



IITR Report Code: SSP – 350

Date of Preparation: June 12, 2018

Total No. of Pages: 11

SSP	T	255
NABL	T	256

Analysis of Drinking Water Samples From BHOPAL

(Ground Water Sample)

Final Report

CSIR-INDIAN INSTITUTE OF TOXICOLOGY RESEARCH
VISHVIGYAN BHAWAN, 31, MAHATMA GANDHI MARG,
LUCKNOW-226001, UP, INDIA

Telephone: 0522-2627586, 2613786; Fax: 0522-2628227, 2611547

Email: rpbdiitr@iitr.res.in

12 June 2018

Test Report

1. **Project Code:** SSP – 350
2. **Test Material Code No.:** SSP-350 (1-20)
3. **Date sample received:** 06/04/2018
4. **Physico-chemical characteristics of the test material:**
 - (i) **As described by sponsor:** NA
 - (ii) **As seen in the laboratory:** Clear
5. **Test performed:**
 1. **PHYSICO-CHEMICAL**
 2. **PESTICIDES**
 3. **METALS**
6. **Standard methodologies and reference standards used for testing:**
SOP/WAL/001; Standard Methods for the Examination of Water and Wastewater (APHA, AWWA, WPCF), 22nd ed. 2012.
7. **Amendments to Standard Operating Procedure (SOPs) if any:** None

Details of Ground Water in Bhopal
GPS Coordinates: E- Longitude, N- Latitude
Sampling date: 3rd & 4th April, 2018

S.No.	Ground water sample code	Sample Location	Longitude (E)	Latitude (N)	Depth (ft.)
1	1	Green Park Colony, H No. 152 Mr. Anil Kr. Choudhary, opp. Nagar Water tank.	83°10.022	25°30.076	1689
2	2	Sant Kanwar Ram Nagar Satyam Govt. High School.	83°10.022	25°30.076	1706
3	3	Choukse Nagar, Mr. RV Gupta H. No. 31	77°23.426	23°17.323	260
4	4	Rambha Nagar, Mr. Ram Gopal H. No.273	77°23.426	23°17.323	1708
5	5	Rishado Colony Mr. Chithor Singh H.No.9/A	77°23.426	23°17.326	400
6	6	Rajgarh Colony, Ganesh Mandir	77°23.426	23°17.323	200
7	7	Foota Maqbara	77°23.426	23°17.323	67
8	8	Ekta Nagar, Mrs. Sushila Kavan H.No. 10	77°23.426	23°17.323	160
9	9	Dulichand Ka Bag, Mr. Ziual Haq Shop	77°24.673	23°16.203	70
10	10	New Kabadkha, Bhopal steel press shop (opp. Steel Industries)	77°24.614	23°16.203	110
11	11	Ehele Hadis Masgid	77°24.614	23°16.203	Not available
12.	12.	Sunder Nagar Ishtiaq Ahmed H. No.71	77°24.431	23°16.400	150
13	13	Shaheen Nagar Colony, Mr. Shazad H.No.43/44	77°24.431	23°16.400	250
14	14	Nishaatpura, Mrs. Saraswathi Bai H.No. 43	77°24.431	23°16.400	170
15	15	Pratap Nagar, Mr. Balveer Singh Rajput 232	77°24.431	23°16.400	310
16	16	Laxmi Nagar, Mr. Brijesh Sharma H.No. 176	77°24.431	23°16.400	160
17	17	Chandan Nagar, Mrs. Shakeela Begum H.No. B-59	77°24.431	23°16.400	320
18	18	Chola Mandir, Mr. Dinesh Sahu H.No. 673	76°54.229	26°08.309	100
19	19	Dwarka Nagar Mr. DS Mehra St.No. 5, 09	76°54.229	26°08.309	170
20	20	Krishna Nagar, Mr. Gulab Singh H.No.1316	76°54.229	26°08.309	150

