final</b> :	1.10 m	<b>Ground Level</b> :	7.2899
<b>Coordinat</b> :	<b>N</b> :	886368.6713	<b>E</b> :	671327.8622	<b>Date</b> :	2/6/03

Depth (m)	Sample	Legend	Soil Description	SPT	$q_p$ (kg/cm <sup>2</sup> )	$q_u$ (kg/cm <sup>2</sup> )	$\gamma_b$ (g/cm <sup>3</sup> )	Gs	Wc (%)	L.L. (%)	P.L. (%)	S.L. (%)
2.0	U		Stiff Silty CLAY High Plasticity Traces of Sand Brown	12	1.2	0.92	1.88	2.7	38	72	26	14.4
	US											
4.0	U			10	2.0							
6.0	U			18	2.2							
8.0	U			25	2.0							
	D		Very Dense Graded SAND Some Silt Gray	50/15		3.0						
10.0	D											
12.0	D			50/12								
14.0	D			50/12								
16.0	D			50/14								
	U		Hard Silty CLAY, High Plasticity Seams of Sand Gray to Yellow	50/10								
18.0	D		Very Dense Graded SAND, Some Silt Gray to Yellow	50/5								
20.0	D											
22.0	D			50/5								
24.0	D			50/3								
26.0	D			50/3								
	D		Seams of CLAY									
28.0	D		Very Dense Graded SAND and GRAVEL Traces of Silt	50/5								
30.0	D		Yellow to Gray	50/2								

END OF BORING

## Key

U	: Undisturbed Sample	qu	: Unconfined Compressive Strength	L.L	: Liquid Limit
Us	: Shelby Sample	qp	: Pocket penetrometer	P.L	: Plastic Limit
D	: Disturbed Sample	Gs	: Specific Gravity	S.L	: Shrinkage Limit
GWD	: Ground water Depth	SPT	: Standard Penetration Test	Wc	: Natural Water Content

## Borehole Log

<b>Project</b> :	Water Supply Development in Northwest Part of Sharqiya Governorate	<b>Figure No.</b> :	6
<b>Location</b> :	New Water Treatment Plant in Hehya	<b>Borehole No.</b> :	5
<b>GWD</b> :	<b>Initial</b> : 4.10 m <b>Final</b> : 1.10 m	<b>Ground Level</b> :	7.0965
<b>Coordinat</b> :	<b>N</b> : 886368.6713 <b>E</b> : 671228.5632	<b>Date</b> :	3/6/03

Depth (m)	Sample	Legend	Soil Description	SPT	$q_p$ (kg/cm <sup>2</sup> )	$q_u$ (kg/cm <sup>2</sup> )	$\gamma_b$ (g/cm <sup>3</sup> )	Gs	Wc (%)	L.L. (%)	P.L. (%)	S.L. (%)
2.0	U		Soft to Medium Silty CLAY	11	1.2							
	U		Traces of Fine Sand									
4.0	U		Brown	6	1.0							
	US					0.34	1.65	2.58	43	68	26	15
6.0	U		CLAY with Interbedded Silt	6	0.8							
8.0	U			6	1.0							
10.0	U			8	0.8							
12.0	D			45								
14.0	D			50/15								
16.0	D		Very Dense Graded SAND	50/8								
	D		Yellow to Gray									
18.0	D			50/5								
20.0	D			50/5								
22.0	D		Very Dense Graded and Cemented	50/3								
	D		Silty SAND									
24.0	D		Yellow to Gray	50/2								
26.0	D			50/3								
28.0	D		Very Dense Graded SAND,	50/2								
	D		Traces of Fine Gravel									
30.0	D		Yellow	50/2								

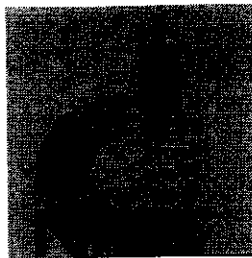
END OF BORING

## Key

U : Undisturbed Sample	qu : Unconfined Compressive Strength	L.L. : Liquid Limit
Us : Shelby Sample	qp : Pocket penetrometer	P.L. : Plastic Limit
D : Disturbed Sample	Gs : Specific Gravity	S.L. : Shrinkage Limit
GWD : Ground water Depth	SPT : Standard Penetration Test	Wc : Natural Water Content



## Water Quality Analysis



# **Study of Water Quality in Sharkia Governorate**

Tahrir Street - Dokki - Giza

Tel: 3371479

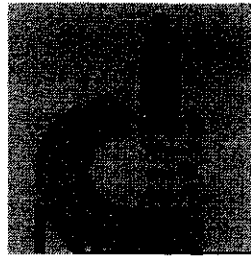
Fax : 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧

## **Drinking Water Analysis**



Results of drinking water analysis

Sampling date: 31/5/2003

Parameters	Unit	محطة مياه العدوة (بئر ارتوازي)	محطة مياه العدوة خزان المحطة الدمجة	Guideline of Egyptian drinking water standard
pH	-	7.7	7.8	6.5-9.2
Turbidity	NTU	3.3	4.8	5-10
Total Dissolved Solids	mg/l	688	643	1200
Total Hardness (CaCO <sub>3</sub> )	mg/l	264	256	500
Calcium (Ca <sup>++</sup> )	mg/l	69	69	200
Magnesium (Mg <sup>++</sup> )	mg/l	22	20	150
Nitrate (NO <sub>3</sub> -N)	mg/l	0.02	0.03	10
Fluoride (F)	mg/l	0.35	0.44	0.8
Chloride (Cl)	mg/l	140	128	500
Sulphate (SO <sub>4</sub> <sup>-</sup> )	mg/l	96	89	400
Iron (Fe)	mg/l	1.48	0.49	1.0
Manganese (Mn)	mg/l	0.72	0.56	0.5
Copper (Cu)	mg/l	ND	ND	1.0
Lead (Pb)	mg/l	ND	ND	0.05
Zinc (Zn)	mg/l	ND	ND	5.0
Total Coliform	MPN/100ml	0.0	23	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

*Osama A. Aly*

Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



### Results of drinking water analysis

Sampling date: 31/5/2003

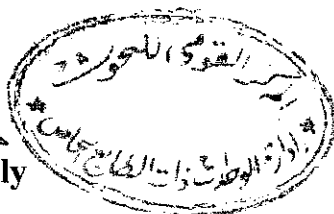
Parameters	Unit	محطة مياه العواسجة بئر رقم ١	محطة مياه العواسجة بئر رقم ٢	Guideline of Egyptian drinking water standard
pH	-	7.6	7.5	6.5-9.2
Turbidity	NTU	3.2	2.1	5-10
Total Dissolved Solids	mg/l	806	848	1200
Total Hardness (CaCO <sub>3</sub> )	mg/l	166	180	500
Calcium (Ca <sup>++</sup> )	mg/l	39	42	200
Magnesium (Mg <sup>++</sup> )	mg/l	16	18	150
Nitrate (NO <sub>3</sub> -N)	mg/l	Nil	1.8	10
Fluoride (F)	mg/l	0.33	0.41	0.8
Chloride (Cl)	mg/l	238	312	500
Sulphate (SO <sub>4</sub> <sup>-</sup> )	mg/l	133	139	400
Iron (Fe)	mg/l	0.67	0.45	1.0
Manganese (Mn)	mg/l	0.38	0.24	0.5
Copper (Cu)	mg/l	ND	ND	1.0
Lead (Pb)	mg/l	ND	ND	0.05
Zinc (Zn)	mg/l	0.12	0.1	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit  
*Osama A. Aly*  
Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax: 3370931 - 3601877

شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٦٠١٨٧٧ - ٣٣٧٠٩٣١

**Results of drinking water analysis**

Sampling date: 31/5/2003

Parameters	Unit	محطة مياه ههيا (بئر رقم ١)	محطة مياه ههيا (بئر رقم ٢)	Guideline of Egyptian drinking water standard
pH	-	7.6	7.5	6.5-9.2
Turbidity	NTU	1.5	2.1	5-10
Total Dissolved Solids	mg/l	998	1001	1200
Total Hardness (CaCO <sub>3</sub> )	mg/l	218	201	500
Calcium (Ca <sup>++</sup> )	mg/l	54	50	200
Magnesium (Mg <sup>++</sup> )	mg/l	20	19	150
Nitrate (NO <sub>3</sub> -N)	mg/l	0.04	Nil	10
Fluoride (F)	mg/l	0.33	0.33	0.8
Chloride (Cl)	mg/l	252	258	500
Sulphate (SO <sub>4</sub> <sup>-</sup> )	mg/l	168	165	400
Iron (Fe)	mg/l	0.63	0.57	1.0
Manganese (Mn)	mg/l	0.62	0.55	0.5
Copper (Cu)	mg/l	ND	ND	1.0
Lead (Pb)	mg/l	ND	ND	0.05
Zinc (Zn)	mg/l	0.008	0.1	5.0
Total Coliform	MPN/100 ml	0.0	0.0	0.0

ND: Not detected

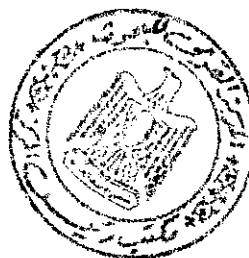
Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Osama A. Aly

Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax: 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٦٠١٨٧٧ - ٣٣٧٠٩٣١



Results of drinking water analysis

Sampling date: 31/5/2003

Parameters	Unit	محطة مياه ههيا (بئر رقم ٣)	محطة مياه ههيا (بئر رقم ٤)	Guideline of Egyptian drinking water standard
pH	-	7.5	7.7	6.5-9.2
Turbidity	NTU	2.8	1.9	5-10
Total Dissolved Solids	mg/l	897	1114	1200
Total Hardness (CaCO <sub>3</sub> )	mg/l	218	268	500
Calcium (Ca <sup>++</sup> )	mg/l	55	68	200
Magnesium (Mg <sup>++</sup> )	mg/l	19	24	150
Nitrate (NO <sub>3</sub> -N)	mg/l	Nil	0.04	10
Fluoride (F)	mg/l	0.31	0.41	0.8
Chloride (Cl <sup>-</sup> )	mg/l	234	212	500
Sulphate (SO <sub>4</sub> <sup>-</sup> )	mg/l	163	160	400
Iron (Fe)	mg/l	0.63	0.48	1.0
Manganese (Mn)	mg/l	0.48	0.53	0.5
Copper (Cu)	mg/l	ND	ND	1.0
Lead (Pb)	mg/l	ND	ND	0.05
Zinc (Zn)	mg/l	0.1	0.12	5.0
Total Coliform	MPN/100 ml	0.0	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Osama A. Ali  
Prof. Osama A. Ali



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٦٠١٨٧٧ - ٣٣٧٠٩٣١

Results of drinking water analysis

Sampling date: 31/5/2003

Parameters	Unit	محطة مياه ههيا خزان الوحدة الدمجة رقم ١	محطة مياه ههيا خزان الوحدة الدمجة رقم ٢	Guideline of Egyptian drinking water standard
pH	-	7.5	7.5	6.5-9.2
Turbidity	NTU	3.6	5.3	5-10
Total Dissolved Solids	mg/l	229	913	1200
Total Hardness (CaCO <sub>3</sub> )	mg/l	120	218	500
Calcium (Ca <sup>++</sup> )	mg/l	30	54	200
Magnesium (Mg <sup>++</sup> )	mg/l	11	20	150
Nitrate (NO <sub>3</sub> -N)	mg/l	0.19	0.03	10
Fluoride (F)	mg/l	0.26	0.35	0.8
Chloride (Cl)	mg/l	18	236	500
Sulphate (SO <sub>4</sub> <sup>-</sup> )	mg/l	30	164	400
Iron (Fe)	mg/l	0.55	0.78	1.0
Manganese (Mn)	mg/l	0.56	1.0	0.5
Copper (Cu)	mg/l	ND	ND	1.0
Lead (Pb)	mg/l	ND	ND	0.05
Zinc (Zn)	mg/l	ND	0.1	5.0
Total Coliform	MPN/100 ml	0.0	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Osama A. Aly  
Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

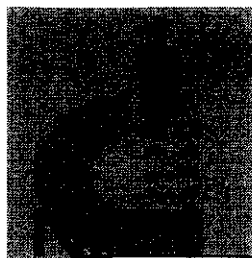
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شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧





