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संघ सरकार

MINISTRY OF WATER RESOURCES

केन्द्रीय भूमिजल बोर्ड

CENTRAL GROUND WATER BOARD

A SHORT REPORT REGARDING NEED TO STOP OVER-EXPLOITATION OF GROUND WATER BY M/S HINDUSTAN COCA-COLA BEVERAGES LTD., MEHNDIGANJ, VARANASI DISTRICT, U.P.

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1.0 INTRODUCTION

Hindustan Coca Cola Beverages Limited (HCCBL) has one Plant at Mehndiganj, Block Araziline, District Varanasi, U.P. As per complaint of an N.G.O. Lok Samiti HCCBL Plant is withdrawing enormous quantity of ground water due to which water levels in the areas around the Plant is declining at a faster rate and most of the Dug wells and Ponds are getting dried. A brief report on the basis of the survey carried out in and around the Plant on 23.02.2012 is given below.

Varanasi district covers an area of 1578 sq.km. Administratively, the district comprises of two tehsils and eight blocks. The district mainly occupies Indo-Gangetic alluvial plain which is made of two types of alluvium- (a) Newer alluvium-along the flood plains of Ganga and (b) Older alluvium- occupying the uplands, locally known as 'uparvor'.

The site under reference is located 50 m north on NH-2, approximately 17 km. from Varanasi city, under survey of India Toposheet No. 63 K/15 and Latitude: 26° 15' 45" N and Longitude: 87° 50' 40", and falls under Araziline block.

2.0 HYDROGEOLOGY AND SUB-SURFACE GEOLOGY

Geologically, the Varanasi district is mainly underlain by Indo-Gangetic alluvium (Varanasi Alluvium), the deposition of which commenced from the Pleistocene period after the final upheaval of the Himalayas. It consists of interbedded layers of sand, silt and clay which is associated with Kankar at places. In the unconsolidated alluvial sediments ground water occurs in the pore spaces in the zone of saturation. On perusal of the lithological logs of the tubewells, it is observed that a

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thin clay bed is occurring in the entire district which is occasionally mixed with Kankar. The thickness of this layer varies from 6.00 m to 44.06 m. bgl.

Nearest tubewell constructed by CGWB is Admapur exploratory well (Approximately 7 Kms. from Coca Cola Plant) Lithological log of this tubewell is as follows :

ADMAPUR EXPLORATORY WELL

0.00 - 6.00	Surface soil
6.00-24.10	Clay, dark brown, sticky, plastic with minor Kankar
24.10 - 36.30	Clay - greyish black, sticky with indurated sand.
36.30 - 42.40	Sand fine grained, greyish with little blackish clay.
42.40 - 57.70	Sand fine to coarse grained, greyish, comprised of quartz, feldspars and ferromagnesium minerals
57.70 - 60.70	Kankar of gravel size, angular to sub- angular
60.70 - 63.80	Sand coarse grained, brownish
63.80 - 72.90	Sand fine grained, brownish
72.90 - 127.80	Sand medium to coarse grained.

2.1 Ground Water Scenario:

2.1.1 Depth to Water Level:

Depth to water level in phreatic zone varies from 2.40 to 13.95 m. bgl. in pre-monsoon period and in post-monsoon period it varies from 1.42 to 8.87 m.bgl. It is observed that water level is generally deeper in the areas adjacent to river Ganga, where as it is shallower in canal command areas. During hydrogeological surveys around Coca-cola Plant, Mehndiganj in Araziline block on 23.2.12, depth to water level ranged from 9.75 m to 15.54 m.bgl. and 25.30 mbgl in Piezometer of Coca-Cola Plant.

The depth to water level of the wells monitored during the current visit is as below:

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DEPTH TO WATER LEVELS IN AND AROUND HCCBL PLANT, 2012

Sl. No.	Location	Appx. distance from Coca-Cola Plant (m)	Depth to water level (mbgl)
1	Mirza Murad	6500 (west)	10.58
2	Bhikharipur	1500 (west)	11.50
3	Harpur	2400 (North)	15.54
4	Kachnar	1100 (North-East)	12.12
5	Khemaipur	5000 (South)	9.75
6	Piezometer	In the Plant premises	25.30

It was found that in the area inside the factory the water level is very deep (25.30 m.bgl.). However, in the area adjoining the factory water levels are relatively shallow ranging between 9.75 - 15.54 m.bgl.

