

Annexure -B

Query from GPCB	Reply to GPCB
To abstract groundwater of 850 m ³ /day as per design of ERM	<ul style="list-style-type: none"> • As per our previous remediation design by ERM in August 2016 and 4th TEC Meeting of Aug 2017, ERM suggested us to abstract groundwater of 850 m³/day. As per their design, groundwater abstraction rate from shallow hydraulic containment wells should be 1.5 m³/hr. and intermediate hydraulic containment wells should be 10 m³/hr. However, in actual, we could abstract only 350-400 m³/day. • Moreover, if we try to abstract 850 m³/day of groundwater, then it may happen that our remaining wells get dry due to continuous pumping from Hydraulic Containment Wells (HCW). It may be noted that our two shallow HCW are already dry and yield groundwater sometimes post-monsoon and remaining two wells are almost dry and pumping less than designed level of abstraction. • As per Minutes of Meeting of 10th TEC dt. 17/09/2021, GPCB suggested to redesign abstraction rate of existing groundwater treatment system. Based on that our present consultant M/s. Kadam Environmental Consultants (KEC) redesigned abstraction rate considering groundwater contamination plume in shallow, intermediate and deep zone of aquifer, pore volume, hydraulic conductivity, groundwater slopes and groundwater velocity and as per their calculation total groundwater abstraction should not be more than 250 m³/day. As per redesign of KEC, we are sufficiently abstracting groundwater and it needs to be minimized to 250m³/day from contaminated borewells. Rest requirement have to be fulfilled from Fresh water borewells (Refer Annexure –I). • As per our existing plume (based on the latest monitoring report results), lower South-West area of the site stretching towards off-site is showing colour in concentration of maximum 250 Pt. Co. (Refer Annexure –II). Hence, if GPCB suggest to abstract groundwater of 850 m³/day then we need to install additional Shallow Hydraulic Containment Wells near existing HCW of lower South-West area after conducting relevant tests for installation of wells.

ANNEXURE -I**Redesign of Groundwater Abstraction Rate**

In previous investigations ERM has provided evidence that the groundwater at the Bodal site is contaminated with color. ERM suggested a containment strategy to remove the risks for down gradient receptors. In this note the approach for such a containment strategy is discussed in more detail and a recommendation for the initial abstraction volume is given.

As per ERM results, groundwater contamination plume at Bodal is shown below:

- Shallow zone: 400m (Length) & 300m (Width) flowing towards South-West
- Intermediate zone: 350m (Length) & 300m (Width) flowing towards South-West
- Deep zone (considering the same plume as intermediate zone): 350m (Length) & 300m (Width) flowing towards South-West

The pore volume is between 0.35 and 0.40.

In ERM Report, following values for hydraulic conductivity are presented:

- Shallow part (20-40 mbgl) of the aquifer zone: 4.19 E-05 m/s (=3.62 m/d)
- Intermediate part (40-55 mbgl) of the aquifer zone: 3.5 E-05 m/s (=3.02 m/d)
- Deep part (40-65 mbgl) of the aquifer zone: 1 E -04 m/s (=8.64 m/d)

From the ERM report it can be assessed that the groundwater slopes in all aquifer zones are towards southwest direction. The slope for the different zones are as follows:

- Shallow zone: 0.0048 m/m
- Intermediate zone: 0.0051 m/m
- Deep zone (based on the survey in that area): 0.0011 m/m

On the basis of the reported hydraulic conductivity and the assessed groundwater slopes the groundwater velocity for the aquifer zones can be calculated as follows:

- Shallow zone: $3.62 \text{ m/d} * 0.0048 \text{ m/m} * 365 = 6.34 \text{ m/y}$
- Intermediate zone: $3.02 \text{ m/d} * 0.0051 \text{ m/m} * 365 = 5.63 \text{ m/y}$
- Deep zone: $8.64 \text{ m/d} * 0.0011 \text{ m/m} * 365 = 3.46 \text{ m/y}$

As stated before the reported width of the groundwater contamination plume is about 300m in shallow & intermediate and deep zone. On average shallow zone, intermediate zone and deep zone has aquifer thickness of 15-20m (Considered ~20m). Given these dimensions and the calculated groundwater velocities for the 3 zones, the required abstraction rates for complete containment of the groundwater pollution on the south-West perimeter of the Bodal site can be calculated as follows:

