



QUARTERLY REPORT BOTTLED WATER QUALITY



PAKISTAN COUNCIL OF RESEARCH IN WATER RESOURCES

Ministry of Science & Technology

Khyban-e-johar, H-8/1, Islamabad.

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INTRODUCTION

Drinking water quality is deteriorating continually due to biological contamination from human waste, chemical pollutants from industries and agricultural inputs. Piped water also gets contaminated because pipes are laid very close to sewerage lines or open drains and cause many serious water borne diseases. It was found that 45% of infant deaths have been attributed to diarrhea and about 60% to overall infectious waterborne diseases in Pakistan. According to the World Health Organization (WHO) 25-30% of the diseases are gastro-intestinal in nature. The poor quality of drinking water has forced a large cross-section of citizens to buy bottled water. As a consequence of this expanding market a mushroom growth of bottled water industry in the country is witnessed during the last five years. However, many of the mineral water companies were found selling contaminated water. To monitor and improve the quality of bottled water, the government of Pakistan has designated the PCRWR as focal point agency.

1. Ministry of Science & Technology informed PCRWR Vide U.O. No. 5(21)/2004-ATA-II dated 17.10.2005 that the Cabinet in its meeting under the chairmanship of Prime Minister directed Ministry of Science & Technology to undertake regular survey/samples of bottled/mineral water at source of production publicize the results on a quarterly basis and follow up with punitive/legal action.
2. Ministry of Science & Technology has assigned the task of quality monitoring of bottled water and publicize the results to PCRWR Vide U.O. No.1(1)/2005-Secy (MoST) dated 8.12.2005.

PCRWR SAMPLING METHODOLOGY

No. of brands collected	38
No. of cities targeted	8 (Islamabad, Rawalpindi, Lahore, Bahawalpur, Multan, Peshawar, Quetta and Hyderabad)
Composition of sampling Team	One Research Officer and Two Laboratory Assistants
Sampling Procedure	Thirty eight commercially available brands of mineral/bottled water were collected from eight cities of four Provinces of Pakistan These samples were collected by the senior staff members of Head Office and Regional Offices of the Council in May, 2009. A set of four bottles of each brand was collected and sealed on site.
Transparency	One out of these four sealed bottles was handed over to shopkeeper at the time of sample collection; second sample was preserved in the National Water Quality Laboratory of PCRWR,

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Islamabad for future record, and rest of the samples were used for analysis. Identification codes were allotted to all the brands according to PCRWR Bottled Water Classification System.

PCRWR BOTTLED WATER CLASSIFICATION SYSTEM

Sr. No	Brand Name	PCRWR Code	City	Date Collected	Bottled Water Type	Container Size	Manufacturer
1	Nestle	BWH-01	Islamabad	16-06-2009	Purified Water	1.5Liter	Nestle Pakistan Ltd. 308- upper Mall, Lahore 54000 Pakistan
2	Kinley	BWH-02	Islamabad	16-06-2009	Purified Water	1.5Liter	Coca-Cola Beverages Pakistan Shahbazpur road Rahimyar khan.
3	Aquafina	BWH-03	Islamabad	16-06-2009	Purified Water	1.5Liter	Haideri Beverages Pvt Ltd.CDA Industrial Triangle Kahuta Road Islamabad.
4	Life	BWH-04	Islamabad	16-06-2009	Purified Water	1.5Liter	Life Water Industries, 235, Industrial Estate I-9 Islamabad.
5	Mitchell's Balance	BWH-05	Islamabad	16-06-2009	Natural mineral water	1.5Liter	Product of FPCO Mitchell's Fruit Forms Ltd. Renala Khurd Lahore.
6	Gourmet	BWH-06	Lahore	17-06-2009	Purified water	1.5Liter	Gourmet Foods 1.5 Sunder Industrial Estate Lahore
7	Sufi	BWH-07	Lahore	17-06-2009	Pure Water	1.5Liter	Hadayat Food Stuff Industries Pvt. Ltd. 1-B Garden Block Garden Town Lahore
8	Water King	BWH-08	Lahore	17-06-2009	Purified water	1.5Liter	Al Raheem Traders, 10 km Shah Khalid Town College Road Ferozwala Shahdera Lahore
9	First Water	BWH-09	Lahore	17-06-2009	Purified water	1.5Liter	D-38, SITE Karachi
10	Active	BWH-10	Lahore	17-06-2009	Purified water	1.5Liter	Ali Enterprises, 160-E Plastic Dana Market, Shah Alam Market Lahore.
11	Nation	BWH-11	Lahore	17-06-2009	Safe Drinking Water	1.5Liter	Hamza Brothers 9 km GT Road Rachana Town Shadara Lahore
12	Pak Pure	BWH-12	Lahore	17-06-2009	Strong Healthy Water	1.5Liter	Hamza Brothers 9 km GT Road Rachana Town Shadara Lahore
13	Karaiz	BWH-13	Lahore	17-06-2009	Purified water	1.5Liter	Suit # M-65, Mazzanine Floor Harmain Tower, Johar More, Block 19, Gulistan-e-Johar, Karachi
14	Pacific	BWH-14	Lahore	17-06-2009	Natural	1.5Liter	R & H Food Industries,