### Results of drinking water analysis

Sampling date: 31/5/2003

Parameters	Unit	محطة مياه المحمودية (بئر رقم ١)	محطة مياه المحمودية (بئر رقم ٢)	Guideline of Egyptian drinking water standard
pH	-	7.7	7.6	6.5-9.2
Turbidity	NTU	2.9	1.2	5-10
Total Dissolved Solids	mg/l	804	696	1200
Total Hardness (CaCO <sub>3</sub> )	mg/l	296	254	500
Calcium (Ca <sup>++</sup> )	mg/l	72	64	200
Magnesium (Mg <sup>++</sup> )	mg/l	28	23	150
Nitrate (NO <sub>3</sub> -N)	mg/l	Nil	Nil	10
Fluoride (F)	mg/l	0.33	0.29	0.8
Chloride (Cl)	mg/l	222	184	500
Sulphate (SO <sub>4</sub> <sup>-</sup> )	mg/l	143	106	400
Iron (Fe)	mg/l	0.52	0.98	1.0
Manganese (Mn)	mg/l	0.86	1.1	0.5
Copper (Cu)	mg/l	ND	ND	1.0
Lead (Pb)	mg/l	ND	ND	0.05
Zinc (Zn)	mg/l	ND	ND	5.0
Total Coliform	MPN/100 ml	0.0	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

*Osama A. Aly*  
Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

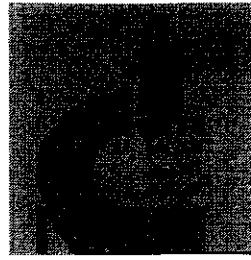
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شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



Results of drinking water analysis

Sampling date: 31/5/2003

Parameters	Unit	محطة مياه العلاقة (بئر ارتوازي)	Guideline of Egyptian drinking water standard
pH	-	7.2	6.5-9.2
Turbidity	NTU	11.2	5-10
Total Dissolved Solids	mg/l	673	1200
Total Hardness (CaCO <sub>3</sub> )	mg/l	332	500
Calcium (Ca <sup>++</sup> )	mg/l	45	200
Magnesium (Mg <sup>++</sup> )	mg/l	53	150
Nitrate (NO <sub>3</sub> -N)	mg/l	Nil	10
Fluoride (F)	mg/l	0.29	0.8
Chloride (Cl)	mg/l	134	500
Sulphate (SO <sub>4</sub> <sup>-</sup> )	mg/l	146	400
Iron (Fe)	mg/l	1.18	1.0
Manganese (Mn)	mg/l	1.22	0.5
Copper (Cu)	mg/l	ND	1.0
Lead (Pb)	mg/l	ND	0.05
Zinc (Zn)	mg/l	ND	5.0
Total Coliform	MPN/100 ml	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Osama A. Aly

Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٦٠١٨٧٧ - ٣٣٧٠٩٣١



Results of drinking water analysis

Sampling date: 31/5/2003

Parameters	Unit	محطة مياه الفريديية (بئر ارتوازي)	Guideline of Egyptian drinking water standard
pH	-	7.2	6.5-9.2
Turbidity	NTU	11.9	5-10
Total Dissolved Solids	mg/l	504	1200
Total Hardness (CaCO <sub>3</sub> )	mg/l	236	500
Calcium (Ca <sup>++</sup> )	mg/l	58	200
Magnesium (Mg <sup>++</sup> )	mg/l	22	150
Nitrate (NO <sub>3</sub> -N)	mg/l	Nil	10
Fluoride (F)	mg/l	0.31	0.8
Chloride (Cl <sup>-</sup> )	mg/l	122	500
Sulphate (SO <sub>4</sub> <sup>-</sup> )	mg/l	15	400
Iron (Fe)	mg/l	1.06	1.0
Manganese (Mn)	mg/l	0.53	0.5
Copper (Cu)	mg/l	ND	1.0
Lead (Pb)	mg/l	ND	0.05
Zinc (Zn)	mg/l	ND	5.0
Total Coliform	MPN/100 ml	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Prof. Osama A. A.



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧

Results of drinking water analysis

Sampling date: 31/5/2003

Parameters	Unit	محطة مياه الساحة (بئر ارتوازي)	Guideline of Egyptian drinking water standard
pH	-	7.5	6.5-9.2
Turbidity	NTU	1.6	5-10
Total Dissolved Solids	mg/l	796	1200
Total Hardness (CaCO <sub>3</sub> )	mg/l	220	500
Calcium (Ca <sup>++</sup> )	mg/l	58	200
Magnesium (Mg <sup>++</sup> )	mg/l	18	150
Nitrate (NO <sub>3</sub> -N)	mg/l	0.15	10
Fluoride (F)	mg/l	0.28	0.8
Chloride (Cl)	mg/l	202	500
Sulphate (SO <sub>4</sub> <sup>-</sup> )	mg/l	123	400
Iron (Fe)	mg/l	0.46	1.0
Manganese (Mn)	mg/l	1.02	0.5
Copper (Cu)	mg/l	ND	1.0
Lead (Pb)	mg/l	ND	0.05
Zinc (Zn)	mg/l	0.11	5.0
Total Coliform	MPN/100 ml	0.0	0.0

ND: Not detected

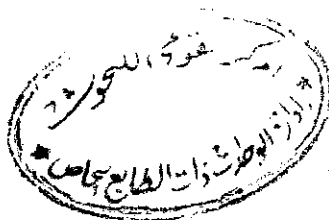
Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

*Osama A. Aly*

Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

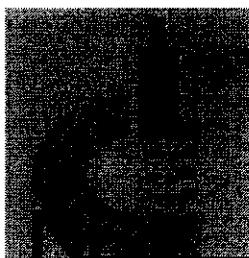
Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



### Results of drinking water analysis

Sampling date: 31/5/2003

Parameters	Unit	محطة مياه منزل حيان (بئر ارتوازي)	Guideline of Egyptian drinking water standard
pH	-	7.4	6.5-9.2
Turbidity	NTU	1.4	5-10
Total Dissolved Solids	mg/l	1099	1200
Total Hardness (CaCO <sub>3</sub> )	mg/l	420	500
Calcium (Ca <sup>++</sup> )	mg/l	101	200
Magnesium (Mg <sup>++</sup> )	mg/l	41	150
Nitrate (NO <sub>3</sub> -N)	mg/l	0.15	10
Fluoride (F)	mg/l	0.53	0.8
Chloride (Cl)	mg/l	348	500
Sulphate (SO <sub>4</sub> <sup>-</sup> )	mg/l	134	400
Iron (Fe)	mg/l	1.09	1.0
Manganese (Mn)	mg/l	2.16	0.5
Copper (Cu)	mg/l	ND	1.0
Lead (Pb)	mg/l	ND	0.05
Zinc (Zn)	mg/l	0.12	5.0
Total Coliform	MPN/100 ml	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Osama A. Aly  
Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

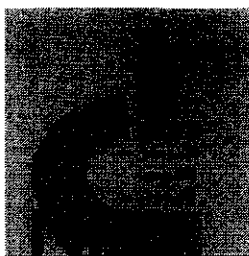
Fax : 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧

**Drinking Water Analysis**  
**7/6/2003**



### Results of drinking water analysis

Sampling date: 7/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه الساحة	مياه الشبكة التابعة لمحطة مياه الساحة	Guideline of Egyptian drinking water standard
pH	-	7.6	7.4	6.5-9.2
Turbidity	NTU	1.1	1.2	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1400	1510	-
Total Dissolved Solids	mg/l	801	869	1200
Total Hardness (CaCO <sub>3</sub> )	mg/l	224	230	500
Calcium (Ca <sup>++</sup> )	mg/l	57	60	200
Magnesium (Mg <sup>++</sup> )	mg/l	20	19	150
Nitrate (NO <sub>3</sub> -N)	mg/l	0.16	0.07	10
Fluoride (F <sup>-</sup> )	mg/l	0.25	0.28	0.8
Chloride (Cl <sup>-</sup> )	mg/l	192	216	500
Sulphate (SO <sub>4</sub> <sup>-</sup> )	mg/l	124	135	400
Iron (Fe)	mg/l	0.22	0.08	1.0
Manganese (Mn)	mg/l	0.69	0.25	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Osama A. Ali

Prof. Osama A. Ali



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax: 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



### Results of drinking water analysis

Sampling date: 7/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه عزبة شديد	مياه الشبكة التابعة لمحطة مياه عزبة شديد	Guideline of Egyptian drinking water standard
pH	-	7.8	7.7	6.5-9.2
Turbidity	NTU	1.5	1.5	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1620	1580	-
Total Dissolved Solids	mg/l	933	917	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	238	232	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	57	58	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	23	21	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	0.08	0.08	10
Fluoride (F)	mg/l	0.27	0.26	0.8
Chloride ( $\text{Cl}^-$ )	mg/l	244	233	500
Sulphate ( $\text{SO}_4^{--}$ )	mg/l	157	155	400
Iron (Fe)	mg/l	0.48	0.15	1.0
Manganese (Mn)	mg/l	0.11	0.43	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧





### Results of drinking water analysis

Sampling date: 7/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه ههيا الرئيسية	مياه الشبكة التابعة لمحطة مياه ههيا الرئيسية	Guideline of Egyptian drinking water standard
pH	-	7.6	7.6	6.5-9.2
Turbidity	NTU	2.0	2.0	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1580	1560	-
Total Dissolved Solids	mg/l	897	906	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	226	224	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	55	58	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	21	19	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	0.11	0.08	10
Fluoride (F)	mg/l	0.28	0.29	0.8
Chloride ( $\text{Cl}^-$ )	mg/l	230	230	500
Sulphate ( $\text{SO}_4^-$ )	mg/l	160	151	400
Iron (Fe)	mg/l	0.25	0.2	1.0
Manganese (Mn)	mg/l	0.58	0.82	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	0.034	0.031	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Prof. Osama A.



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧

### Results of drinking water analysis

Sampling date: 7/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه ههيا الرئيسية	مياه الشبكة التابعة لمحطة مياه ههيا الرئيسية	Guideline of Egyptian drinking water standard
pH	-	7.9	7.7	6.5-9.2
Turbidity	NTU	1.2	1.2	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1680	1660	-
Total Dissolved Solids	mg/l	803	945	1200
Total Hardness (CaCO <sub>3</sub> )	mg/l	218	224	500
Calcium (Ca <sup>++</sup> )	mg/l	54	55	200
Magnesium (Mg <sup>++</sup> )	mg/l	20	21	150
Nitrate (NO <sub>3</sub> -N)	mg/l	0.005	0.07	10
Fluoride (F <sup>-</sup> )	mg/l	0.26	0.28	0.8
Chloride (Cl <sup>-</sup> )	mg/l	250	253	500
Sulphate (SO <sub>4</sub> <sup>-</sup> )	mg/l	160	164	400
Iron (Fe)	mg/l	0.34	0.21	1.0
Manganese (Mn)	mg/l	0.4	0.42	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	0.033	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

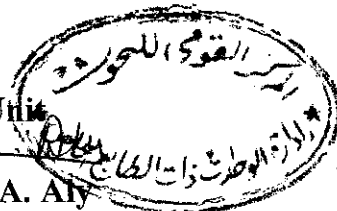
ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



### Results of drinking water analysis

Sampling date: 7/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه عزبة فهمي	مياه الشبكة التابعة لمحطة مياه عزبة فهمي	Guideline of Egyptian drinking water standard
pH	-	7.7	7.7	6.5-9.2
Turbidity	NTU	1.1	1.1	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1420	1410	-
Total Dissolved Solids	mg/l	820	763	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	226	226	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	58	58	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	20	19	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	0.18	0.28	10
Fluoride ( $\text{F}^-$ )	mg/l	0.25	0.22	0.8
Chloride ( $\text{Cl}^-$ )	mg/l	217	214	500
Sulphate ( $\text{SO}_4^{--}$ )	mg/l	121	118	400
Iron (Fe)	mg/l	0.13	0.18	1.0
Manganese (Mn)	mg/l	0.17	0.52	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

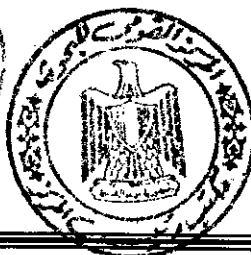
ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Osama A. Ali  
Prof. Osama A. Ali



Tahrir Street - Dokki - Giza

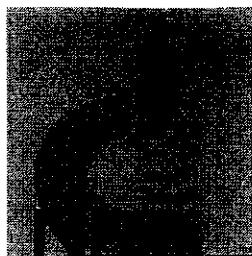
Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٦٠١٨٧٧ - ٣٣٧٠٩٣١



### Results of drinking water analysis

Sampling date: 7/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه الفريديية	مياه الشبكة التابعة لمحطة مياه الفريديية	Guideline of Egyptian drinking water standard
pH	-	7.5	7.3	6.5-9.2
Turbidity	NTU	1.0	1.0	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	950	920	-
Total Dissolved Solids	mg/l	514	501	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	242	234	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	57	59	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	24	21	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	0.18	0.06	10
Fluoride (F)	mg/l	0.21	0.22	0.8
Chloride (Cl)	mg/l	130	120	500
Sulphate ( $\text{SO}_4^-$ )	mg/l	18	13	400
Iron (Fe)	mg/l	0.54	0.61	1.0
Manganese (Mn)	mg/l	0.45	0.67	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