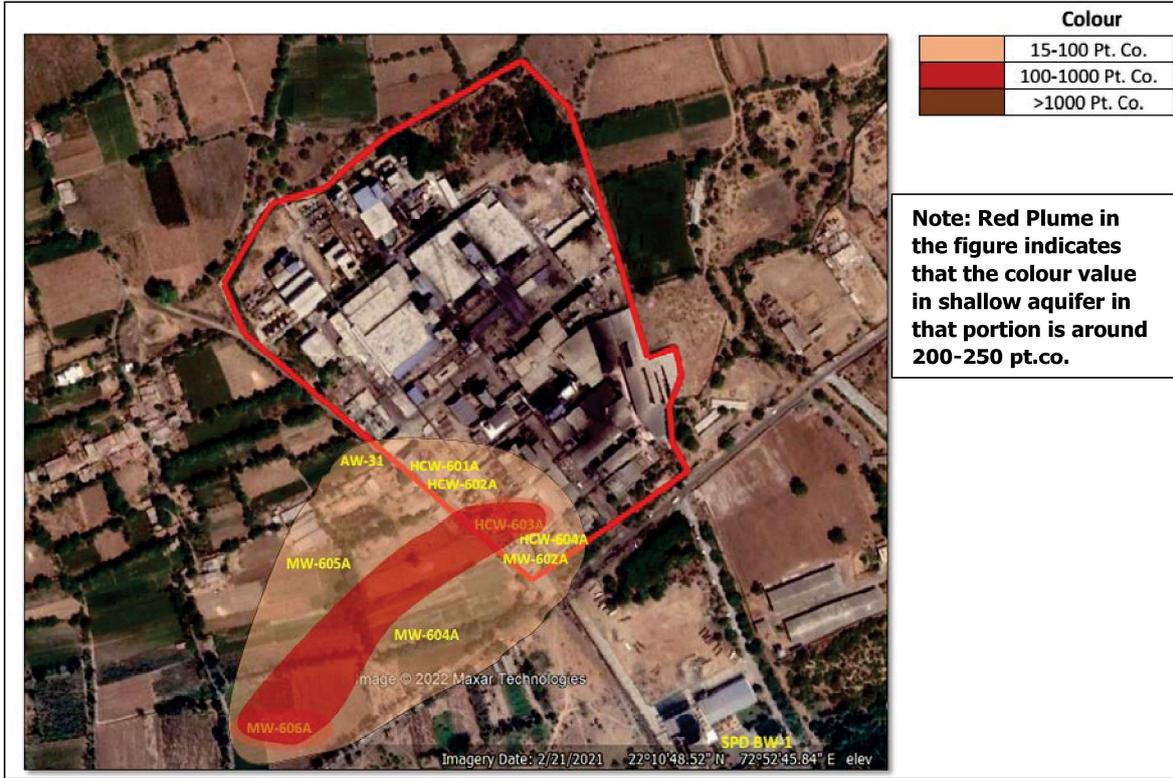
- Shallow zone: $300 \text{ m} * 20 \text{ m} * 6.34 \text{ m/y} = 38,040 \text{ m}^3/\text{y}$
- Intermediate zone: $300 \text{ m} * 20 \text{ m} * 5.63 \text{ m/y} = 33,780 \text{ m}^3/\text{y}$
- Deep zone: $300 \text{ m} * 20 \text{ m} * 3.46 \text{ m/y} = 20,760 \text{ m}^3/\text{y}$

Total required abstraction from 3 zones is thus 92,580 m³/y or **254 m³/day**

So actual abstraction rate calculated based on the field data is $\sim 250\text{m}^3/\text{day}$.

ANNEXURE -II

Plume in Shallow Zone (30M)





BODAL CHEMICALS LTD.

Progress Report – February 2022: Groundwater Monitoring at Bodal Chemicals Ltd., Karakhadi, Vadodara District

FEBRUARY 2022



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BODAL CHEMICALS LTD.**Progress Report – February 2022: Groundwater
Monitoring at Bodal Chemicals Ltd., Karakhadi, Vadodara
District**

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This report is submitted for the use of M/s. Bodal Chemicals Ltd., as a part of the project of Progress Report – February 2022: Groundwater Monitoring at Bodal Chemicals Ltd., Karakhadi, Vadodara District, Gujarat, India.

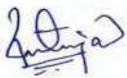
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1 PROJECT BACKGROUND

1.1 Brief Description

M/s. Bodal Chemicals Ltd. (Unit-VII) is located at Block No. 804 of Village Dudhwada, Taluka Padra, District Vadodara of Gujarat State, India.

ERM India Pvt. Ltd. (hereinafter referred as 'ERM') was appointed by Bodal Chemicals Ltd. (hereinafter referred as 'BCL') in 2016 for undertaking soil and groundwater investigations at their facility. ERM completed drilling and well installation of 14 Nos. of Monitoring Wells and 7 Nos. of Hydraulic Containment Wells as a part of soil and groundwater remediation. ERM did periodic groundwater sampling from May 2016 to June 2019 and completed soil and groundwater remediation.