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					Water		120 Temple, Road, 1st Floor Ghous Bakers, Lahore
15	Guardian	BWH-15	Lahore	17-06-2009	Safe Drinking Water	1.5 Liter	Aqua Safe Mineral Water Co.96 Macleod Road Lahore.
16	Hunza	BWH-16	Lahore	17-06-2009	Mineral Water	1.5 Liter	Sadat Park, 10 Km Multan Road Lahore
17	Sparklet	BWH-17			Pure Drinking Water	1.5 Liter	64 Khayaban-e-Suhurwardy G- 6/4 Islamabad
18	Piyaas	BWH-18	Bahawalpure	23-06-2009	Pure Drinking Water	0.6 Liter	Arshad industry mouza zakira, samman satta head office 59-A Grain market Bahawalpur Pakistan.
19	Pak Crystal	BWH-19	Bahawalpure	23-06-2009	Pure Drinking Water	1.5 Liter	Pak Taiba Enterprises 157-B, Small Industrial Estate Sahiwal Pakistan
20	IS Berg	BWH-20	Bahawalpure	23-06-2009	Purified water	1.5 Liter	Premier Water Refining Company Sialkot Pakistan.
21	Klassic Valley	BWH-21	Islamabad	20-06-2009	mineral water	0.6 Liter	Klassic Valley Bahater More Taxila
22	Hydropsy	BWH-22	Hyderabad	24-06-2009	Pure Drinking Water	0.6 Liter	Karachi 92-21-6377654
23	Tahoor	BWH-23	Hyderabad	24-06-2009	Pure & Natural Water	0.6 Liter	A-S Enterprises C-148 Block-6 Gulshan-e- Iqbal O.O Box 17830 Karachi
24	Montana	BWH-24	Hyderabad	24-06-2009	Purified water	0.6 Liter	Office No. 301 Plot No. 84-C 21 st Commercial Phase II DHA Karachi
25	Noble	BWH-25	Hyderabad	24-06-2009	Purified water	0.6 Liter	Tower Market Hakeem Habebullah Road Hyderabad Pakistan
26	Oslo Plus	BWH-26	Hyderabad	24-06-2009	Pure Drinking Water	0.6 Liter	14 Ramazan Chamber, Dr. Bilmoria Street, Office-1 Chanderegar Road Karachi
27	Spring Fresh	BWH-27	Hyderabad	24-06-2009	Pure Drinking Water	1.5 Liter	208, Billy's Towers, Rashid Minhas Road Karachi
28	Vey	BWH-28	Hyderabad	24-06-2009	Pure Drinking Water	0.6 Liter	424, Bhayani Center Block-M, North Nazimabad Karachi 74700, Pakistan
29	Dew Drops	BWH-29	Rawalpindi	26-06-2009	Pure Drinking Water	0.6 Liter	Bottled by Dew Drops Pakistan Ltd. 308 upper Mall Islamabad-54000, Pakistan
30	Awmas	BWH-30	Rawalpindi	26-06-2009	Pure Drinking Water	0.6 Liter	Phone # 051-2519954 www.awmas.com
31	Great	BWH-31	Rawalpindi	26-06-2009	Pure Drinking Water	1.5 Liter	Great Food Industries G.T Road Opp. Wah Model Town Taxila