TABLE-1: PHYSICO-CHEMICAL PARAMETERS

S. No.	Sample Code	Sample Location	pH	Conductivity (µS/cm)	Phosphate as P (mg/L)	Nitrate (mg/L)	Fluoride (mg/L)	Chloride (mg/L)
1	1	Green Park Colony, H No. 152 Mr. Anil Kr. Choudhary, opp. Nagar, Water tank.	7.34	742.0	<0.003	<1.0	0.53	58.98
2	2	Sant Kanwar Ram Nagar Satyam Govt. High School.	7.1	631.0	<0.003	9.05	0.43	40.98
3	3	Choukse Nagar, Mr. RV Gupta H. No. 31	7.12	677.0	<0.003	<1.0	0.33	37.98
4	4	Rambha Nagar, Mr. Ram Gopal H. No.273	7.03	2060.0	0.013	119.95	0.55	356.88
5	5	Rishado Colony Mr.Chithor Singh H.No.9/A	6.98	1445.0	<0.003	31.77	0.46	212.93
6	6	Rajgarh Colony, Ganesh Mandir	7.2	688.0	<0.003	14.08	0.48	52.98
7	7	Foota Maqbara	7.1	1037.0	<0.003	9.72	0.67	93.97
8	8	Ekta Nagar, Mrs. Sushila Kavan H.No. 10	7.12	777.0	<0.003	30.54	0.38	73.97
9	9	Dulichand Ka Bag, Mr. Ziual Haq Shop	7.03	882.0	<0.003	29.35	0.42	91.97
10	10	New Kabadkha, Bhopal Steel Press Shop (opp. Steel Industries)	6.97	1144.0	0.007	23.99	0.35	137.95
11	11	Ehele Hadis Masgid	6.87	1320.0	<0.003	18.14	0.38	176.94
12.	12	Sunder Nagar Ishtiaq Ahmed H. No.71	6.92	2060.0	<0.003	71.32	0.51	366.88

Note-Values marked with < (less then) sign are the minimum detection limit for the corresponding parameters.

TABLE-1: PHYSICO-CHEMICAL PARAMETERS

S. No.	Sample Code	Sample Location	pH	Conductivity ($\mu\text{S/cm}$)	Phosphate as P (mg/L)	Nitrate (mg/L)	Fluoride (mg/L)	Chloride (mg/L)
13	13	Shaheen Nagar Colony, Mr. Shazad H.No.43/44	6.96	1765.0	<0.003	12.99	0.49	235.92
14	14	Nishaatpura, Mrs. Saraswathi Bai H.No. 43	7.09	1990.0	<0.003	133.14	0.38	311.9
15	15	Pratap Nagar, Mr. Balveer Singh Rajput 232	7.35	1545.0	0.004	27.45	0.36	197.93
16	16	Laxmi Nagar, Mr. Brijesh Sharma H.No. 176	7.20	1735.0	<0.003	27.54	0.57	250.09
17	17	Chandan Nagar, Mrs. Shakeela Begum H.No. B-59	7.20	1234.0	<0.003	27.68	0.37	145.95
18	18	Chola Mandir, Mr. Dinesh Sahu H.No. 673	6.95	1791.0	<0.003	84.5	0.32	303.9
19	19	Dwarka Nagar Mr. DS Mehra St.No. 5, 09	6.98	1525.0	<0.003	26.35	0.31	171.94
20	20	Krishna Nagar, Mr. Gulab Singh H.No.1316	6.88	1960.0	<0.003	164.95	0.3	293.9

Note-Values marked with < (less then) sign are the minimum detection limit for the corresponding parameters.

TABLE-1: PHYSICO-CHEMICAL PARAMETERS

S. No.	Sample Code	Sample Location	Sulphate (mg/L)	Sodium (mg/L)	Potassium (mg/L)	TOC (µg/L)
1	1	Green Park Colony, H No. 152 Mr. Anil Kr. Choudhary, opp. Nagar, Water tank.	30.41	104.64	1.85	11.28
2	2	Sant Kanwar Ram Nagar Satyam Govt. High School.	26.51	59.6	0.32	21.81
3	3	Choukse Nagar, Mr. RV Gupta H. No. 31	58.2	84.88	0.65	3.41
4	4	Rambha Nagar, Mr. Ram Gopal H. No.273	140.1	206.73	0.79	BDL
5	5	Rishado Colony Mr. Chithor Singh H.No.9/A	92.44	128.59	5.36	17.11
6	6	Rajgarh Colony, Ganesh Mandir	52.98	78.82	1.75	16.55
7	7	Foota Maqbara	79.64	92.26	0.29	26.58
8	8	Ekta Nagar, Mrs. Sushila Kavan H.No. 10	54.44	73.56	8.59	BDL
9	9	Dulichand Ka Bag, Mr. Ziual Haq Shop	52.44	140.24	18.85	BDL
10	10	New Kabadkha, Bhopal Steel Press Shop (opp. Steel Industries)	71.24	115.5	1.71	BDL
11	11	Ehele Hadis Masgid	75.24	124.34	2.21	39.39
12	12	Sunder Nagar Ishtiaq Ahmed H. No.71	127.1	207.46	1.92	BDL