2.1.2 Long Term Water Level Trend:

Data of all monitoring stations of Ground Water Department in the district were analyzed from 2000 to 2009, which indicates that only one block shows a rising trend of water levels. All the remaining seven blocks show declining long term water level trends. Ten years (2002-2011) data of two National Hydrograph Network stations of CGWB located at Araziline block were analysed to know the long term trend which also indicate long term decline during pre-monsoon period to the tune of 0.1045 m/year and during post- monsoon period to the tune of 1.1168m/year (Table-I). Seven blocks of Varanasi district including Araziline block show declining long term water level trends ranging between 0.09 (in Baragaon) to 0.59 m/ year (in Harhuwa block) during the pre-monsoon period and between 0.12 (in Pindra Block) to 1.21 m/year (in Harhuwa block) during post-monsoon period.

2.1.3 Ground Water Resources:

To facilitate the ground water development judiciously, the block wise ground water resources have been worked out based on GEC-97 norms (Table-II) and GEC-14 norms (Table-III).

A perusal of Table-II and Table-III shows that the net annual ground water availability in Araziline block was 7219.28 ham. during 2004, which was reduced to 611.70 ham. in 2009. Existing gross ground water draft for all uses was 5358.66 ham

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during 2004, which has enhanced to 6180.01 ham. in 2009. Stage of ground water development was 72.84% in 2004 with safe category, while in 2009 the stage of ground water development increased to 96.39% and block is categorised as critical.

2.2 Ground Water Abstraction by HCCBL Plant:

There are two numbers of tubewells inside the plant of Coca-cola, Mehandiganj which are withdrawing the ground water regularly. The depth of these tubewells are approximately 100.00 m.bgl. (as reported by Plant Manager-Annexure-II) and withdrawing water from Phreatic zone. On an average 100 kilo liters/ day (i.e. 100 cum/day).- ground water is being withdrawn from the tubewells(30 Cum/day from each tubewell) . Total water withdrawn from both bore wells in year 2011 was 36084 kilo litres (36084 cum.) (Annexure-II).

2.2.1 Status of Ground Water Level in and around the HCCBL Plant:

There is one Piezometer installed inside the plant of Coca-cola which was constructed during 2005. Water level data of pre-monsoon and post-monsoon period from year 2005 onward is annexed as Annexure-I.

Depth to water level in this Piezometer recorded on 1.3.12 is 25.29 m.bgl. Seven numbers of open wells were monitored by State Ground Water Deptt. and CGWB around Coca-cola plant to monitor the water level . Data of these wells from 2002 to 2006 is annexed as Annexure- I. Five numbers of open wells were monitored on 23.2.2012 around Coca-Cola plant and water level data was taken. On the basis of above data, depth to water level map is prepared which is annexed as Plate-I.

The depth to water level in Piezometer has declined by more than 7m in a period of 5 years from year 2006 to 2011 (Annexure-II).

2.2.2 Rain Water Harvesting measures by the HCCBL:

Hindustan Coca-Cola Beverages Limited had constructed 27 Rain Water Harvesting structures around Mehandiganj plant and in Varanasi city constructed over a period of 8 years (2003-2010). As per HCCBL data the recharge capacity of all the structures in 79141 cum. if monsoon is normal (Annexure-III).

The Coca-cola plant has only two RWH structures in the premises whereby recharging 5467 cum. of rain water per year (as claimed by Plant) and remaining 25 RWH structures installed by the factory are actually away from the premises located

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in as 1.5 to 20 Kms. from the Plant premises which don't have any bearing on imping of water being carried out by the factory.

3.0 CONCLUSION

It is observed that excess ground water withdrawn is taking place inside the plant which is reflected by water level data of Piezometer. The rate of decline of water level in plant premises is 1.19m. per year however, in the area surrounding the plant the rate of water level decline ranges between 0.50 to 0.75 m. per year. As per plant authorities all the Rain Water harvesting structures are well maintained but due to below normal rainfall since 2004 (except in 2008 & 2011) its desired impact is not visible in the area. Stage of ground water development was 72.84% in 2004 with Safe category, while in 2009 the stage of ground water development increased to 96.39% and block is categorized as Critical. The depth to water level in Piezometer in plant premises has declined by more than 7m in a period of 5 years from year 2006 to 2011 (Annexure-II).