After completion of soil and groundwater remediation, Bodal approached Kadam Environmental Consultants (hereinafter referred as 'KEC') for seasonal monitoring of groundwater quality and measuring groundwater levels from existing 14 Nos. of Monitoring Wells and 7 Nos. of Hydraulic Containment Wells and appointed them as Consultant by issuing work order on 17th June 2019.

KEC conducted groundwater monitoring in August 2019, February 2020, September 2020, January 2021, April 2021, September 2021 and February 2022. The team from KEC visited the site on 21st and 22nd February 2022 and conducted groundwater sampling & analysis from 14 Nos. of Monitoring Wells and 7 Nos. of Hydraulic Containment Wells and groundwater level measurements from 14 Nos. of Monitoring Wells.

The site and groundwater sampling locations are shown in **Figure 1**.

Figure 1: Site and Groundwater Sampling Locations



2 GROUNDWATER MONITORING AND GRAPH REPRESENTATION

2.1 Groundwater Sampling & Analysis

The groundwater samples for winter season were collected on 21st and 22nd February 2022 from 14 Nos. of Monitoring Wells (MW) [4 Nos. of shallow wells of 25m depth, 5 Nos. of intermediate wells of 50m depth & 5 Nos. of deep wells of 65m depth], 4 Nos. of Hydraulic Containment Wells [1 No. of shallow wells of 30m depth & 3 Nos. of intermediate wells of 55m depth] and 2 Nos. of surrounding bore wells. The groundwater samples were collected using Bailer/ Discharge point and were filled into sample bottle/carboy after sufficient purging. These sample bottles/carboy were sealed, labelled and placed into a cooler pack with ice packs for onsite holding and were transferred to Kadam Environmental Consultants, Vadodara laboratory with chain of custody data for analysis of parameters like pH, Colour, Total Dissolved Solids (TDS), Chlorides and Chemical Oxygen Demand (COD). The groundwater analysis results of Monitoring and Hydraulic Containment Wells is shown in **Table 2-1**.

Table 2-1: Groundwater Analysis Results of Monitoring, Hydraulic Containment & Bore Wells

Sr. No	Type of Wells & Nomenclature	Analysis Results				
		pH	Colour (Pt. Co)	TDS (mg/l)	Chlorides (mg/l)	COD (mg/l)
Monitoring Wells						
1	MW-602A (30m)	6.93	25	5352	1190	<5
2	MW-604A (30m)	6.65	25	4512	1015	<5
3	MW-605A (30m)	6.63	100	6260	1394	133
4	MW-606A (30m)	7.29	200	5248	885	63
5	MW-602B (50m)	6.98	80	5380	1199	67
6	MW-603B (50m)	6.19	<1	8092	3235	154
7	MW-604B (50m)	6.8	250	7612	1699	167
8	MW-605B (50m)	6.67	80	6856	1520	129
9	MW-606B (50m)	7.28	<1	3928	870	<5
10	MW-602C (65m)	7.02	25	6372	1415	83
11	MW-604C (65m)	7.23	100	3508	779	29
12	MW-606C (65m)	6.64	25	1832	405	29
Hydraulic Containment Wells						
13	HCW-601A (30m)	6.90	25	5372	1195	54
14	HCW-602A (30m)	7.76	80	4992	1110	75
15	HCW-603A (30m)	7.33	200	4948	1100	63
16	HCW-604A (30m)	7.86	25	4644	1029	25
17	HCW-602B (55m)	7.31	25	4524	1009	21
18	HCW-603B (55m)	7.26	<1	4684	1040	24
19	HCW604B (55m)	8.09	<1	3412	1140	29
On-Site Bore-Wells						
20	AW-90	7.36	<1	2716	1065	18

Sr. No	Type of Wells & Nomenclature	Analysis Results				
		pH	Colour (Pt. Co)	TDS (mg/l)	Chlorides (mg/l)	COD (mg/l)
21	AW-91	7.26	<1	4452	1561	27
22	SPD BW-1	7.17	<1	3340	740	<5
Off-Site Bore Wells						
23	GW-1	7.22	<1	2572	887	13
24	AW-31	7.25	50	3428	1370	144

2.2 Groundwater Level Measurement

The groundwater levels were measured and noted on 21st and 22nd February 2022 from 12 Nos. of Monitoring Wells (MW) using Water Level Indicator with sensor probe. The groundwater levels are shown in **Table 2-2**.