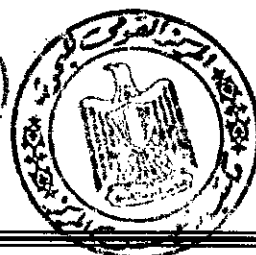
ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Osama A. Aly  
Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax: 3370931 - 3601877

شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧

**Drinking Water Analysis**  
**14/6/2003**



**Results of drinking water analysis\***

**Sampling date: 14/6/2003**

**Water samples were collected from the distribution system.**

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه العدوة	مياه الشبكة التابعة لمحطة مياه العدوة	Guideline of Egyptian drinking water standard
pH	-	7.7	7.8	6.5-9.2
Turbidity	NTU	1.0	0.9	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1210	1210	-
Total Dissolved Solids	mg/l	707	708	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	258	260	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	67	68	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	22	22	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	Nil	0.003	10
Fluoride ( $\text{F}^-$ )	mg/l	0.21	0.22	0.8
Chloride ( $\text{Cl}^-$ )	mg/l	136	142	500
Sulphate ( $\text{SO}_4^{--}$ )	mg/l	92	94	400
Iron (Fe)	mg/l	0.09	0.03	1.0
Manganese (Mn)	mg/l	1.2	0.53	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

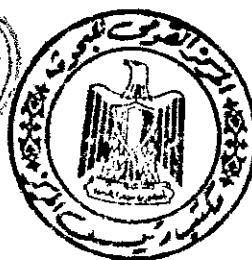
ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Osama A. Aly  
Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

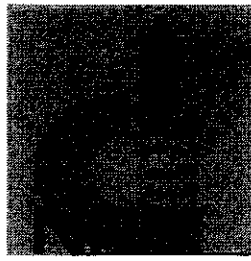
Tel: 3371479

Fax: 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



### Results of drinking water analysis

Sampling date: 14/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه العواصجة	مياه الشبكة التابعة لمحطة مياه العواصجة	Guideline of Egyptian drinking water standard
pH	-	7.8	7.9	6.5-9.2
Turbidity	NTU	1.5	1.1	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1450	1450	-
Total Dissolved Solids	mg/l	831	843	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	158	154	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	37	36	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	16	16	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	0.002	0.002	10
Fluoride (F)	mg/l	0.24	0.25	0.8
Chloride (Cl)	mg/l	228	232	500
Sulphate ( $\text{SO}_4^{--}$ )	mg/l	119	129	400
Iron (Fe)	mg/l	0.63	0.05	1.0
Manganese (Mn)	mg/l	0.48	0.12	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Osama A. Ali  
Prof. Osama A. Ali



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧

### Results of drinking water analysis

Sampling date: 14/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه العلافة	مياه الشبكة التابعة لمحطة مياه العلافة	Guideline of Egyptian drinking water standard
pH	-	7.5	7.6	6.5-9.2
Turbidity	NTU	0.9	0.9	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1130	1120	-
Total Dissolved Solids	mg/l	699	694	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	340	336	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	93	91	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	26	26	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	0.002	0.002	10
Fluoride ( $\text{F}^-$ )	mg/l	0.2	0.21	0.8
Chloride ( $\text{Cl}^-$ )	mg/l	140	136	500
Sulphate ( $\text{SO}_4^{--}$ )	mg/l	141	139	400
Iron (Fe)	mg/l	0.04	0.53	1.0
Manganese (Mn)	mg/l	0.56	0.52	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

*Osama A. Aly*  
Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax: 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧





### Results of drinking water analysis

Sampling date: 14/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه ههيا الرئيسية	مياه الشبكة التابعة لمحطة مياه ههيا الرئيسية	Guideline of Egyptian drinking water standard
pH	-	7.7	7.8	6.5-9.2
Turbidity	NTU	1.1	1.2	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1590	1420	-
Total Dissolved Solids	mg/l	835	672	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	200	202	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	50	50	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	18	18	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	0.002	0.001	10
Fluoride ( $\text{F}^-$ )	mg/l	0.23	0.2	0.8
Chloride ( $\text{Cl}^-$ )	mg/l	244	244	500
Sulphate ( $\text{SO}_4^{--}$ )	mg/l	156	151	400
Iron (Fe)	mg/l	0.31	0.53	1.0
Manganese (Mn)	mg/l	0.31	0.33	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

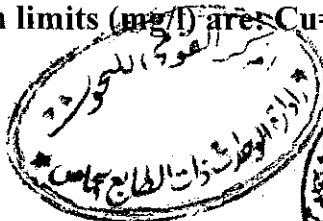
ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Osama A. Aly  
Prof. Osama A. Aly



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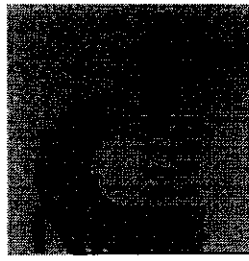
Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



### Results of drinking water analysis

Sampling date: 14/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه المحمودية	مياه الشبكة التابعة لمحطة مياه المحمودية	Guideline of Egyptian drinking water standard
pH	-	7.9	7.9	6.5-9.2
Turbidity	NTU	1.0	1.1	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1420	1600	-
Total Dissolved Solids	mg/l	711	778	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	292	288	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	75	74	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	25	25	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	0.003	0.003	10
Fluoride ( $\text{F}^-$ )	mg/l	0.2	0.23	0.8
Chloride ( $\text{Cl}^-$ )	mg/l	236	240	500
Sulphate ( $\text{SO}_4^{--}$ )	mg/l	137	135	400
Iron (Fe)	mg/l	0.06	0.27	1.0
Manganese (Mn)	mg/l	0.60	0.58	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

*Osama A. Aly*  
Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

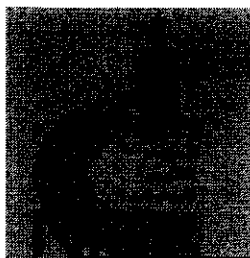
Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



### Results of drinking water analysis

Sampling date: 14/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه منزل حيان	مياه الشبكة التابعة لمحطة مياه منزل حيان	Guideline of Egyptian drinking water standard
pH	-	7.5	7.6	6.5-9.2
Turbidity	NTU	1.6	1.6	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1810	1810	-
Total Dissolved Solids	mg/l	1035	1066	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	369	400	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	98	99	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	37	37	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	0.01	0.03	10
Fluoride ( $\text{F}^-$ )	mg/l	0.28	0.28	0.8
Chloride ( $\text{Cl}^-$ )	mg/l	360	368	500
Sulphate ( $\text{SO}_4^{--}$ )	mg/l	134	118	400
Iron (Fe)	mg/l	0.02	0.29	1.0
Manganese (Mn)	mg/l	1.1	1.4	0.5
Copper (Cu)	mg/l	0.02	0.03	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	0.0	7	0.0

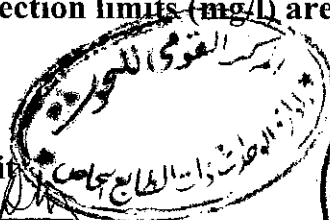
ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧

**Drinking Water Analysis**  
**21/6/2003**



**Results of drinking water analysis \*\***

Sampling date: 21/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه المهدية	مياه الشبكة التابعة لمحطة مياه المهدية	Guideline of Egyptian drinking water standard
pH	-	7.6	7.8	6.5-9.2
Turbidity	NTU	0.9	1.1	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1000	1230	-
Total Dissolved Solids	mg/l	545	710	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	250	328	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	64	84	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	22	29	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	0.046	0.29	10
Fluoride ( $\text{F}^-$ )	mg/l	0.21	0.25	0.8
Chloride ( $\text{Cl}^-$ )	mg/l	132	191	500
Sulphate ( $\text{SO}_4^{--}$ )	mg/l	19.1	61.3	400
Iron (Fe)	mg/l	0.28	0.49	1.0
Manganese (Mn)	mg/l	0.38	0.49	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

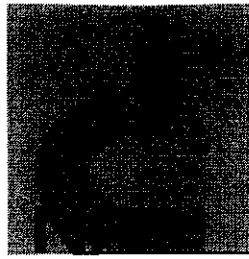
Tel: 3371479

Fax: 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت: ٣٣٧١٤٧٩

فاكس: ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



### Results of drinking water analysis

Sampling date: 21/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه الفريدية	مياه الشبكة التابعة لمحطة مياه الفريدية	Guideline of Egyptian drinking water standard
pH	-	7.9	7.9	6.5-9.2
Turbidity	NTU	0.9	0.9	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	920	930	
Total Dissolved Solids	mg/l	460	469	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	218	221	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	59	59	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	18	18	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	0.009	0.006	10
Fluoride (F)	mg/l	0.2	0.2	0.8
Chloride ( $\text{Cl}^-$ )	mg/l	119	121	500
Sulphate ( $\text{SO}_4^{--}$ )	mg/l	9.1	10.5	400
Iron (Fe)	mg/l	0.85	1.58	1.0
Manganese (Mn)	mg/l	0.15	0.30	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	0.0	5	0.0

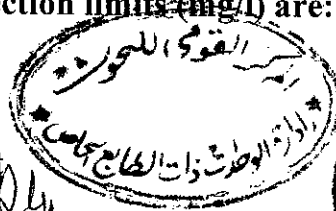
ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

*Osama A. Aly*  
Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax: 3370931 - 3601877

شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



### Results of drinking water analysis

Sampling date: 21/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه العدوة	مياه الشبكة التابعة لمحطة مياه العدوة	Guideline of Egyptian drinking water standard
pH	-	7.7	8.0	6.5-9.2
Turbidity	NTU	1.0	1.0	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1190	1200	
Total Dissolved Solids	mg/l	671	688	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	242	250	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	63	65	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	21	21	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	0.009	0.007	10
Fluoride ( $\text{F}^-$ )	mg/l	0.21	0.21	0.8
Chloride ( $\text{Cl}^-$ )	mg/l	138	138	500
Sulphate ( $\text{SO}_4^{--}$ )	mg/l	87	92	400
Iron (Fe)	mg/l	0.16	0.04	1.0
Manganese (Mn)	mg/l	0.31	0.34	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	0.0	0.0	0.0

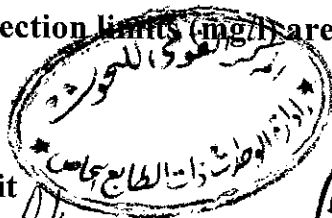
ND: Not detected

Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧

### Results of drinking water analysis

Sampling date: 21/6/2003

Water samples were collected from the distribution system.

Parameters	Unit	مياه الشبكة التابعة لمحطة مياه العدوة	مياه الشبكة التابعة لمحطة مياه العدوة	Guideline of Egyptian drinking water standard
pH	-	8.1	8.1	6.5-9.2
Turbidity	NTU	1.1	1.1	5-10
Electrical Conductivity	$\mu\text{mho/cm}$	1200	1210	
Total Dissolved Solids	mg/l	690	696	1200
Total Hardness ( $\text{CaCO}_3$ )	mg/l	248	268	500
Calcium ( $\text{Ca}^{++}$ )	mg/l	65	70	200
Magnesium ( $\text{Mg}^{++}$ )	mg/l	21	23	150
Nitrate ( $\text{NO}_3\text{-N}$ )	mg/l	0.009	0.011	10
Fluoride ( $\text{F}^-$ )	mg/l	0.19	0.19	0.8
Chloride ( $\text{Cl}^-$ )	mg/l	140	146	500
Sulphate ( $\text{SO}_4^{--}$ )	mg/l	87	90	400
Iron (Fe)	mg/l	0.11	0.48	1.0
Manganese (Mn)	mg/l	0.29	0.36	0.5
Copper (Cu)	mg/l	N.D	N.D	1.0
Lead (Pb)	mg/l	N.D	N.D	0.05
Zinc (Zn)	mg/l	N.D	N.D	5.0
Total Coliform	MPN/100ml	1	4	0.0

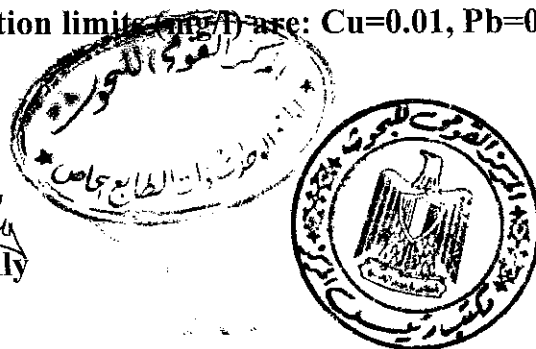
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Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

14/6/2003

Head of the Unit

*Osama A. Aly*  
Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

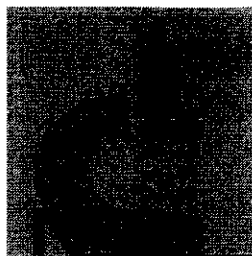
Fax : 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧





**Results of drinking water analysis**  
**Table (1)**

Sampling date: 21/6/2003

Parameters	Unit	مياه الطرد محطة مياه الزقازيق	Guideline of Egyptian drinking water standard
Nitrate (NO <sub>3</sub> -N)	mg/l	0.027	10
Nitrite (NO <sub>2</sub> -N)	mg/l	Nil	0.05
Ammonia (NH <sub>3</sub> -N)	mg/l	Nil	-

ND: Not detected

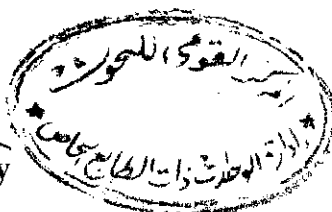
Instrument Detection limits (mg/l) are: Cu=0.01, Pb=0.05, Zn=0.005

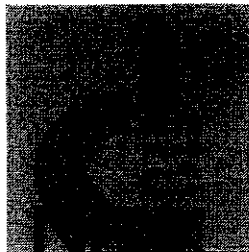
14/6/2003

Head of the Unit

*Osama A. Aly*

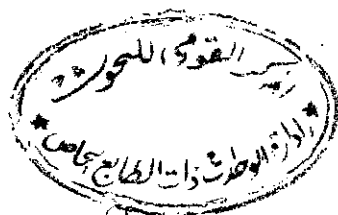
Prof. Osama A. Aly





**Algal examination (drinking water) (21/6/2003) Al-Zagazig treatment plant**

Parameters	Unit	Results
<b>Total Diatoms Count</b>		150
<b>1-Threads (Filaments)</b>	<b>Organism/ml</b>	50
<b>2-Unicell</b>		100
<b>Total Green Algae Count</b>		20
<b>1-Unicell</b>	<b>Organism/ml</b>	10
<b>2-Colonies</b>		10
<b>Total Blue-Green Algae Count</b>		20
<b>1-Colonies</b>	<b>Organism/ml</b>	20
<b>Total Algal Counts</b>	<b>Organism/ml</b>	190



*Osama A. Aly*

Tahrir Street - Dokki - Giza

Tel: 3371479

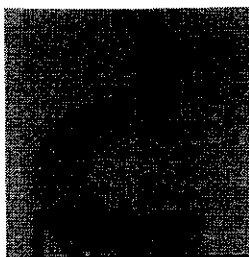
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شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٦٠١٨٧٧ - ٣٣٧٠٩٣١

# Report



**Report On the Quality Of Raw Water Collected At The Intake Of The  
Hihya Treatment Plant**

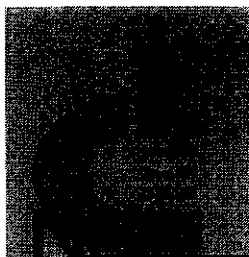
Three water samples were collected at the dates given in each table for the physico-chemical analysis and algal examination. Results attained revealed the following conditions.

**1- First sample dated 27/5/2003.**

- 1-1- Chemical analysis of the raw water revealed that the concentration of total iron amounted to 1.95mg/l. This concentration exceeds the permissible level. Results of other parameters are in agreement with the acceptable levels for drinking water.
- 1-2- Algal counts are relatively high and exceed that usually found in Nile River water. Algal population represented the three major algal groups namely, diatoms, green and blue-green. Diatoms are the dominant species.

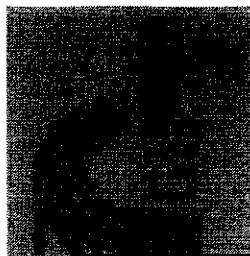
**2- Second sample dated 10/6/2003.**

- 2-1- Results of chemical analysis still indicate the high concentration level of iron in water (2.6mg/l) which exceeds the permissible level for drinking water. Results of the other parameters indicate water of good quality.
- 2-2- Total algal counts are very high (8540 org./ml) and three algal groups are represented in the water sample. Diatoms are the most dominant algal species.



**3- Third water sample dated 21/6/2003.**

- 3-1- The concentration of total iron was still exceeding the permissible level. Results of the other parameters show water of good quality.
- 3-2- Algal counts are still relatively high and diatoms represent the dominant group.



**Assessment Of The Optimal pH And Alum Dose For Treatment Of The  
Raw Water**

Three water samples were tested by the far procedure to determine the optimum pH and dose for the treatment of the raw water. Results are given in the respective tables. The outcome of the experiments revealed the following:

**1- Sample dated 27/5/2003.**

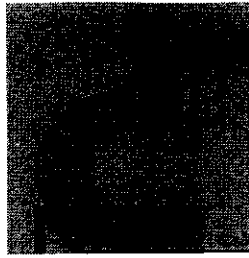
The optimum pH for effective alum coagulation amounted to 7.8 to 7.9. The optimum alum dose was 30mg/l where turbidity was decreased from 11NTU to 1.7NTU.

**2- Sample dated 10/6/2003.**

Results of the far test showed an optimum pH for alum coagulation was 7.8-7.9. The optimum alum dose for turbidity removal amounted to 20mg/l where residual turbidity was 1.68NTU.

**3- Sample dated 21/6/2003.**

The optimum pH for coagulation ranged between 7.0 and 7.2. The optimum alum dose was 40mg/l where the turbidity of raw water was decreased from 12NTU to 1.5NTU. Using alum doses of 20, 30 and 40mg/l, the total alkalinity of the treated water amounted to 120, 116 and 114mg/l. These values insure that water alkalinity is still valid to react with the added alum doses.



The concentration of iron in the raw water sample was decreased to 0.03mg/l after treatment with alum dose in the range of 20-40mg/l. These results indicate the expected improvement in water quality after coagulation-flocculation and sedimentation.



### **Report on Drinking Water Quality**

#### **1- Samples collected on 31/5/2003.**

Water samples were collected representing 16 drinking water stations and results are given in the respective tables.

Chemical and bacteriological analysis revealed the following characters:

#### **Water samples collected on 31/5/2003**

The general physico- chemical quality of water samples showed the acceptable levels of the parameters investigated except for the following cases:

#### **Iron (Fe) exceed the permissible level in:**

- water samples collected from El- Adwa well.
- water samples collected from EL -Alkma well.
- Water samples collected from Al- Faridia well.

#### **Manganese exceeded the permissible level in:**

- In water samples collected from Hihya plant and El- Adwa well well.
- In water samples collected from Hihya well No.4.
- In water samples collected from Storage Tank Hihya Compact Unit.
- In water samples collected from Mahmodia well No.1 and 2.
- In water samples collected from El- Alkama well.
- In water samples collected from Al- Faridia well.
- In water samples collected from Al- Saha well.



The general physico-chemical and bacteriological quality were within the permissible levels according to the Egyptian drinking water standards, except as indicated in the following cases:

Iron (Fe) exceeded the permissible level of water from the distribution system of Al-Faridia plant.

**Manganese (Mn) exceeded the permissible level in :**

- Water from the distribution system of Al-Adwa Plant.
- Water from the distribution system of Al- Alkma Plant.
- Water from the distribution system of Al- Mahmodia Plant.
- Water from the distribution system of Hayan Plant.

**Total coliforms do exist in the water of Hayan plant.**

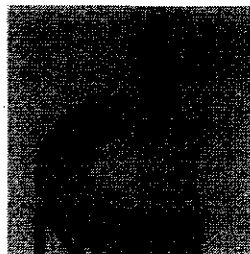
**Head of the Unit**

*Osama A. Aly*

**Prof. Dr. Osama A. Aly**



## **Raw Water Analysis**



**Results of raw water analysis from the intake point of the new water treatment plant in Hihya at Bahr Mowes, Sharkia governorate.**

First sample: 27/5/2003

**Physico-chemical Analysis**

Parameters	Unit	Results	Guideline of Egyptian drinking water standard
Water Temperature	°C	25	-
Turbidity	NTU	11	5-10
Taste	Unit	Tasteless	Acceptable
Odor	Unit	Odorless	Odorless
Color	Unit	30	20-30
pH	-	8.1	6.5-9.2
Total Alkalinity (CaCO <sub>3</sub> )	mg/l	142	-
Total Hardness (CaCO <sub>3</sub> )	mg/l	116	500
Total Dissolved Solids	mg/l	245	1200
Calcium (Ca)	mg/l	27	200
Magnesium (Mg)	mg/l	12	150
Chloride (Cl)	mg/l	16	500
Ammonium Nitrogen (NH <sub>4</sub> -N)	mg/l	0.1	-
Nitrite (NO <sub>2</sub> -N)	mg/l	0.02	0.005
Nitrate (NO <sub>3</sub> -N)	mg/l	0.16	10
Iron (Fe)	mg/l	1.95	0.3-1.0
Manganese (Mn)	mg/l	0.05	0.1-0.5
Fluoride (F)	mg/l	0.35	0.8

14/6/2003

Head of the Unit

Prof. Osama A. Adly



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



**Algal examination (27/5/2003)**

Parameters	Unit	Results
Total Diatoms Count	Organism/ml	6220
1-Threads (Filaments)		1260
2-Unicell		4960
Total Green Algae Count	Organism/ml	640
1-Threads (Filaments)		80
2-Unicell		140
3-Colonies		420
Total Blue-Green Algae Count	Organism/ml	220
1-Threads (Filaments)		40
2-Colonies		180
Total Algal Counts	Organism/ml	7080



Sama A. Aly

Tahrir Street - Dókki - Giza

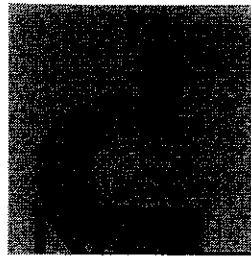
Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقي - الجيزة

ت : ٣٣٧١٤٧٩


فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



**Jar Test for coagulant effectiveness**

**Collection date: 27/5/2003**

- 1-The jar test was run to determine the coagulant effectiveness with respect to Alum (Aluminum Sulfate).
- 2-Alum doses investigated were 20, 30 and 40 mg/l, respectively.
- 3-Raw water turbidity amounted to 11 NTU and optimum dose for turbidity removal was 30 mg/l (1.7 NTU).
- 4-Optimum pH for coagulant effectiveness was in the range of 7.8-7.9.





Results of raw water analysis from the intake point of the new water  
treatment plant in Hihya at Bahr Mowes, Sharkia governorate.

Second sample: 10/6/2003

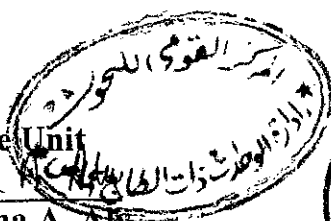
Physico-chemical Analysis

Parameters	Unit	Results	Guideline of Egyptian drinking water standard
Water Temperature	°C	28	-
Turbidity	NTU	27	5-10
Taste	Unit	Tasteless	Acceptable
Odor	Unit	Odorless	Odorless
Color	Unit	30	20-30
pH	-	7.8	6.5-9.2
Total Alkalinity (CaCO <sub>3</sub> )	mg/l	124	-
Total Hardness (CaCO <sub>3</sub> )	mg/l	114	500
Total Dissolved Solids	mg/l	232	1200
Calcium (Ca)	mg/l	28	200
Magnesium (Mn)	mg/l	11	150
Chloride (Cl <sup>-</sup> )	mg/l	14	500
Ammonium Nitrogen (NH <sub>4</sub> -N)	mg/l	Nil	-
Nitrite (NO <sub>2</sub> -N)	mg/l	0.01	0.005
Nitrate (NO <sub>3</sub> -N)	mg/l	0.03	10
Iron (Fe)	mg/l	2.6	0.3-1.0
Manganese (Mn)	mg/l	0.23	0.1-0.5
Fluoride (F <sup>-</sup> )	mg/l	0.26	0.8

22/6/2003

Head of the Unit

Osama A. Aly  
Prof. Osama A. Aly



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax: 3370931 - 3601877

شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



**Algal examination (10/6/2003)**

Parameters	Unit	Results
Total Diatoms Count		7560
1-Threads (Filaments)	Organism/ml	1843
2-Unicell		5717
Total Green Algae Count		700
1-Threads (Filaments)	Organism/ml	60
2-Unicell		120
3-Colonies		520
Total Blue-Green Algae Count		280
1-Threads (Filaments)	Organism/ml	40
2-Colonies		240
Total Algal Counts	Organism/ml	8540



Osama A. Aly

Tahrir Street - Dokki - Giza

Tel: 3371479

Fax : 3370931 - 3601877

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فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧



**Jar Test for coagulant effectiveness**


**Collection date: 10/6/2003**

1-The jar test was run to determine the coagulant effectiveness with respect to Alum (Aluminum Sulfate).