Thus any further development of ground water for domestic, irrigation and industrial purposes should be carried out very judiciously and in a planner manner ensuring sustainability of the existing water resources located near the factory premises.

As per complaint of Lok Samiti regarding drying up of Dug-wells, village ponds, hand pumps and hardship to farmers for irrigation water, around Coca-Cola Plant, it is observed that this is not due to withdrawal of ground water by Coca-Cola Plant. There is declining trend in seven blocks of Varanasi district, but in Araziline block the declining rate is slightly higher. In spite of this decline there was water in some ponds, and Dug-wells and good crop of wheat and mustard observed in fields.

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Table-1

WATER LEVEL TRENDS OF SELECT CGWB MONITORING STATIONS, VARANASI DISTRICT, U.P.
(from Year 2002 to 2011)

District : VARANASI

Sl. No.	Location	Premonsoon			Postmonsoon			Annual		
		Data Points	Rise (m/year)	Fall (m/year)	Data Points	Rise (m/year)	Fall (m/year)	Data Points	Rise (m/year)	Fall (m/year)
	Block : ARAJILINE									
1	Jikhan (Narsara)	9	-	0.1945	10	-	0.1501	35	-	0.2082
2	Rajatalab I	5	-	-	6	-	1.1168	21	-	-
	Block : DEYAPURI									
1	Kakrahwari	9	-	1.6340	10	-	1.3335	37	-	1.2797
2	Thatra	8	-	1.4894	9	-	0.5897	36	-	0.8160

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RECONSTRUCTED DYNAMIC GROUND WATER RESOURCES, VARANASI DISTRICT, U.P.

Sl. No.	Block/District	Commanded Area (ha)	Net Annual Ground Water Availability	Existing Gross Ground Water Draft for Irrigation	Existing Gross Ground Water Draft for Domestic & Industrial Water Supply	Existing Gross Ground Water Draft for All Uses (5+6)	Provision for Domestic and Industrial Requirement Supply	Net Ground Water Availability for Future Irrigation Development (4-5-8)	Stage of Ground Water Development (7/4) x 100 (%)
1	2	3	4	5	6	7	8	9	10
District - VARANASI									
1	Arajhine	Command	-	-	-	-	-	-	-
		Non Command	-	-	-	-	-	-	-
		Total	6411.20	5284.50	895.51	6180.01	1126.70	0.00	96.39
2	Baragaon	Command	-	-	-	-	-	-	-
		Non Command	-	-	-	-	-	-	-
		Total	6321.45	3999.00	512.15	4511.15	862.97	1459.48	71.36
3	Chiragaon	Command	-	-	-	-	-	-	-
		Non Command	-	-	-	-	-	-	-
		Total	5932.91	4597.00	722.41	5319.41	1672.92	-337.01	89.66
4	Cholapur	Command	-	-	-	-	-	-	-
		Non Command	-	-	-	-	-	-	-
		Total	6298.92	4351.00	555.60	4906.60	1055.46	892.46	77.90

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Sl. No.	Command	Command No.	Net Annual Ground Water Availability	Existing Gross Ground Water Draft for Irrigation	Existing Gross Water Draft for Domestic & Industrial Water Supply	Existing Gross Ground Water Draft for All Uses (5+6)	Provision for Domestic and Industrial Requirement Supply	Net Ground Water Availability for Future Irrigation Development (4-5-8)	Stage of Ground Water Development (7/4)×100 (%)
1	2	3	4	5	6	7	8	9	10
5	Harhuwa	Command	-	-	-	-	-	-	-
		Non Command	-	-	-	-	-	-	-
		Total	4632.70	3750.50	606.33	4356.83	882.20	0.00	94.05
6	Kashividyapeeth	Command	-	-	-	-	-	-	-
		Non Command	-	-	-	-	-	-	-
		Total	4546.49	2431.50	778.95	3210.45	2041.89	73.10	70.61
7	Pindra	Command	-	-	-	-	-	-	-
		Non Command	-	-	-	-	-	-	-
		Total	8101.22	5596.00	626.85	6222.85	1072.92	1432.30	76.81
8	Sewapuri	Command	-	-	-	-	-	-	-
		Non Command	-	-	-	-	-	-	-
		Total	5727.20	3291.50	570.80	3862.30	1170.15	1265.55	67.44
	TOTAL		47972.08	33301.00	5268.60	38569.60	9885.21	4785.87	80.40

GROUND WATER RESOURCES OF VARANASI DISTRICT, U.P.