Table 2-2: Groundwater Levels

Sr. No.	Type of Wells & Nomenclature	Groundwater Level (m)
1	MW-602A (25m)	13.25
2	MW-604A (25m)	12.85
3	MW-605A (25m)	15.00
4	MW-606A (25m)	14.15
5	MW-602B (50m)	18.20
6	MW-603B (50m)	18.80
7	MW-604B (50m)	15.05
8	MW-605B (50m)	18.45
9	MW-606B (50m)	17.95
10	MW-602C (65m)	18.80
11	MW-604C (65m)	17.75
12	MW-606C (65m)	17.25

2.3 Photographs



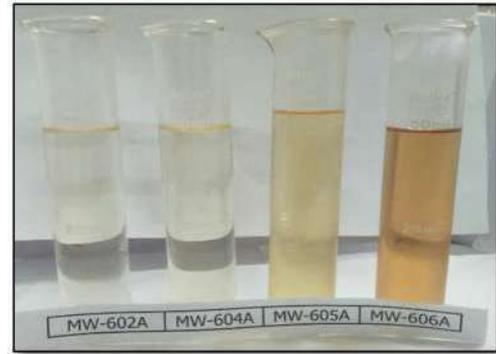
Groundwater Sampling from On-site Monitoring Well



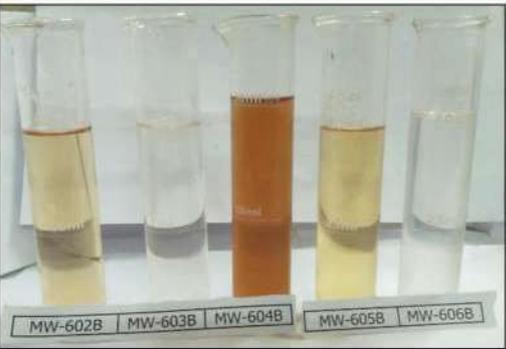
Groundwater Sampling from Off-site Monitoring Well



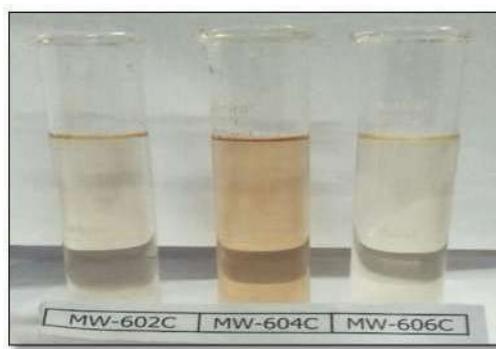
Groundwater level measurement from Monitoring Well



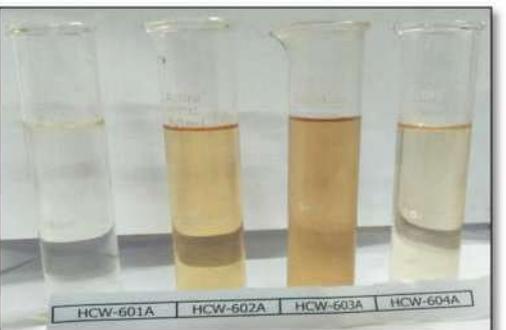
Groundwater Samples of Shallow Monitoring Wells (MW-602A, MW-604A, MW-605A & MW-606A)



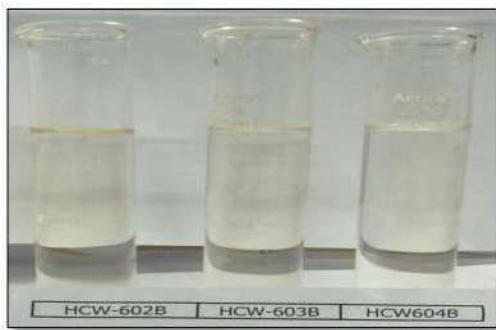
Groundwater Samples of Intermediate Monitoring Wells (MW-602B, MW-603B, MW-604B, MW-605B & MW-606B)



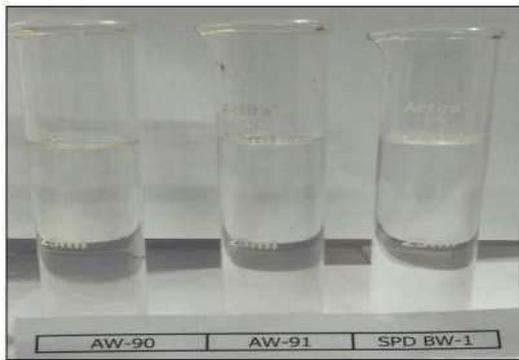
Groundwater Samples of Deep Monitoring Wells (MW-602C, MW-604C & MW-606C)



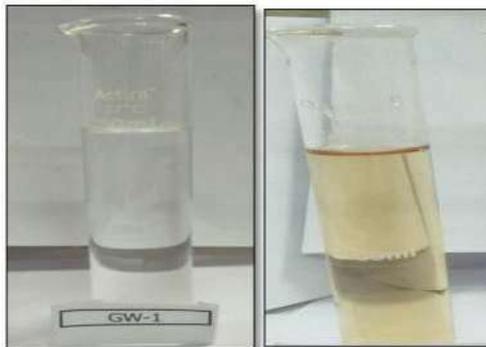
Groundwater Samples of Shallow Hydraulic Containment Wells (HCW-601A, HCW-602A, HCW-603A & HCW-604A)