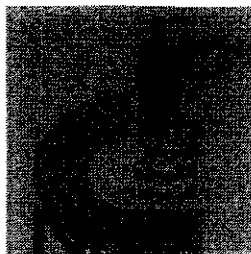
2-Alum doses investigated were 20, 30 and 40 mg/l, respectively.

3-Raw water turbidity amounted to 27 NTU and optimum dose for turbidity removal was 20 mg/l, where turbidity was decreased to 1.68 NTU.

4-Optimum pH for coagulant effectiveness was in the range of 7.8-7.9.







**Results of raw water analysis from the intake point of the new water treatment plant in Hihya at Bahr Mowes, Sharkia governorate.**

**Third sample: 21/6/2003**

**Physico-chemical Analysis**

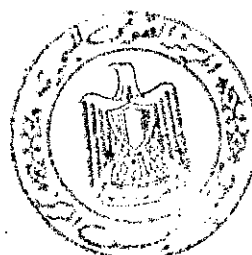
Parameters	Unit	Results	Guideline of Egyptian drinking water standard
Water Temperature	°C	28	-
Turbidity	NTU	12	5-10
Taste	Unit	Tasteless	Acceptable
Odor	Unit	Odorless	Odorless
Color	Unit	25	20-30
pH	-	8.0	6.5-9.2
Total Alkalinity (CaCO <sub>3</sub> )	mg/l	126	-
Total Hardness (CaCO <sub>3</sub> )	mg/l	114	500
Total Dissolved Solids	mg/l	189	1200
Calcium (Ca)	mg/l	28	200
Magnesium (Mn)	mg/l	11	150
Chloride (Cl)	mg/l	13	500
Ammonium Nitrogen (NH <sub>4</sub> -N)	mg/l	Nil	-
Nitrite (NO <sub>2</sub> -N)	mg/l	N.D	0.005
Nitrate (NO <sub>3</sub> -N)	mg/l	0.02	10
Iron (Fe)	mg/l	2.0	0.3-1.0
Manganese (Mn)	mg/l	0.29	0.1-0.5
Fluoride (F <sup>-</sup> )	mg/l	0.31	0.8

22/6/2003

Head of the Unit

Osama A. A.

Prof. Osama A.



Tahrir Street - Dokki - Giza

Tel: 3371479

Fax : 3370931 - 3601877

شارع التحرير - الدقى - الجيزة

ت : ٣٣٧١٤٧٩

فاكس : ٣٣٧٠٩٣١ - ٣٦٠١٨٧٧

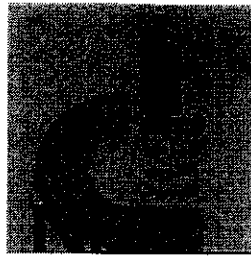


**Algal examination (21/6/2003)**

Parameters	Unit	Results
Total Diatoms Count		6400
1-Threads (Filaments)	Organism/ml	1700
2-Unicell		4700
Total Green Algae Count		520
1-Threads (Filaments)	Organism/ml	80
2-Unicell		120
3-Colonies		320
Total Blue-Green Algae Count		200
1-Threads (Filaments)	Organism/ml	20
2-Colonies		180
Total Algal Counts	Organism/ml	7120







Jar Test for coagulant effectiveness

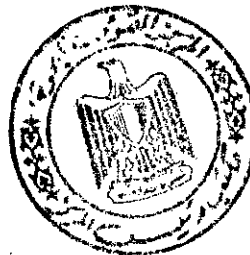
Collection date: 21/6/2003

- 1-The jar test was run to determine the coagulant effectiveness with respect to Alum (Aluminum Sulfate).
- 2-Alum doses investigated were 20, 30 and 40 mg/l and total alkalinity of the treated water amounted to 120, 116, 114 mg/l respectively.
- 3-Raw water turbidity amounted to 12 NTU. Using the coagulant doses given, the turbidity values amounted 3.3, 2.1 and 1.5 respectively and optimum dose for turbidity removal was 40 mg/l.
- 4-Optimum pH for coagulant effectiveness was in the range of 7.3-7.7.

14/6/2003

Head of the Unit

*Osama A. Aly*  
Prof. Osama A. Aly



## Result of Social Survey

Report No. \_\_\_\_\_

# Social Survey

JICA Basic Design Study Team  
June 2003

Name of Surveyor : \_\_\_\_\_

Date of Survey : \_\_\_\_\_

Area Visited : Hihya / Abbassa / Huseiniya / Faqus / Kafr Saqr

: 1. Urban / 2. Rural

Name of the person  
interview \_\_\_\_\_

Address : \_\_\_\_\_

Does the house / :  
apartment have

24 hours water available / Scheduled Supply

Please Specify the :  
Source of Water  
(which compaction  
unit or which well  
pumping station?)

For SHEGAWASD OFFICIAL

---

	Question	Answer	Other Specification
1	How many people are living in the house/apartment?		
2	How many of the people in the house/apartment are:	Age over 12 : Age under 12:	
3	Type of the House	A. Apartment / B. Dwelling	
4	Number of houses connected to a water consumption meter		
5	Number of persons connected to a water consumption meter		
6	Which occupation does the person earn main income have?	<input type="checkbox"/> A. Farmers <input type="checkbox"/> B. Employee <input type="checkbox"/> C. Worker/Labour <input type="checkbox"/> D. Shop Owner <input type="checkbox"/> E. Retired <input type="checkbox"/> F. Others	Please Specify if others
7	How much water did you use and how much did you pay when the last bill came?	_____ m <sup>3</sup> per a month ( _____ m <sup>3</sup> per _____ months) _____ L..E. per a month ( _____ L.E. per _____ months)	If there is any variation depending on season, please write down. (such as the case of Ramadan).
8	Which is the peak hour for water use in your house?	<input type="checkbox"/> A. Before 6 am <input type="checkbox"/> B. 6 – 9 <input type="checkbox"/> C. 9 – 12 <input type="checkbox"/> D. 12 – 15 <input type="checkbox"/> E. 15 – 18 <input type="checkbox"/> F. 18 – 21 <input type="checkbox"/> G. 21 – 24 <input type="checkbox"/> H. After midnight	Please specify if there is the variation of time depending on season (such as the case of Ramadan).
9	What is the main use of water in your house?	<input type="checkbox"/> A. Cooking <input type="checkbox"/> B. Drinking <input type="checkbox"/> C. Washing dish	Please specify if others:

	Question	Answer	Other Specification
		<input type="checkbox"/> D. Washing cloth <input type="checkbox"/> E. Bath / Toilet <input type="checkbox"/> H. Others	
10	Do you BUY water?	Yes / No	(if no, go to 14)
11	If Yes, what type of water do you buy per WEEK?	Which type? <input type="checkbox"/> A. Bottled water <input type="checkbox"/> B. From tank lorry <input type="checkbox"/> C. From neighbour <input type="checkbox"/> D. Others	How much litre? <input type="checkbox"/> A. litre <input type="checkbox"/> B. litre <input type="checkbox"/> C. litre <input type="checkbox"/> D. litre Please specify if others
12	What the main purpose for buying water?	<input type="checkbox"/> A. Cooking <input type="checkbox"/> B. Drinking <input type="checkbox"/> C. Others	Please specify if others.
13	How much do you pay for buying water per MONTH?	L.E. per MONTH	
14	Do you drink tap water	A. Yes / B. No C: Other Sources	
15	What type of toilet do you have?	<input type="checkbox"/> A. Flush toilet <input type="checkbox"/> B. Without Flush	
16	What type of bathroom do you have?	<input type="checkbox"/> A. Bath tub & shower <input type="checkbox"/> B. Bath tub only <input type="checkbox"/> C. Shower only <input type="checkbox"/> E. N/A	
17	Do you have washing machine?	Yes / No	
18	Do you know where wastewater from toilet / bath room goes?	<input type="checkbox"/> A. I don't know <input type="checkbox"/> B. Municipal Sewer System <input type="checkbox"/> C. Drainage Canals <input type="checkbox"/> D. Septic Tank <input type="checkbox"/> E. Surface Ground <input type="checkbox"/> F. Others	
19	Do you know where wastewater from washing and kitchen goes?	<input type="checkbox"/> A. I don't know <input type="checkbox"/> B. Municipal Sewer System <input type="checkbox"/> C. Drainage Canals	



	Question	Answer	Other Specification
		<input type="checkbox"/> D. Septic Tank <input type="checkbox"/> E. Surface Ground <input type="checkbox"/> F. Others	
	<b>Question on the quality of water supply</b>		
20	Are you satisfied with the colour?	Yes / No	
21	Are you satisfied with the taste?	Yes / No	
22	Are you satisfied with the smell?	Yes / No	
23	Are you satisfied with water pressure in your tap?	Yes / No	
24	Are you satisfied with water volume you receive?	Yes / No	
25	If water supply cut-off occurs, how often in a MONTH?	Times per Day Times per Week Times per MONTH	
26	How long is the water supply cut off in a DAY	Hours	
27	Are you satisfied with the current water supply as a whole?	Yes / No	
28	If no, why?		

	Question	Answer	Other Specification
29	What do you expect on water supply project?		
30	How much are you willing to pay for water if all of your problems are solved?		L.E per MONTH
31	Family Income per MONTH?	<input type="checkbox"/> A. 1 – 200 L.E. <input type="checkbox"/> B. 200 – 400 L.E. <input type="checkbox"/> C. 400 – 600 L.E. <input type="checkbox"/> D. 600 – 800 L.E. <input type="checkbox"/> E. More than 800 L.E.	

## Water Pressure and Supply Condition Survey

Please fill in the following columns after the investigation.

	Item	Result	Remarks
1	Tap Water Pressure reading		Hihya Group Only
2	Time to fulfil the bucket	Sec.	Hihya Group Only
3	Is the water reading meter moving?	Yes / No	
4	How do you describe the family you visited?	<input type="checkbox"/> A. very rich <input type="checkbox"/> B. rich <input type="checkbox"/> C. moderate <input type="checkbox"/> D. poor <input type="checkbox"/> E. very poor	
5	Please describe the house hygiene condition	<input type="checkbox"/> A. very clean <input type="checkbox"/> B. clean <input type="checkbox"/> C. moderate <input type="checkbox"/> D. bad <input type="checkbox"/> E. awful	

## **Analysis of the result of the survey**

### **1 ) Number of samples**

Approximately more than 60 samples were collected from each urban and rural area.

### **2 ) Number of residence**

The average is 6.20 person per house. The detail shows 4.69 for adult (over the age of 12 and 1.51 for children (not more than the age of 12). This value applies all areas where the survey was conducted.

### **3 ) Type of residence**

40 to 60% of the house is apartment type in urban area. On the other hand, more than 60% of residence lives in house type in rural area.

### **4 ) Number of houses and persons per 1 water reading meter.**

This value reflects the type of house. Thus the number of houses and persons per 1 water consumption reading meter is high in urban area though only 1 or 2 house share 1 consumption meter in rural area.

### **5 ) Occupation**

Employees are the majority occupation found in the survey and it amounts to 35% in rural area followed by farmer (25%) and retirees (20%). On the contrary, employees in urban area reaches 40% followed by retired (30%) and shop owner (15%) in urban area.

### **6 ) Water consumption and charge in the last 3 months**

The amount of water consumption and its charge in the last three months were examined. This result was combined with the average number of people per 1 water reading meter, which gives water consumption per day per capita.

The result of the survey shows 30 to 40 m<sup>3</sup>/3 month of water consumption is the average in rural area. This is equivalent to 50 ~ 75 l/c/d. Hihya Markaz and Husseinia have the lowest values (52.9l /c/d). On the other hand, Water consumption per capita per day in Kafr Sakr exceeds more than 110 l/c/d.

Urban area shows the similar result. The average LCD in Kafr Saqr and Abbassa is more than 140 l/c/d. On the other hand, Hihya and Huseiniya has only 65 l/c/d, which is solely a half of the value in the former 2 Markaz.

#### **7 ) Peak Hour**

30% of the people in rural area answered the peak our of water use is between 6 to 9 am and 50% said between 9 to 12 am. This shows 80% of the population in rural area highly use water in the morning and this could attribute to washing clothes. Similarly 60% of the people in urban area answered same as in rural area, but there is 25% of answers for between 12 to 15 pm. It is considered there might be a various ways of living in urban area, but most probably it is due to lunch time.

#### **8 ) Peak Hour for summer**

50% and 55% in rural and urban area, respectively, answered the peak hour is between 12 to 18. It is probably due to taking shower after work.

#### **9 ) Main use of water**

95% of people claimed the main use of water is for washing.

#### **1 0 ) Purchase of mineral water etc.**

95% of people answered they do not purchase any other water though 10% of the residence buys. The main use of the purchased water is drinking or cooking. Particularly groundwater is the main water source for rural area. This indicates particularly the residents in rural area have complaints of the groundwater, which gradually increase its salinity level. Although the average income is relatively low in comparison to urban area, the rural area residence may not endure for saline water.