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32	Al-Saudia	BWH-32	Rawalpindi	26-06-2009	Pure Drinking Water	1.5 Liter	Al-Saudia water Industries 49-Eastrdge, Near High Court, Rawalpindi
33	Nectar	BWH-33	Rawalpindi	26-06-2009	Pure Drinking Water	1.5 Liter	Nectar Water Islamabad Plot # 14/10, Markaz G-7
34	Abaseen	BWH-34	Peshawar	26-06-2009	Pure Drinking Water	0.6 Liter	Wasay Laboratories (Pvt) Ltd. 148- Industrial Estate Jamrud Road Peshawar
35	Khyber Aqua	BWH-35	Peshawar	30-06-2009	Pure Drinking Water	0.6 Liter	Biokon Moya, Services Hospital Road, Peshawar, NWFP, Pakistan
36	Zindigi	BWH-36	Peshawar	30-06-2009	Pure Drinking Water	0.6 Liter	H.H Enterprises 141-AIE Hayatabad, Peshawar, NWFP Pakistan
37	National	BWH-37	Peshawar	30-06-2009	Pure Drinking Water	0.6 Liter	R.G Enterprises Nasir Bagh Road, University board of Peshawar NWFP
38	Aqwah	BWH-38	Peshawar	30-06-2009	Pure Drinking Water	0.6 Liter	R.G Enterprises Nasir Bagh Road, University board of Peshawar NWFP

PCRWR LABORATORY TESTING PROTOCOLS

APHA, AWWA and WEF. 1992. Standard Methods for the Examination of Water and Wastewater. American Public Health Association, American Water Works Association and Water Environment Federation, Washington, DC.

Physical	Color, Odor, Taste, pH, Turbidity (NTU), Conductivity ($\mu\text{S}/\text{cm}$)
Chemical	Alkalinity (m.mol/l as CaCO_3), Arsenic (ppb), Bicarbonate, Calcium (mg/l), Carbonate (mg/l), Chloride (mg/l), Lead (ppb), Hardness (mg/l), Magnesium (mg/l), Nitrate Nitrogen (mg/l), Potassium (mg/l), Sodium (mg/l), Sulfate (mg/l), Phosphate (mg/l), TDS (mg/l), Fluoride (mg/l), Iron (mg/l)
Microbiological	Total Coliforms, Fecal Coliforms, E-coli

WATER QUALITY PERMISSIBLE LIMITS FOR BOTTLED WATER

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Sr. #	Parameter	Units	Permissible Limits		
			WHO	IBWA	PSQCA
1.	Alkalinity	(m.mol/l)	NGVS	NGVS	NGVS
2.	Bicarbonate	(mg/l)	NGVS	NGVS	NGVS
3.	Calcium	(mg/l)	NGVS	NGVS	100
4.	Carbonate	(mg/l)	NGVS	NGVS	NGVS
5.	Chloride	(mg/l)	250	250	250
6.	Co lour	(TCU)	15	NGVS	5
7.	Conductivity	(µS/cm)	NGVS	NGVS	NGVS
8.	Fluoride	(mg/l)	1.5	3	0.7
9.	Hardness	(mg/l)	NGVS	NGVS	NGVS
10.	Iron	(mg/l)	0.3	0.3	0.3
11.	Magnesium	(mg/l)	NGVS	NGVS	50
12.	Odor	-	Odorless	NGVS	Unobjectionable
13.	Nitrate-N	(mg/l)	10	10	10
14.	pH	-	6.5-8.5	NGVS	6.5-8.5
15.	Potassium	(mg/l)	NGVS	NGVS	10
16.	Sodium	(mg/l)	200	NGVS	50
17.	Sulfate	(mg/l)	250	250	250
18.	Taste	-	Unobject.	NGVS	Unobjectionable
19.	TDS	(mg/l)	1000	500	500
20.	Turbidity	(NTU)	5	NGVS	0.5
21.	Phosphate	(mg/l)	NGVS	NGVS	NGVS
22.	Arsenic	ppb	10	10	10
23.	Total Coliform	MPN/100ml	Nil	Nil	Nil
24.	E-Coli	MPN/100ml	Nil	Nil	Nil

WHO world Health Organization
IBWA International Bottled Water Association
PSQCA Pakistan Standards and Quality Control Authority

SUMMARY OF RESULTS OF PCRWR MONITORING

CONTAMINANTS OF POTENTIAL CONCERNS FOUND IN BOTTLED WATER BRANDS

PHYSICO-CHEMICAL: ARSENIC				
Sr. No	Brand Name	Code	Unit	Level of Contamination
				Analytical Results
1.	Mitchell's Balance	BWH-05	ppb	44
2.	Water King	BWH-08	ppb	17