Groundwater Samples of Intermediate Hydraulic Containment Wells (HCW-602B, HCW-603B & HCW-604B)



Groundwater Samples of Existing Bore Wells of Bodal Unit



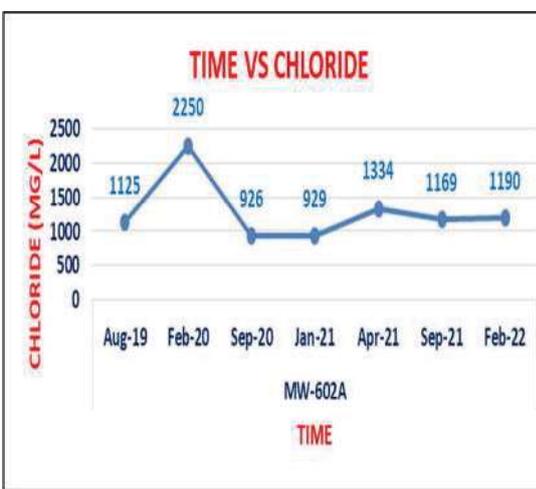
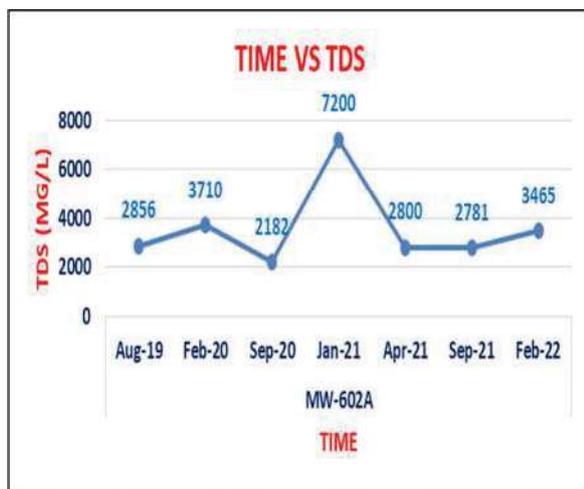
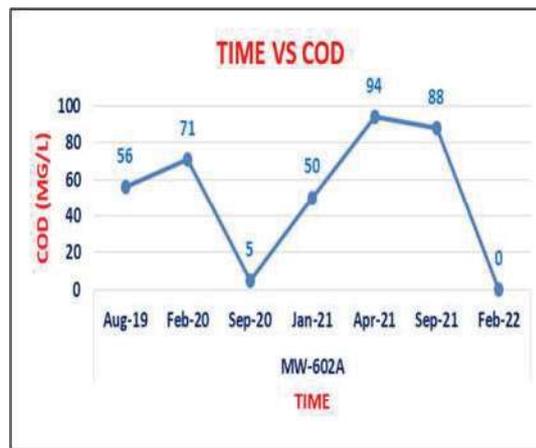
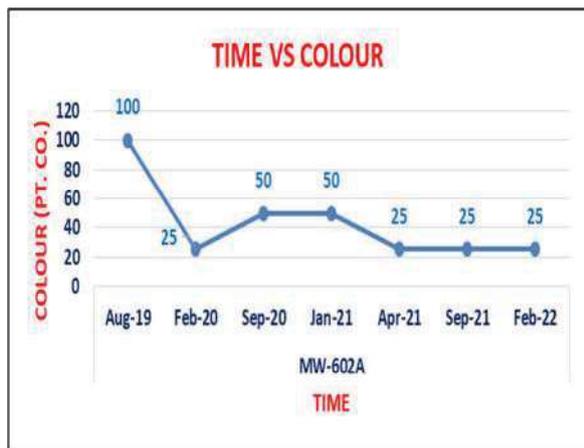
Groundwater Samples from off-site Bore Wells located NE & West of site