#### **1 1 ) Tap water**

95% of the answer shows the residents do drink tap water. On the other hand, approximately 10% of the residents in Hihya answered they do not want to drink tap water.

#### **1 2 ) Type of toilet**

Flushing toilet was widely seen in urban area (50 to 75%) whereas the ratio was less than 35% in rural area. Flushing toilet was not common particularly in Hihya and Husseiniya..

#### **1 3 ) Type of bath**

More than 75 % and 85% answers in urban and rural area showed the house hold shower only and 15% of answer from urban area indicates they equip shower and bath

tab.

**1 4 ) Washing machine**

Washing machine is a very common house electricity equipment and almost 100% of the answer shows they have washing machine at home.

**1 5 ) Effluent from shower and bath.**

In urban area, almost 100% of drainage go to the municipal sewerage system in Hihya, Facus and Kafr Saqr whereas it was 80% in Abbassa. Many of Husseinia houses equips septic tank.

In rural area, municipal sewer system has not completely equipped and many area rely on septic tank.

**1 6 ) Effluent from kitchen**

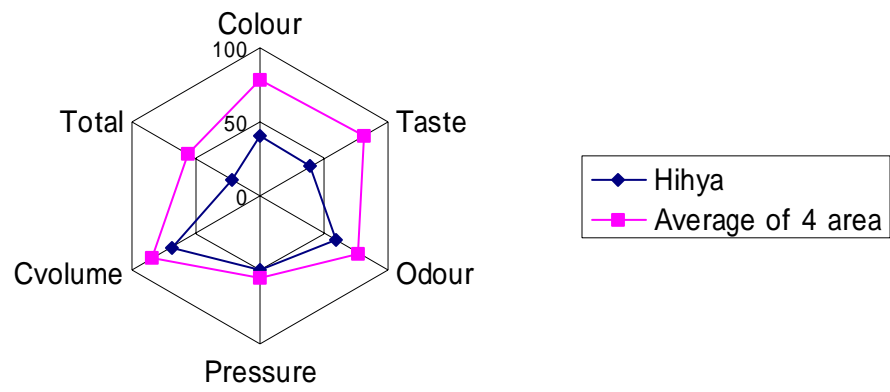
Many answers indicates the drainage go to municipal sewer system or septic tank though some answered they through the effluent to streets.

**1 7 ) Satisfaction for water quality**

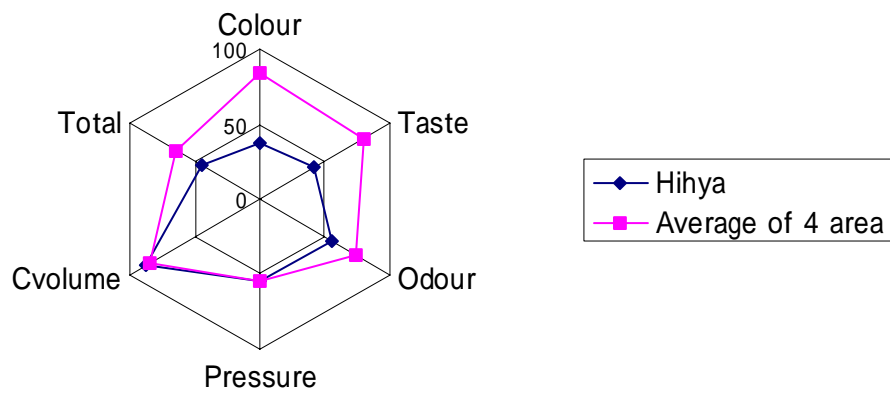
Residential satisfaction on water quality was surveyed in the contents of colour, taste, odour, water pressure, water volume and total evaluation.

Next figure shows the comparison between Hihya and other 4 Markaz. This implies the shape of the satisfaction is very similar between urban and rural area. Particularly satisfaction for colour, taste and odour, which are highly related to water quality, were low in Hihya Markaz comparing to the other 4 areas.

### Rural Area

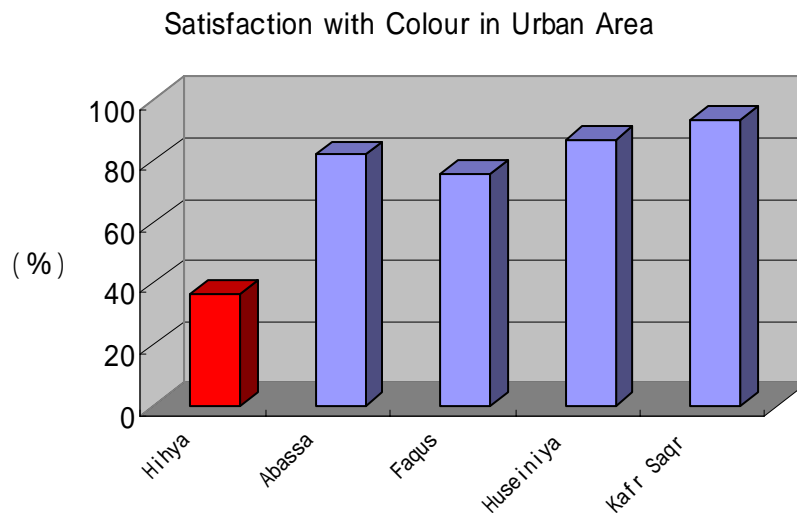
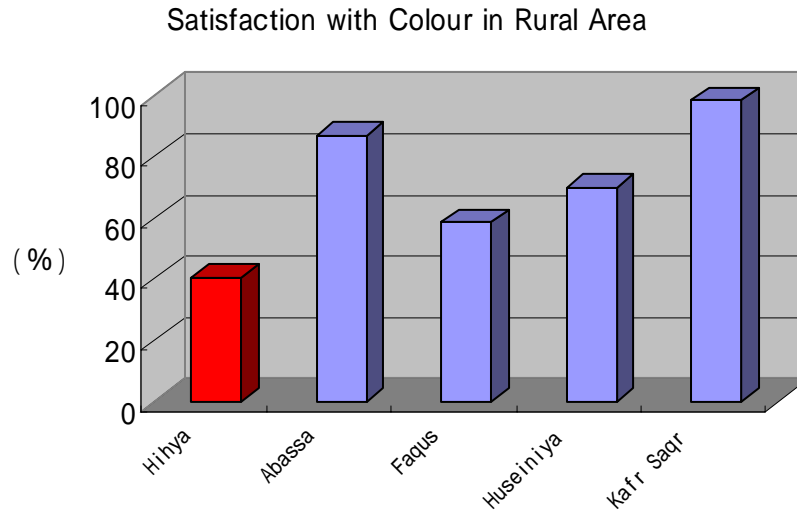


### Urban Area



## Colour

Next figure shows satisfaction on Colour in Urban and Rural area.

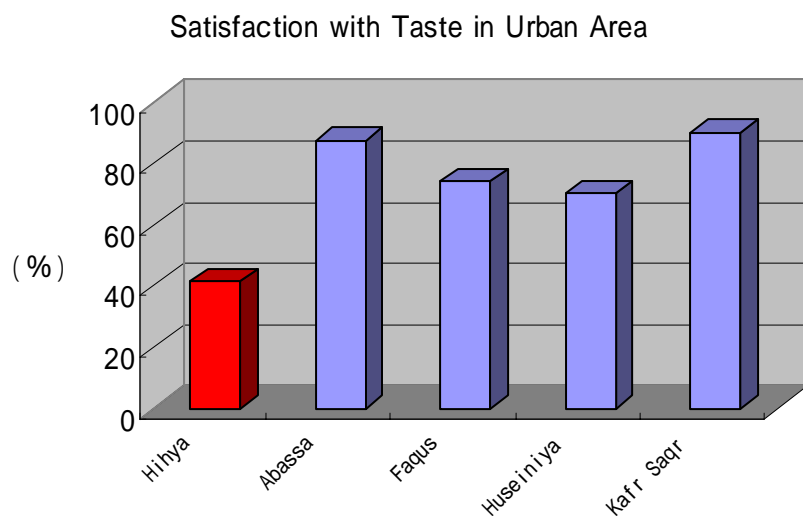
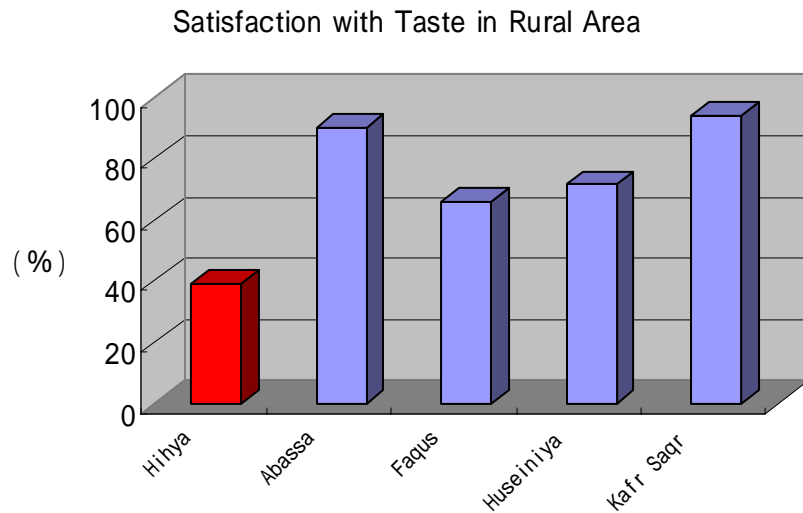


More than 80% and 6% of people in urban and rural area, respectively, in Abassa, Facus, Huseiniya and Kafr Saqr are satisfied with colour of tap water. On the other hand, there is only 40% of people satisfied with the colour of tap water in Hihya Markaz. This value is approximately a half in comparison to other Markaz. Some residents in Hihya explained the colour of the water is yellowish, which may attribute to soil particles. There were also answers which imply the colour of the water is red/blackish, which might be deterioration of water distribution system.



## Taste

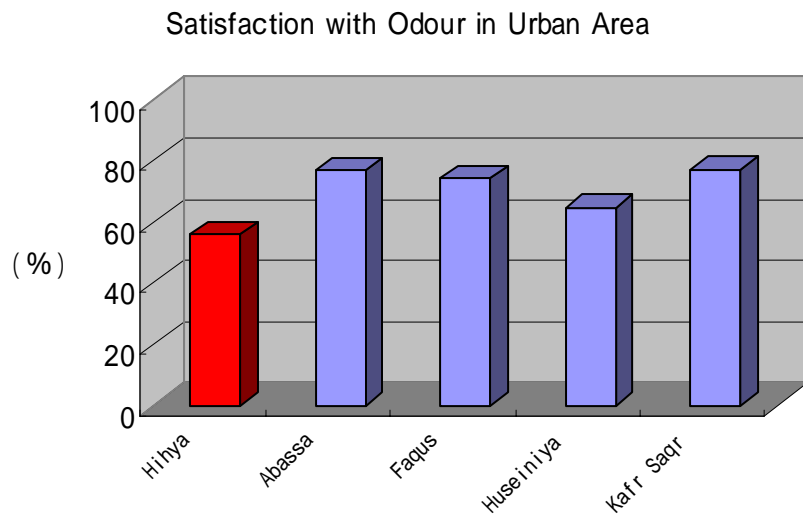
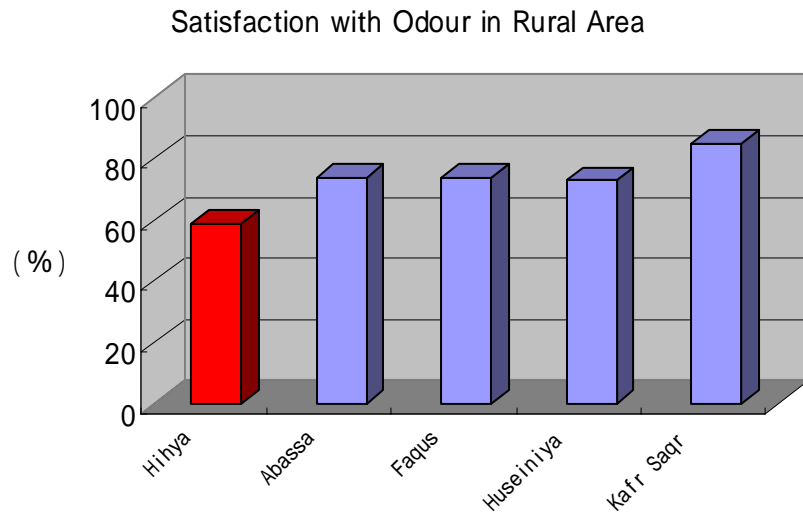
The following figures show the satisfaction for taste.