Note-Values marked with < (less then) sign are the minimum detection limit for the corresponding parameters
BDL = below detection limit

TABLE-1: PHYSICO-CHEMICAL PARAMETERS

S. No.	Sample Code	Sample Location	Sulphate (mg/L)	Sodium (mg/L)	Potassium (mg/L)	TOC (mg/L)
13	13	Shaheen Nagar Colony, Mr. Shazad H.No.43/44	101.1	197.38	7.22	BDL
14	14	Nishaatpura, Mrs. Saraswathi Bai H.No. 43	40.04	392.99	2.23	40.81
15	15	Pratap Nagar, Mr. Balveer Singh Rajput 232	76.84	326.82	1.45	13.58
16	16	Laxmi Nagar, Mr. Brijesh Sharma H.No. 176	166.1	388.47	1.20	40.57
17	17	Chandan Nagar, Mrs. Shakeela Begum H.No. B-59	63.24	124.74	1.01	25.60
18	18	Chola Mandir, Mr. Dinesh Sahu H.No. 673	118.1	124.26	2.12	3.51
19	19	Dwarka Nagar Mr. DS Mehra St.No. 5, 09	90.44	207.06	6.06	26.82
20	20	Krishna Nagar, Mr. Gulab Singh H.No.1316	140.1	141.17	2.16	BDL

Note-Values marked with < (less then) sign are the minimum detection limit for the corresponding parameters
BDL = below detection limit

TABLE-2: PESTICIDES PARAMETERS

S.No.	Sample Code	Sample Location	Organochlorine ^s Pesticide concentration (µg/L)			
			α-HCH	β-HCH	γ-HCH	δ-HCH
1	1	Green Park Colony, H No. 152 Mr. Anil Kr. Choudhary, opp. Nagar, Water tank.	<0.010	<0.010	<0.010	<0.010
2	2	Sant Kanwar Ram Nagar Satyam Govt. High School.	<0.010	<0.010	<0.010	<0.010
3	3	Choukse Nagar, Mr. RV Gupta H. No. 31	<0.010	<0.010	<0.010	<0.010
4	4	Rambha Nagar, Mr. Ram Gopal H. No.273	<0.010	<0.010	<0.010	<0.010
5	5	Rishado Colony Mr. Chithor Singh H.No.9/A	<0.010	<0.010	<0.010	<0.010
6	6	Rajgarh Colony, Ganesh Mandir	<0.010	<0.010	<0.010	<0.010
7	7	Foota Maqbara	<0.010	<0.010	<0.010	<0.010
8	8	Ekta Nagar, Mrs. Sushila Kavan H.No. 10	<0.010	<0.010	<0.010	<0.010
9	9	Dulichand Ka Bag, Mr. Ziual Haq Shop	<0.010	<0.010	<0.010	<0.010
10	10	New Kabadkha, Bhopal Steel Press Shop (opp. Steel Industries)	<0.010	<0.010	<0.010	<0.010
11	11	Ehele Hadis Masjid	<0.010	<0.010	<0.010	<0.010
12	12	Sunder Nagar Ishtiaq Ahmed H. No.71	<0.010	<0.010	<0.010	<0.010
13	13	Shaheen Nagar Colony, Mr. Shazad H.No.43/44	<0.010	<0.010	<0.010	<0.010
14	14	Nishaatpura, Mrs. Saraswathi Bai H.No. 43	<0.010	<0.010	<0.010	<0.010
15	15	Pratap Nagar, Mr. Balveer Singh Rajput 232	<0.010	<0.010	<0.010	<0.010
16	16	Laxmi Nagar, Mr. Brijesh Sharma H.No. 176	<0.010	<0.010	<0.010	<0.010
17	17	Chandan Nagar, Mrs. Shakeela Begum H.No. B-59	<0.010	<0.010	<0.010	<0.010
18	18	Chola Mandir, Mr. Dinesh Sahu H.No. 673	<0.010	<0.010	<0.010	<0.010
19	19	Dwarka Nagar Mr. DS Mehra St.No. 5, 09	<0.010	<0.010	<0.010	<0.010
20	20	Krishna Nagar, Mr. Gulab Singh H.No.1316	<0.010	<0.010	<0.010	<0.010