2.4 Graph of Time vs. Colour, TDS, COD & Chloride showing trend

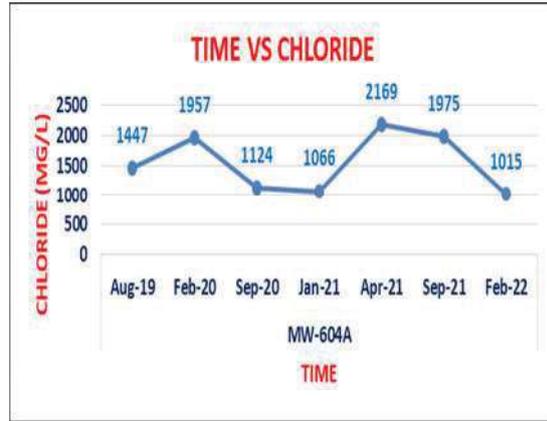
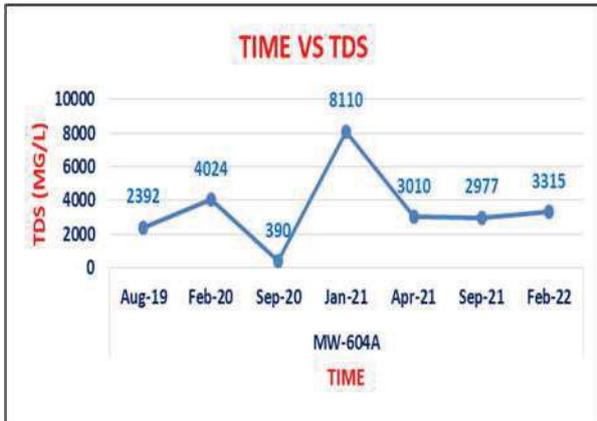
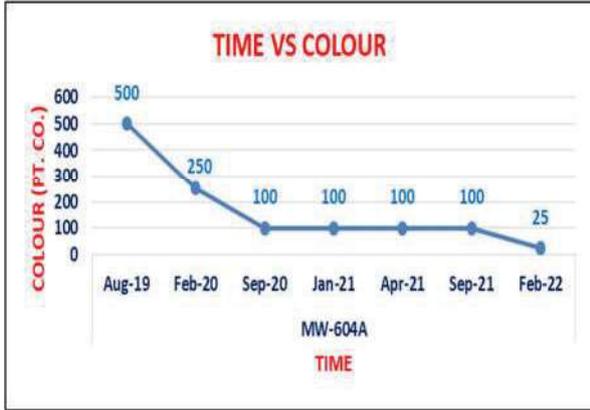
The graph showing trend of colour, COD, chloride & TDS quality of monitoring wells and hydraulic containment wells in shallow, intermediate and deep zone from May 2016 to February 2022 is shown below.