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3.	Active	BWH-10	ppb	27
4.	Nation	BWH-11	ppb	41
5.	Pak Pure	BWH-12	ppb	42
6.	Pacific	BWH-14	ppb	33
7.	Guardian	BWH-15	ppb	11
8.	Hunza	BWH-16	ppb	20
9.	Piyaas	BWH-18	ppb	18
10.	Pak Crystal	BWH-19	ppb	13

PHYSICO-CHEMICAL: SODIUM				
Sr. No	Brand Name	Code	Unit	Level of Contamination
				Analytical Results
11.	Nation	BWH-11	ppm	66
12.	Pak Pure	BWH-12	ppm	86
13.	Guardian	BWH-15	ppm	106
14.	Pak Crystal	BWH-19	ppm	80

PHYSICO-CHEMICAL: POTASIUM				
Sr. No	Brand Name	Code	Unit	Level of Contamination
				Analytical Results
1	IS Berg	BWH-20	ppm	12

PCRWR TESTING: SAFE BRANDS

Sr. No	Brand Name	Code	Quality (Safe/Unsafe)	
			Chemical	Microbiological
1.	Nestle	BWH-01	Safe	Safe
2.	Kinley	BWH-02	Safe	Safe
3.	Aquafina	BWH-03	Safe	Safe
4.	Life	BWH-04	Safe	Safe
5.	Gourmet	BWH-06	Safe	Safe
6.	Sufi	BWH-07	Safe	Safe
7.	First Water	BWH-09	Safe	Safe
8.	Karaiz	BWH-13	Safe	Safe
9.	Sparkellet	BWH-17	Safe	Safe
10.	IS Berg	BWH-20	Safe	Safe
11.	Klassic Valley	BWH-21	Safe	Safe
12.	Hydropsy	BWH-22	Safe	Safe
13.	Tahoor	BWH-23	Safe	Safe
14.	Montana	BWH-24	Safe	Safe

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15.	Noble	BWH-25	Safe	Safe
16.	Oslo Plus	BWH-26	Safe	Safe
17.	Spring Fresh	BWH-27	Safe	Safe
18.	Vey	BWH-28	Safe	Safe
19.	Dew Drops	BWH-29	Safe	Safe
20.	Awmas	BWH-30	Safe	Safe
21.	Great	BWH-31	Safe	Safe
22.	Al-Saudia	BWH-32	Safe	Safe
23.	Nectar	BWH-33	Safe	Safe
24.	Abaseen	BWH-34	Safe	Safe
25.	Khyber Aqua	BWH-35	Safe	Safe
26.	Zindigi	BWH-36	Safe	Safe
27.	National	BWH-37	Safe	Safe
28.	Aqwah	BWH-38	Safe	Safe

PCRWR TESTING: UNSAFE BRANDS

Sr. No	Brand Name	Code	Quality (Safe/Unsafe)	
			Chemical	Microbiological
1)	Mitchell's Balance	BWH-05	Unsafe	Safe
2)	Water King	BWH-08	Unsafe	Safe
3)	Active	BWH-10	Unsafe	Safe
4)	Nation	BWH-11	Unsafe	Safe
5)	Pak Pure	BWH-12	Unsafe	Safe
6)	Pacific	BWH-14	Unsafe	Safe
7)	Guardian	BWH-15	Unsafe	Safe
8)	Hunza	BWH-16	Unsafe	Safe
9)	Piyaas	BWH-18	Unsafe	Safe
10)	Pak Crystal	BWH-19	Unsafe	Safe
11)	IS Berg	BWH-20	Unsafe	Safe

MARKET CONSISTENCY IN TWO NEIGHBORING QUARTERS

Sr. No	Consistent Brands	New Brands	Unavailable Brands
1.	Nestle	Pak-Crystal	Maza
2.	Kinely	Life	Legends
3.	Aquafina	Mitchell's Balance	Avisa
4.	Gourmet	Pak-Pure	Rainbow
5.	Sufi	Karaiz	Pino
6.	Water King	Pacific	Life Care
7.	First	Guardian	Al-Falah