Similar to satisfaction for colour, Hihya markaz has the lowest rate that people are satisfied with the taste of water (40%). Many residents complained the tap water has salty taste in Hihya. Some claimed this trend is worsen year by year. This reveals salinification has progressed.

## Odour

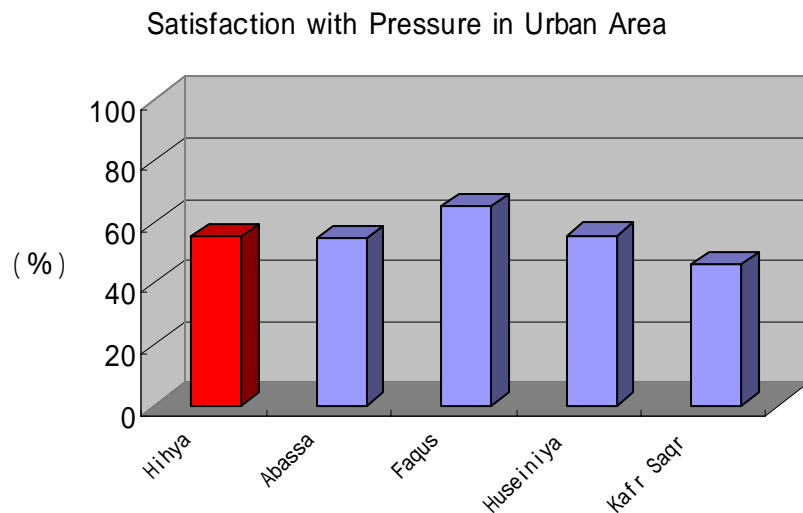
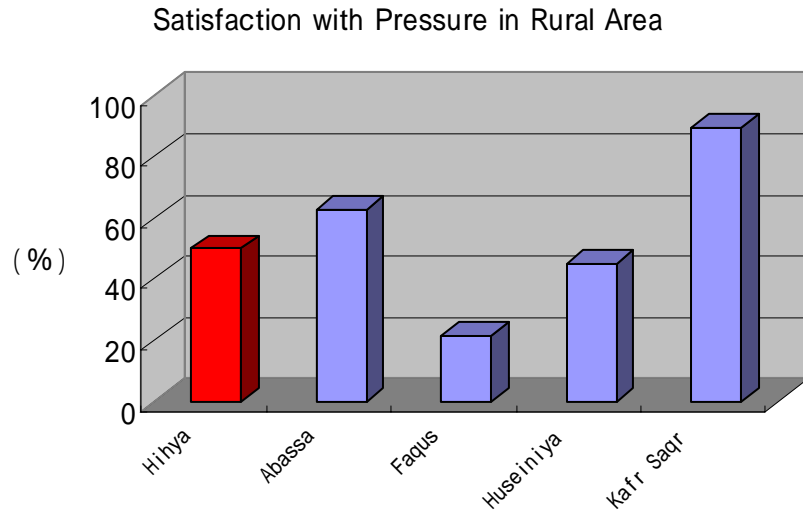
The following figures shows satisfaction for odour.



Although the difference is small, people in Hihya markaz are not satisfied with the smell of water (55%). Many complaints are about the smell of chloride.

## Water pressure

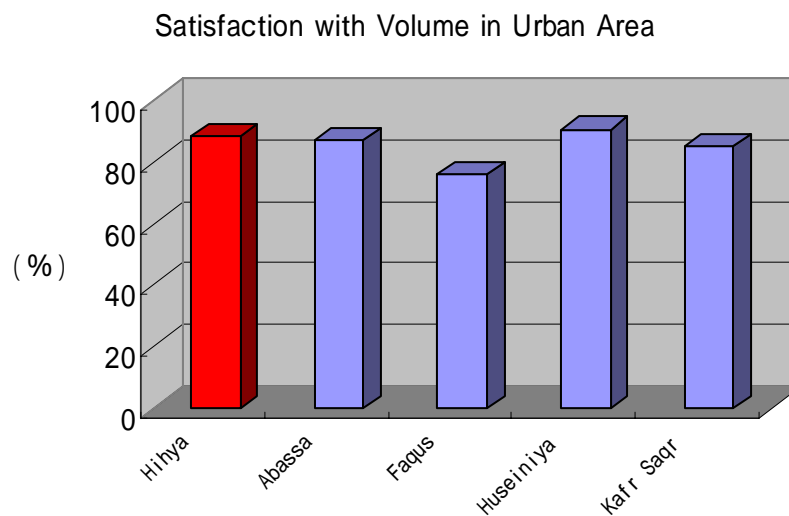
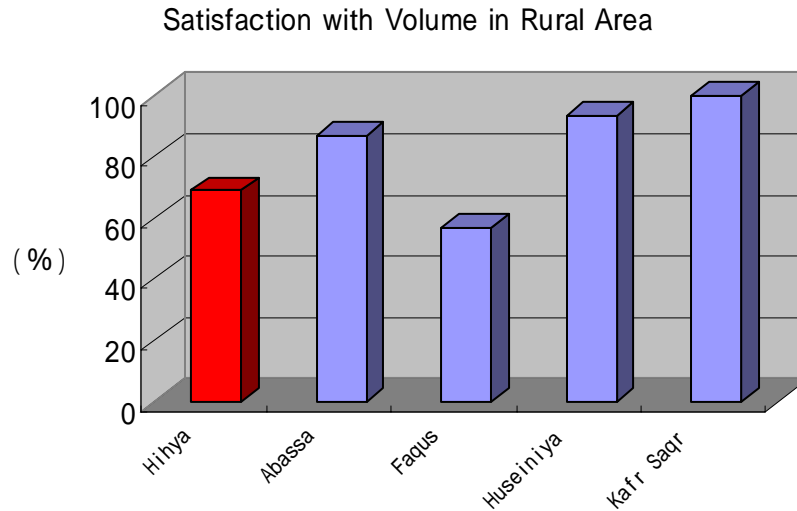
The following figures show the satisfaction for water pressure.



Satisfaction for receiving water pressure is in general low in the all areas. Particularly variance among the areas is large in rural area. This is not due to average receiving water pressure, but is considered due to water cut off (the complaints were significant especially in Facus).

## Water volume

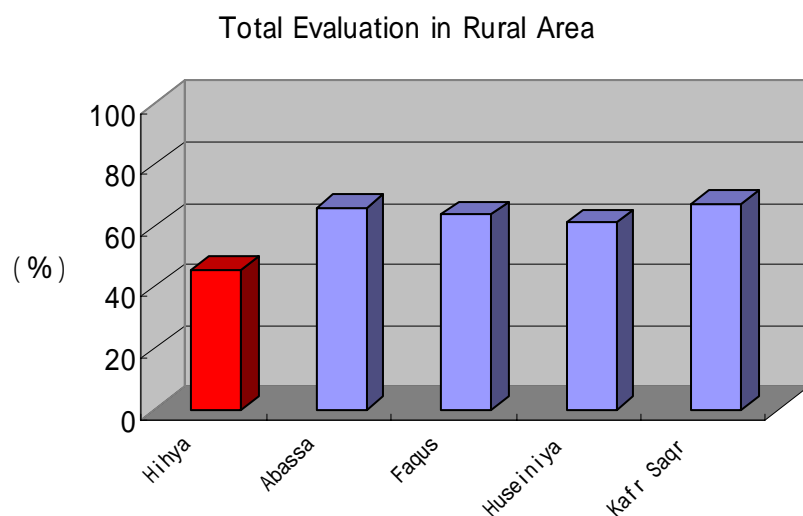
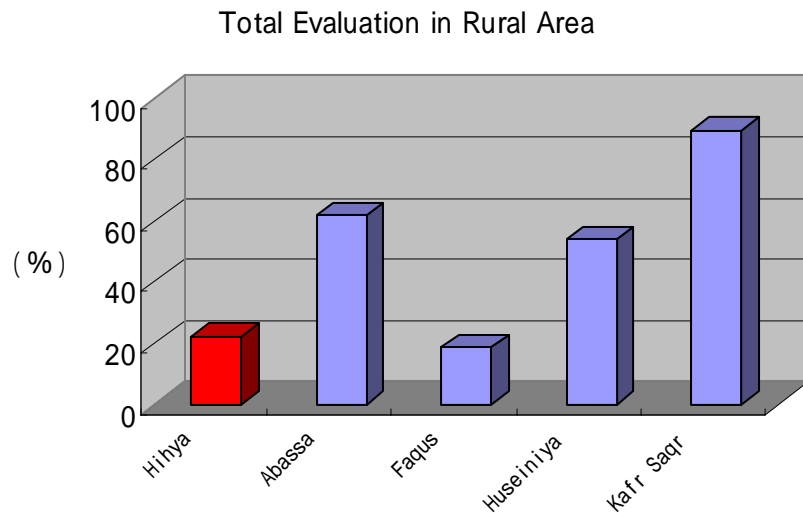
The following figures show the satisfaction for receiving water volume.



Approximately 80% of the habitants in urban area answered the water volume they receive is sufficient. The trend in rural area is very similar. However, only 60% and 50% of the residents are satisfied with water volume in Hihya and Faqus where complaints for water pressure is also high. This implies the local residents in these area highly demand more water.

### Total Evaluation

The following figures show the total evaluation for water supply service by the consumers.



60% of the consumers in 4 urban areas mentioned the current water supply service is in the satisfactory standard. On the other hand, 40% of the habitants in Hihya Markaz are satisfied with the current water service. This is 20% lower than the other areas. It is considered this result reflects complaints for water colour and taste in the area.

In the rural area, there are only 20% of the people satisfied with the present water supply service in Hihya and Faqus. The complaints in Faqus concentrate on receiving water pressure and volume as seen above. As many items in Hihya markaz are in low

numbers, it is understood the people in the Markaz have discontent with the current water service.

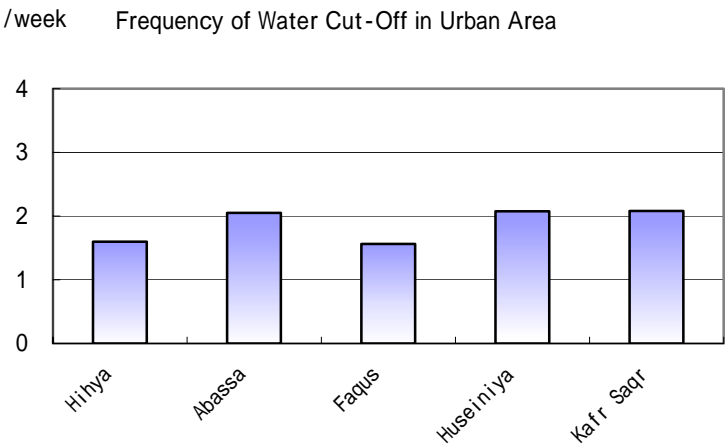
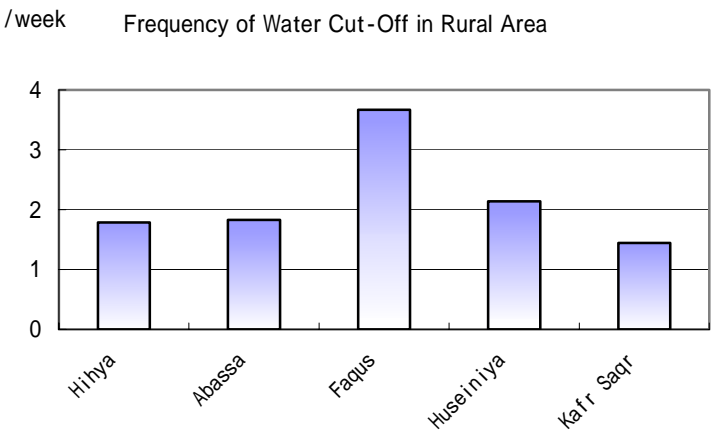
This survey revealed many habitants in rural and urban area of Hihya Markaz have complaints on the water supply service, particularly colour and odour, which are highly related to water quality. Their expectation on the Project is significantly high.