2.4.1 Monitoring Wells

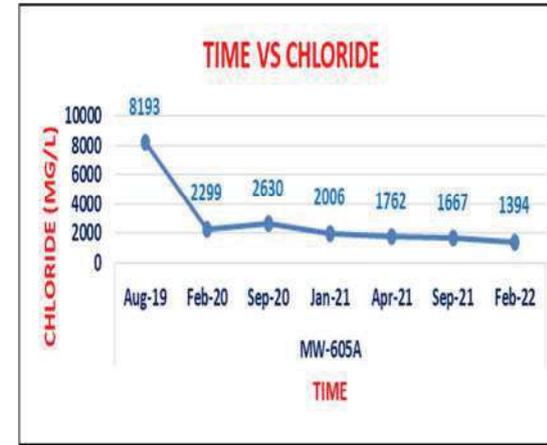
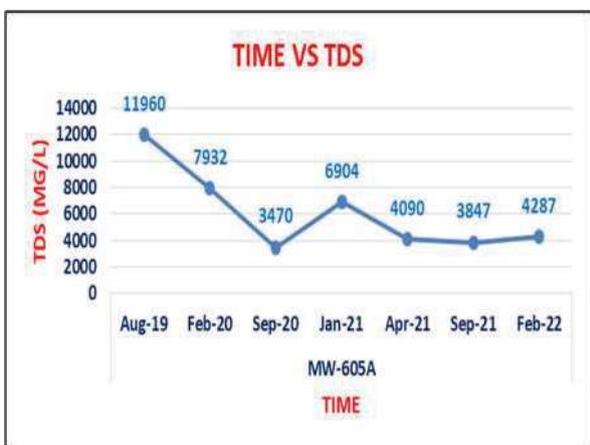
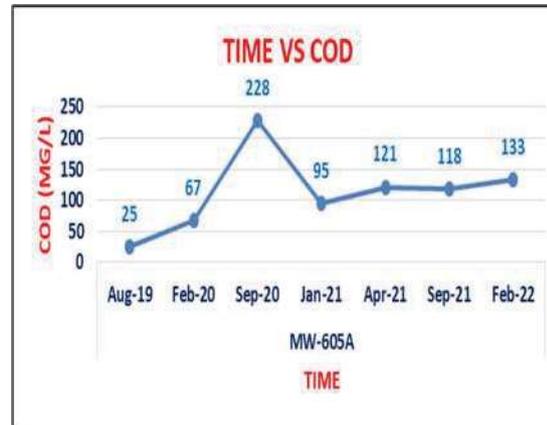
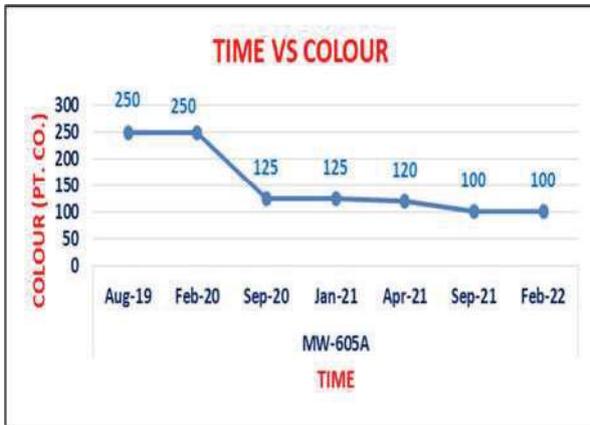
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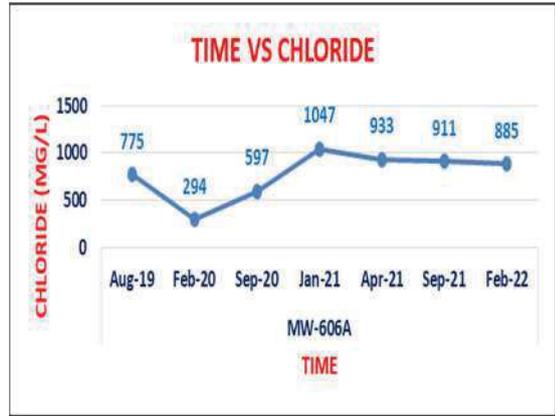
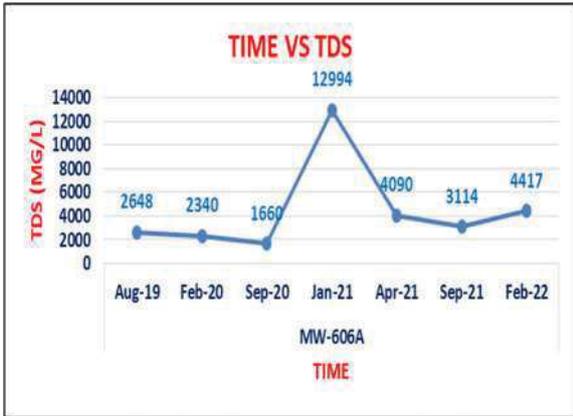
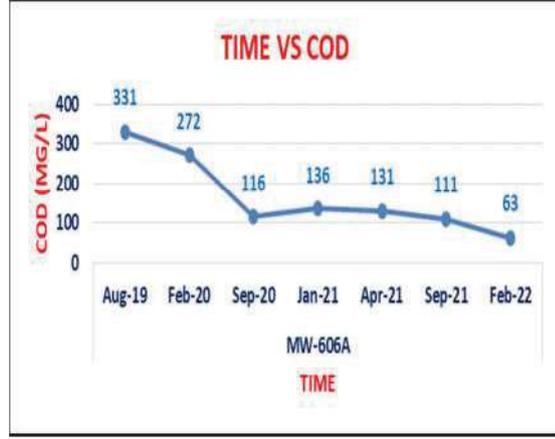
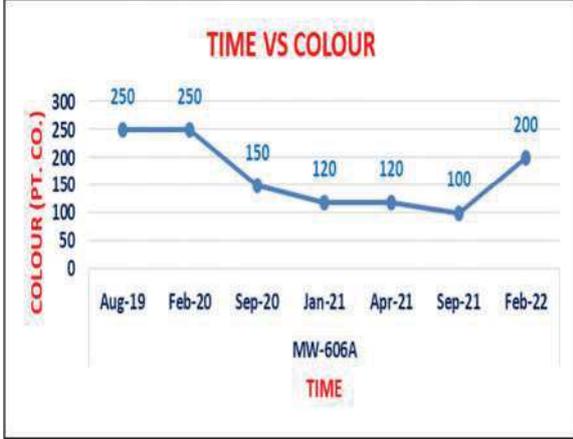