(As on 31.03.2004)

Sl. No.	Administrative Units Blocks	Annual Ground Water Recharge (in ham)	Net Annual Ground Water Availability (in ham)	Existing Gross Ground Water Draft for All Uses (in ham)	Net Ground Water Availability for Future Irrigation Development (in ham)	Stage of Ground Water Development (in %)	Category of Block
1	2	3	4	5	6	7	8
DISTRICT : VARANASI							
1	Araziline	8021.42	7219.28	5258.66	1610.18	72.84	Safe
2	Baragaon	7229.87	6506.88	4824.83	1453.32	74.15	Safe
3	Chiragaon	6896.60	6206.94	4599.85	1328.41	74.11	Safe
4	Cholapur	8438.28	7594.45	5990.40	1367.69	78.88	Safe
5	Harhua	5503.73	4953.36	3865.11	836.28	78.03	Safe
6	Kashi Vidyapeeth	5244.57	4720.11	3945.05	497.21	83.58	Safe
7	Pindra	9000.40	8100.36	4888.66	2919.93	60.35	Safe
8	Sewapuri	7040.33	6336.29	4413.94	1688.24	69.66	Safe
	TOTAL	57375.19	51637.67	37786.49	11701.25	73.18	

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GROUND WATER LEVEL DATA IN AND AROUND HCCBL PLANT, MEHNDIGANJ, VARANASI, U.P.

Water Level (mbgl)

Site	Distance from Plant	2006/07											
		2002		2003		2004		2005		2006/07		Post	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post		
		3	4	5	6	7	8	9	10	11	12		
Piezometer inside the Plant	40 m west					12.00	12.02	13.70	12.65	13.30	13.90		
Khemapur	300 m	12.69	11.70	13.50	7.60	10.61	11.05	11.90	11.78	12.37	12.75		
Bhaupur	5.0 km. south	8.90	8.59	11.02	6.64	5.90	6.20	7.26	7.15	8.10	8.70		
Mirzamurad	3.0 km. west	4.60	3.94	6.09	2.60	6.75	7.40	7.57	6.50	7.98	7.70		
Rajatalab	800 m south	4.98	5.38	7.30	4.00	14.50	11.02	19.64	16.87	20.49	18.00		
Shahbabad	4 km. east	12.97	11.10	16.40	7.70	6.10	7.85	9.00	8.34	10.57	11.00		
Araziline	900 m north	5.32	5.06	7.09	3.80								
Bhikaripur	300 m south											14.50	

DETAILS OF TUBEWELLS IN OPERATION INCLUDING DEPTH, ZONE TAPPED, LITHOLOG, DISCHARGE AND REQUIREMENT OF WATER PER DAY

No. of tubewell	2
Depth of bore wells	100 m
Present discharge – KL/Hr bore well no. 1	40
Present discharge – KL/Hr bore well no. 2	30
Lowering bore well no. 1	35 m
Lowering bore well no. 2	35 m
Total water withdrawn from both bore wells in 2011	36084 KL

Please note that the plant being seasonal in nature, the requirement of water per day varies from month to month. In view of the same the data for total water consumption for the year 2011 has been provided.

WATER LEVEL DATA OF PIEZOMETER INSTALLED IN FACTORY (2001-2011)

Year	Premonsoon	Postmonsoon
2005	No data	15.31
2006	20.97	16.80
2007	24.31	22.10
2008	26.60	13.57
2009	24.45	23.72
2010	26.40	21.76
2011	28.12	17.92

Please note that piezometer was installed in the plant in 2005.

Hindustan Coca-Cola Beverages Private Limited, Mehndiganj, Varanasi

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