Analysis performed on GC-µECD, Agilent- 7890A

Page No. 8 of 11

TABLE-3: METALS PARAMETERS

S. No.	Sample Code	Sample Location	Metal Concentration (mg/L)							
			Cu [#]	Cr [#]	Pb [#]	Co [#]	Ni [#]	Cd [#]	Zn [#]	Hg [*]
1	1	Green Park Colony, H No. 152 Mr. Anil Kr. Choudhary, opp. Nagar, Water tank.	<0.020	<0.025	0.039	<0.020	<0.020	<0.003	<0.500	<0.0002
2	2	Sant Kanwar Ram Nagar Satyam Govt. High School.	<0.020	<0.025	0.039	<0.020	<0.020	<0.003	<0.500	<0.0002
3	3	Choukse Nagar, Mr. RV Gupta H. No. 31	<0.020	<0.025	<0.010	<0.020	<0.020	<0.003	<0.500	<0.0002
4	4	Rambha Nagar, Mr. Ram Gopal H. No.273	<0.020	<0.025	0.056	0.023	0.032	0.006	<0.500	<0.0002
5	5	Rishado Colony Mr. Chithor Singh H.No.9/A	<0.020	<0.025	0.014	<0.020	0.023	0.005	<0.500	<0.0002
6	6	Rajgarh Colony, Ganesh Mandir	<0.020	<0.025	0.033	<0.020	<0.020	<0.003	<0.500	<0.0002
7	7	Foota Maqbara	<0.020	<0.025	0.050	<0.020	0.025	0.004	<0.500	<0.0002
8	8	Ekta Nagar, Mrs. Sushila Kavan H.No. 10	<0.020	<0.025	0.038	<0.020	<0.020	0.004	<0.500	<0.0002
9	9	Dulichand Ka Bag, Mr. Ziual Haq Shop	<0.020	<0.025	0.039	<0.020	<0.020	0.004	<0.500	<0.0002
10	10	New Kabadkha, Bhopal Steel Press Shop (opp. Steel Industries)	<0.020	<0.025	<0.010	<0.020	<0.020	0.004	<0.500	<0.0002
11	11	Ehele Hadis Masgid	<0.020	<0.025	<0.010	<0.020	<0.020	0.004	<0.500	<0.0002
12	12	Sunder Nagar Ishtiaq Ahmed H. No.71	<0.020	<0.025	0.060	0.023	0.037	0.006	<0.500	<0.0002
13	13	Shaheen Nagar Colony, Mr. Shazad H.No.43/44	<0.020	<0.025	0.049	0.022	0.032	0.005	<0.500	<0.0002
14	14	Nishaatpura, Mrs. Saraswathi Bai H.No. 43	<0.020	<0.025	<0.010	<0.020	<0.020	0.004	<0.500	<0.0002
15	15	Pratap Nagar, Mr. Balveer Singh Rajput 232	<0.020	<0.025	0.041	<0.020	0.021	0.004	<0.500	<0.0002
16	16	Laxmi Nagar, Mr. Brijesh Sharma H.No. 176	<0.020	<0.025	<0.010	<0.020	<0.020	0.004	<0.500	<0.0002
17	17	Chandan Nagar, Mrs. Shakeela Begum H.No. B-59	<0.020	<0.025	<0.010	<0.020	<0.020	<0.003	<0.500	<0.0002
18	18	Chola Mandir, Mr. Dinesh Sahu H.No. 673	<0.020	<0.025	0.026	0.022	0.026	0.005	<0.500	<0.0002
19	19	Dwarka Nagar Mr. DS Mehra St.No. 5, 09	<0.020	<0.025	<0.010	<0.020	<0.020	0.004	<0.500	<0.0002
20	20	Krishna Nagar, Mr. Gulab Singh H.No.1316	<0.020	<0.025	0.028	0.022	0.029	0.005	<0.500	<0.0002