18) Water Cut Off

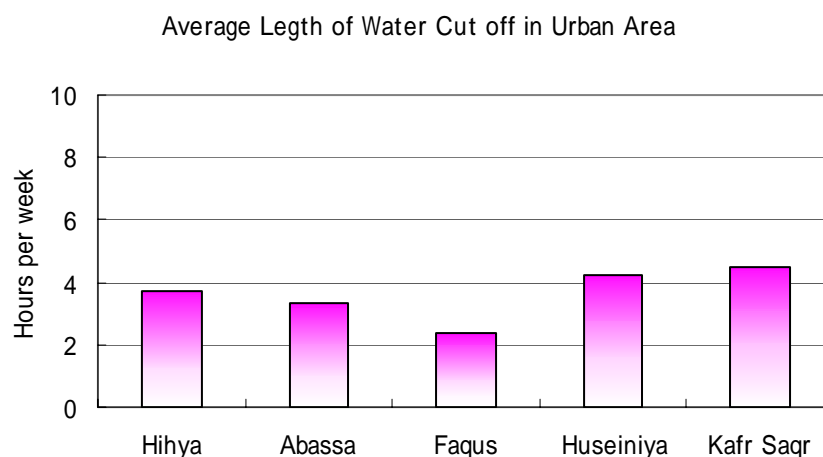
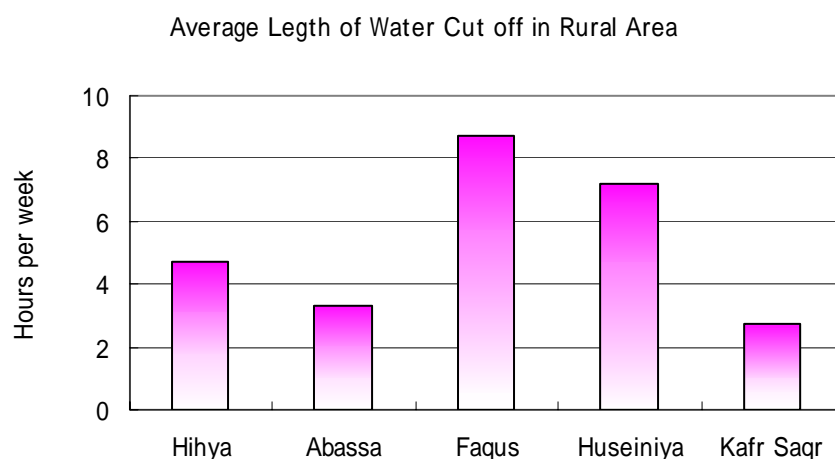
The following figures show the frequency of water cut off in each water supply area.

19) Frequency and Length of Water Cut-Off

The following figures show the frequency and length of water cut off in each area.



The figures below show the length of water cut-off.



Water supply cut off occurs 1.5 to 2 times per week in all surveyed area. Faqus water supply area has the highest rate of 3.5 times per week. The length of water supply cut-off hours is not much differentiated in regions, but Faqus and Huseiniya have relatively longer hours. Some interviewees mentioned it occasionally lasts over 20 hours and may happen 5 times in a week depending on village in Faqus and Huseiniya water supply areas. This fact leads to low score for the total evaluation which is seen in the previous section

## 20) Expansion of Hygiene Equipment

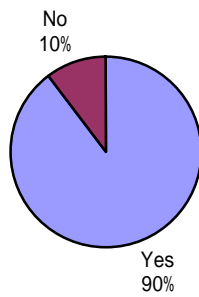
This question was set except Hihya area. The result shows more than 85% of the interviewee declared they do not have any future development plan for bath room and toilet.

## 21) Willingness to Pay

The following figures show the results of the question “the inhabitants have willingness to pay more than the current water charge if water supply service is improved”.

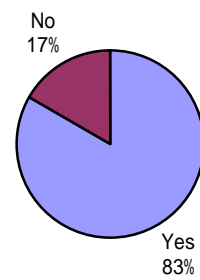
### Rural Area

Hihya in Rural Area

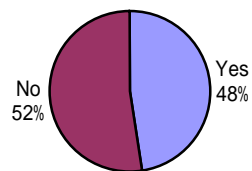


### Urban Area

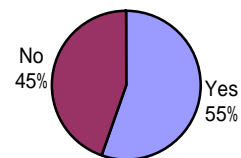
Hihya in Urban Area



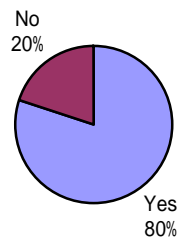
Abassa in Rural Area



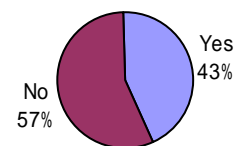
Abassa in Urban Area



Faqus in Rural Area

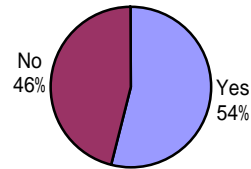


Faqus in Urban Area

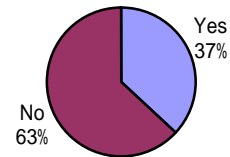




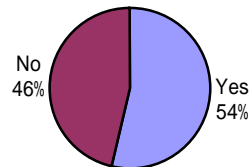
Huseiniya in Rural Area



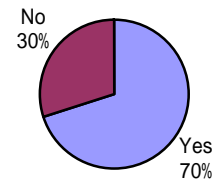
Huseiniya in Urban Area



Kafr Saqr in Rural Area



Kafr Saqr in Urban Area

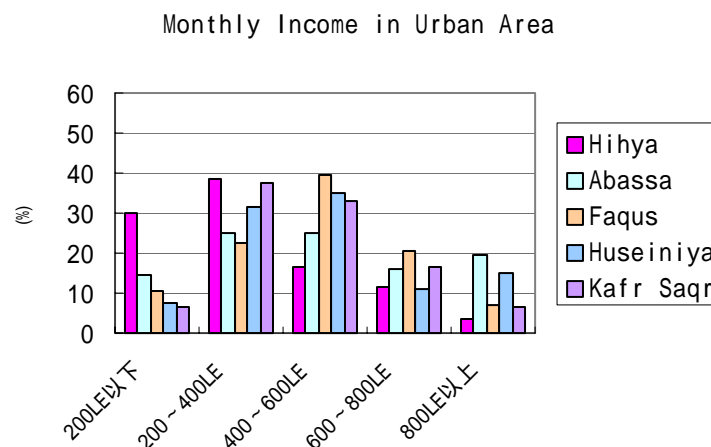
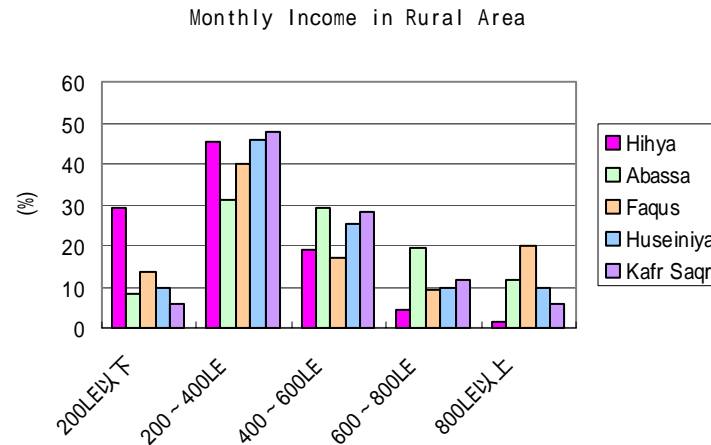


90% and 80% of the residents in rural and urban areas, respectively, in Hihya Markaz answered they have willingness to pay more than the current water charge they pay if water supply service is improved. This is probably because the inhabitants highly have complaints for the current water supply and demand good quality water to be supplied even paying higher price for water supply service.

On the other hand, approximately 40% of the habitants answered they do not wish to pay more than the current price. This may be because they water service with large scale water supply plant distributes water through these 4 areas and the residents consider it is sufficient.

## 22) Average Income

The tables below show the average income in the subject areas.



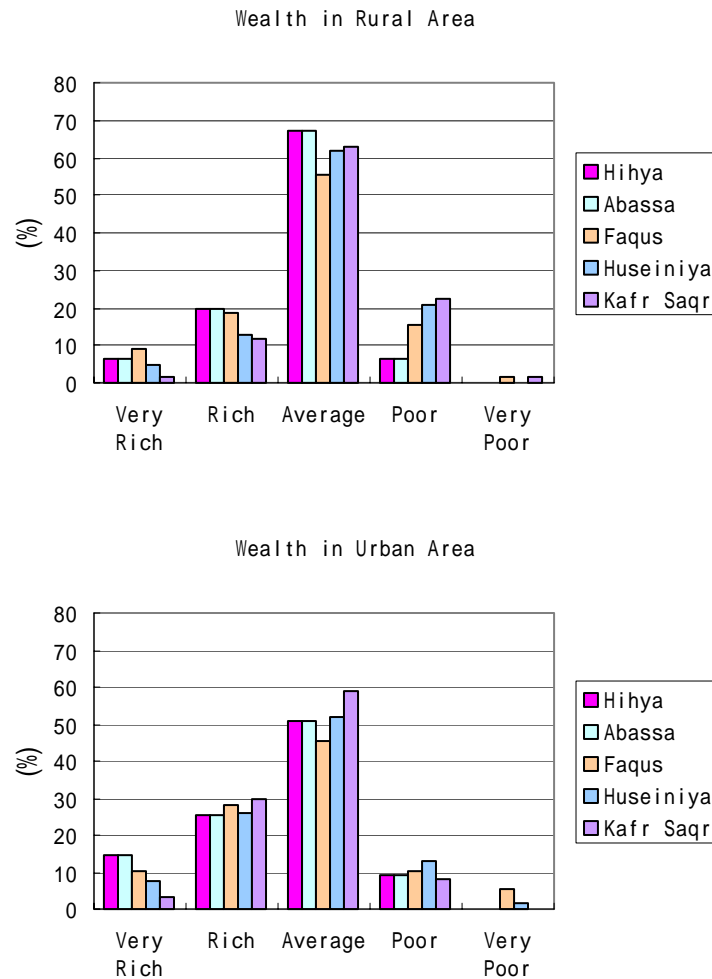
Although the average income in Abassa, Faqus, Huseiniya and Kafr Saqr water supply area shows normal distribution between 200 and 600 LE per month, the distribution in Hihya Markaz is skewed toward left side (between 200 to 400 LE per month).

Approximately 30% of interviewee in rural and urban area of Hihya Markaz have income less than 200 LE. 70% of the residents in this area have the average income of less than 400 whereas the number in the other water supply area is approximately 40 to 55%. On the other hand, there is 6 and 15 % of the interviewees in rural and urban area, of Hihya Markaz, respectively, answered they have the average income of more than 600 LE The same rich layer occupies more than 20% in the other area.

These conclusion indicates the average income in Hihy Markaz is relatively low in comparison to the other water supply area.

## 23) Wealth

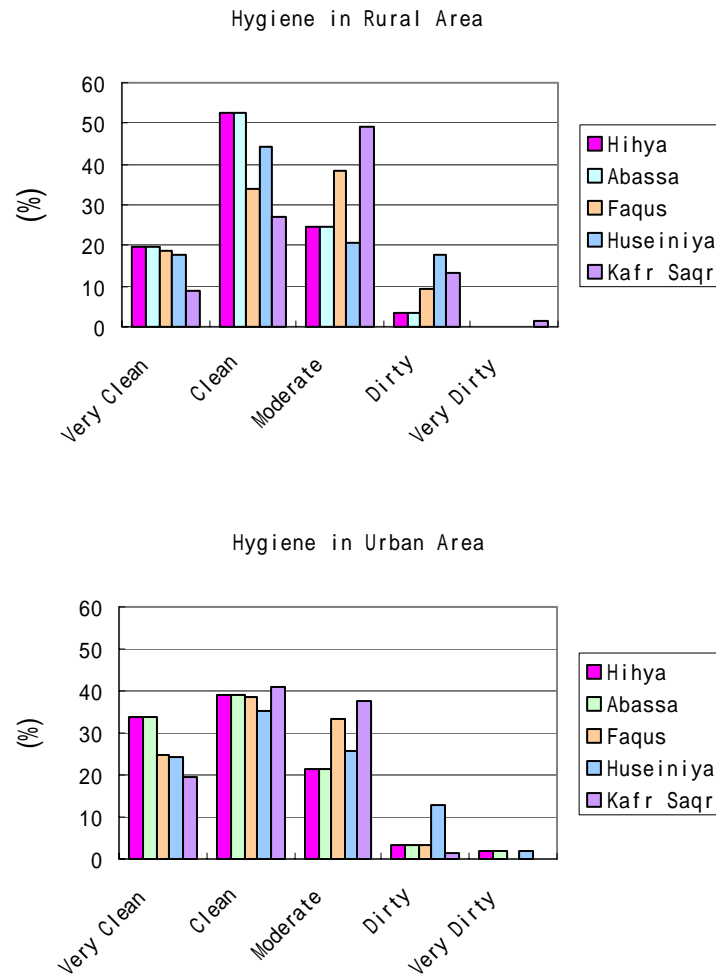
The following figures show the wealth of the visited family. This results were judged by the surveyors and sorted in 5 categories based on furniture, clothes, *etc.*



Although there is small variance in urban area ( $p=0.053$ ), the trends in rural and urban areas are very similar. Most of the interviewees belong to standard wealth followed by rich layers.

## 24) Hygiene Condition

The figures below shows hygiene condition of the visited house. The surveyors judged hygiene condition with 5 categories based on the number of flies, dust, *etc.*



Although there is some variance in urban area, many houses are judged as moderate or clean.