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8.	Nation	Hunza	Aqua National
9.	Sparkllet	Is Berg	Shine Aqua
10.	Piyaas	Klassic Valley	Aqua Water
11.	Hydropsy	Tahoor	Crystal
12.	Dew Drops	Montana	
13.	Necter	Noble	
14.	Abaseen	Oslo Plus	
15.	Al-Saudia	Spring Fresh	
16.	Active	Vey	
17.		Awams	
18.		Great	
19.		Khyber Aqua	
20.		Zindagi	
21.		National	
22.		Aqwah	

DISEASE POTENTIAL FROM CONTAMINATED BOTTLED WATER

Sr. No	Contaminant	Diseases Impacts
1	Arsenic	Cancer (lungs, bladder, skin, prostate, kidney, nose and liver), diabetes kidney diseases, hypertension, heart diseases, birth defects, black foot diseases.
2	Potassium	Lung cancer, Hyperkalemia, Abnormal breakdown of protein
3	Sodium	High concentration of Sodium causes hypertension problem

CONCLUSIONS

Sr. No	Item	Conclusion	
		No.	% age
1.	Total No. Brands Collected	38	100
2.	overall safe brands	27	71
3.	No. of overall unsafe brands	11	29
4.	No. of Chemically safe brands	27	71
5.	No. of Chemically unsafe	11	29

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	brands		
6.	No. of Microbiologically safe brands	38	100
7.	No. of Microbiologically unsafe brands	0	0
8.	No. of Consistent brands in Market	16	33
9.	No. of brands disappeared from market	11	29
10.	No. of new brands	22	58

Detailed Water quality status of each bottled water brand is available at Annexure-1

Chemical and Microbiological Quality of Bottled/Mineral water Brands

Annexure I

Brand Name	Brand Code	Turbidity	pH	EC	TDS	Ca	Mg	Hard	HCO ₃	Cl	Na	F	PO ₄	Fe	K	NO ₃	SO ₄	As	Coliform	E.Coli
PSQCA Bottled Water Standards		0.5	6.5 - 8.5	NGVS	500	100	50	NGVS	NGVS	250	50	0.7	NGVS	0.3	10	10	250	10	Nil	Nil
Units		NTU		µS/cm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	MPN /100ml	MPN /100ml
Nestle	BWH-01	BDL	6.9	313	172	34	5	105	40	64	18	0.4	BDL	BDL	0.9	BDL	15	8	Nil	Nil
Kinley	BWH-02	BDL	6.79	601	331	42	13	160	30	131	50	0.04	BDL	BDL	2.9	0.2	35	0.2	Nil	Nil
Aquafina	BWH-03	BDL	7.1	209	115	2	12	55	10	25	18	0.05	BDL	BDL	1.3	BDL	40	0.1	Nil	Nil
Life	BWH-04	BDL	7.01	434	238	56	12	190	185	12	22	0.2	BDL	BDL	1.2	2.8	12	0.3	Nil	Nil
Mitchell's Balance	BWH-05	BDL	7.3	256	148	14	6	60	95	9	31	0.3	0.07	BDL	3.2	0.1	22	44	Nil	Nil
Gourmet	BWH-06	BDL	6.95	386	212	40	7	130	45	74	19	0.1	BDL	BDL	0.3	BDL	24	0.2	Nil	Nil
Sufi	BWH-07	BDL	7.09	383	210	46	8.5	150	30	82	11	0.03	BDL	BDL	0.4	BDL	25	0.7	Nil	Nil
Water King	BWH-08	BDL	7.25	391	215	22	11	100	160	10	49	0.2	0.03	BDL	1.9	BDL	25	17	Nil	Nil
First Water	BWH-09	BDL	7.12	348	191	40	7	130	20	76	4	BDL	BDL	BDL	7.8	0.1	23	BDL	Nil	Nil
Active	BWH-10	BDL	7.25	282	155	22	13	110	125	2	18	0.4	0.1	BDL	2.3	0.1	13	27	Nil	Nil
Nation	BWH-11	BDL	7.15	501	275	32	12	130	214	14	66	0.25	0.14	BDL	3.8	0.1	25	41	Nil	Nil
Pak Pure	BWH-12	BDL	7.44	719	380	44	22	200	225	34	86	0.3	0.12	BDL	5.1	0.1	68	42	Nil	Nil
Karaiz	BWH-13	BDL	7.69	310	170	24	17	130	140	4	20	0.3	0.07	BDL	3.5	BDL	20	3.5	Nil	Nil
Pacific	BWH-14	BDL	7.68	350	192	20	7.2	80	155	6	43	0.3	BDL	BDL	1.9	BDL	24	33	Nil	Nil
Guardian	BWH-15	BDL	7.73	586	322	16	11	85	230	14	106	0.2	0.04	BDL	2.9	0.1	39	11	Nil	Nil
Hunza	BWH-16	BDL	7.52	335	187	26	14	125	155	5	29	0.25	0.08	BDL	3.9	0.1	19	20	Nil	Nil
Sparklet	BWH-17	BDL	7.68	297	162	36	8.5	125	140	5	19	0.1	0.03	BDL	1	1.6	10	0.36	Nil	Nil
Piyaas	BWH-18	BDL	7.88	395	217	24	8	95	130	22	50	0.3	BDL	BDL	3	0.2	25	18	Nil	Nil
Pak Crystal	BWH-19	BDL	7.7	530	291	24	8	95	130	36	80	0.5	BDL	BDL	4	0.1	60	25	Nil	Nil
IS Berg	BWH-20	BDL	7.67	230	126	24	2.4	70	30	46	3	0.4	0.02	BDL	12	BDL	9	2	Nil	Nil
Klassic Valley	BWH-21	BDL	7.52	414	227	40	16	165	175	8	28	0.25	BDL	BDL	1.5	1.8	14	0.4	Nil	Nil
Hydropsy	BWH-22	BDL	7.68	388	213	28	3.6	85	50	58	39	0.06	BDL	BDL	7	7	13	BDL	Nil	Nil