* Analysis performed on Atomic Fluorescence Spectrometer (PG, AF420)

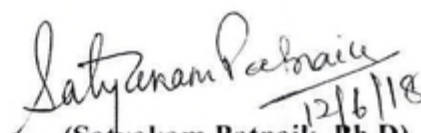
Analysis performed on Atomic Absorption Spectrometer (Perkin Elmer, Pin AAcle 900F)

S. No.	Sample Code	Sample Location	Concentration in µg/L		
			α-Naphthol**	Aldicarb**	Carbaryl**
1	1	Green Park Colony, H No. 152 Mr. Anil Kr. Choudhary, opp. Nagar, Water tank.	0.739	< 0.010	< 0.010
2	2	Sant Kanwar Ram Nagar Satyam Govt. High School.	0.260	< 0.010	< 0.010
3	3	Choukse Nagar, Mr. RV Gupta H. No. 31	0.717	< 0.010	< 0.010
4	4	Rambha Nagar, Mr. Ram Gopal H. No.273	0.642	< 0.010	< 0.010
5	5	Rishado Colony Mr. Chithor Singh H.No.9/A	0.377	< 0.010	< 0.010
6	6	Rajgarh Colony, Ganesh Mandir	0.694	< 0.010	< 0.010
7	7	Foota Maqbara	0.575	< 0.010	< 0.010
8	8	Ekta Nagar, Mrs. Sushila Kavan H.No. 10	0.580	< 0.010	< 0.010
9	9	Dulichand Ka Bag, Mr. Ziual Haq Shop	0.504	< 0.010	< 0.010
10	10	New Kabadkha, Bhopal Steel Press Shop (opp. Steel Industries)	0.598	< 0.010	< 0.010
11	11	Ehele Hadis Masjid	0.155	< 0.010	< 0.010
12	12	Sunder Nagar Ishtiaq Ahmed H. No.71	0.194	< 0.010	< 0.010
13	13	Shaheen Nagar Colony, Mr. Shazad H.No.43/44	0.377	< 0.010	< 0.010
14	14	Nishaatpura, Mrs. Saraswathi Bai H.No. 43	0.138	< 0.010	< 0.010
15	15	Pratap Nagar, Mr. Balveer Singh Rajput 232	0.165	< 0.010	< 0.010
16	16	Laxmi Nagar, Mr. Brijesh Sharma H.No. 176	0.060	< 0.010	< 0.010
17	17	Chandan Nagar, Mrs. Shakeela Begum H.No. B-59	0.082	< 0.010	< 0.010
18	18	Chola Mandir, Mr. Dinesh Sahu H.No. 673	0.133	< 0.010	< 0.010
19	19	Dwarka Nagar Mr. DS Mehra St.No. 5, 09	0.198	< 0.010	< 0.010
20	20	Krishna Nagar, Mr. Gulab Singh H.No.1316	0.179	< 0.010	< 0.010

**Analysis performed on LC-MS-MS (Model API-4000 from AB Sciex, USA)

**TABLE-2: BIS LIMITS (IS 10500: 2012)
FOR DRINKING WATER FOR PHYSICO- CHEMICAL**

Parameter	Requirement (Desirable limit)
pH	6.5-8.5
Conductivity	NS
Phosphate	NS
Nitrate	45
Fluoride	1.0
Chloride	250
Sulphate	200
Sodium	NS
Potassium	NS


(Satyakam Patnaik, Ph.D)

Name, Designation and Signature with date
(Scientist, In-Charge)

Notes:

1. The report pertains to the sample tested only.
2. The report shall not be reproduced in fragments without the written approval of IITR.
3. This report shall not be used for any purpose other than declared by the sponsor.