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Tahoor	BWH-23	BDL	7.66	296	163	26	8.5	100	40	52	4	0.06	BDL	BDL	15	0.2	16	BDL	Nil	Nil
Montana	BWH-24	BDL	7.65	395	217	44	7	140	30	92	10	BDL	BDL	BDL	9.2	0.1	16	BDL	Nil	Nil
Noble	BWH-25	BDL	7.64	398	219	38	16	160	50	62	18	0.13	BDL	BDL	3.6	0.5	45	BDL	Nil	Nil
Oslo Plus	BWH-26	BDL	7.94	251	138	8	8.5	55	55	27	28	0.1	BDL	BDL	0.8	BDL	24	0.1	Nil	Nil
Spring Fresh	BWH-27	BDL	7.53	422	232	36	11	135	105	42	33	0.3	BDL	BDL	2.8	2.7	25	BDL	Nil	Nil
Vey	BWH-28	BDL	7.91	331	182	38	7.2	125	25	71	5	BDL	BDL	BDL	6.8	0.1	16	BDL	Nil	Nil
Dew Drops	BWH-29	BDL	7.82	466	256	60	14	210	185	9	13	0.2	BDL	BDL	1.2	2.4	16	0.3	Nil	Nil
Awmas	BWH-30	BDL	8.14	436	240	36	12	140	150	41	38	0.2	0.03	BDL	1.2	2.5	10	BDL	Nil	Nil
Great	BWH-31	BDL	7.76	412	226	38	17	165	175	9	24	0.25	BDL	BDL	1.5	1.7	25	0.2	Nil	Nil
Al-Saudia	BWH-32	BDL	7.56	614	337	84	18	285	245	11	22	0.3	0.21	BDL	1.6	1.4	45	0.4	Nil	Nil
Nectar	BWH-33	BDL	7.53	461	258	62	13	210	150	13	18	0.15	BDL	BDL	1	1	16	BDL	Nil	Nil
Abaseen	BWH-34	BDL	7.38	492	435	46	27	225	140	13	17	0.5	0.34	BDL	1.9	4.8	22	BDL	Nil	Nil
Khyber Aqua	BWH-35	BDL	7.46	557	306	52	27	240	150	31	23	0.3	0.18	BDL	4.5	5.6	24	0.2	Nil	Nil
Zindigi	BWH-36	BDL	7.62	454	249	42	24	205	135	11	19	0.5	0.23	BDL	1.8	4.6	24	BDL	Nil	Nil
National	BWH-37	BDL	7.54	382	210	32	19	160	110	13	18	0.4	0.26	BDL	1.6	3.3	15	BDL	Nil	Nil
Aqwah	BWH-38	BDL	7.61	385	211	32	21	165	110	11	18	0.4	0.2	BDL	1.6	2.8	14	BDL	Nil	Nil

NGVS =No Guideline Value Set