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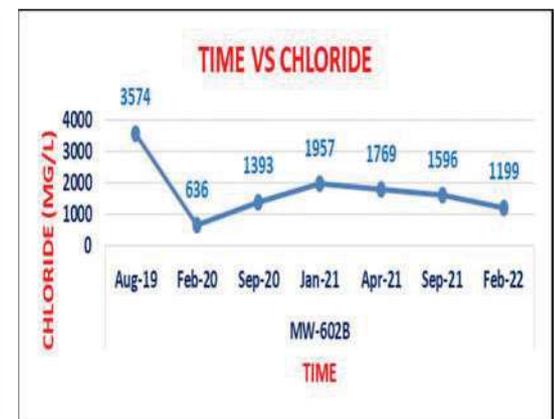
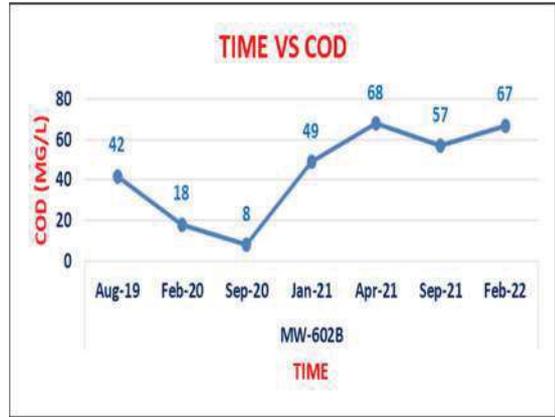
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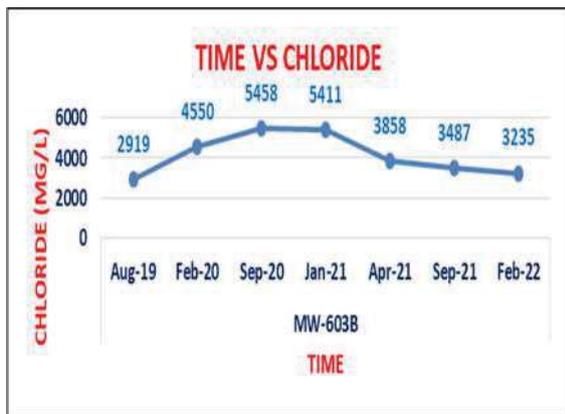
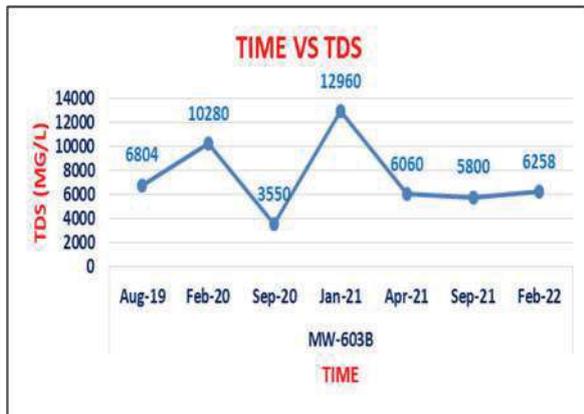
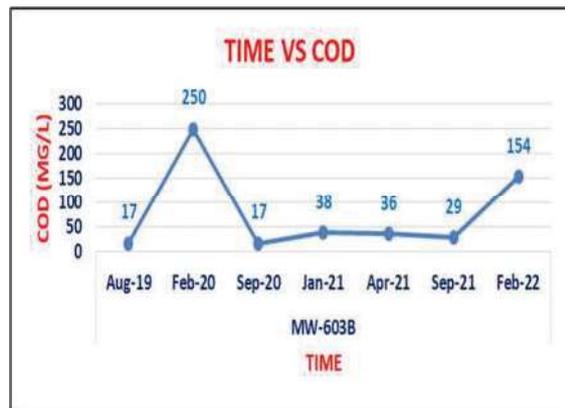
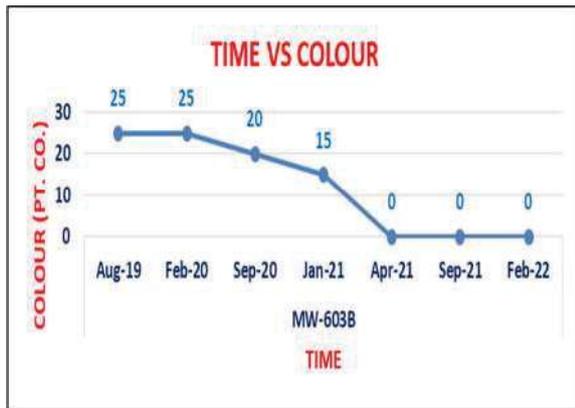
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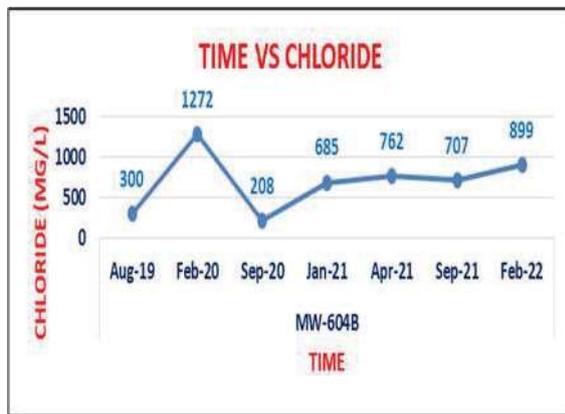
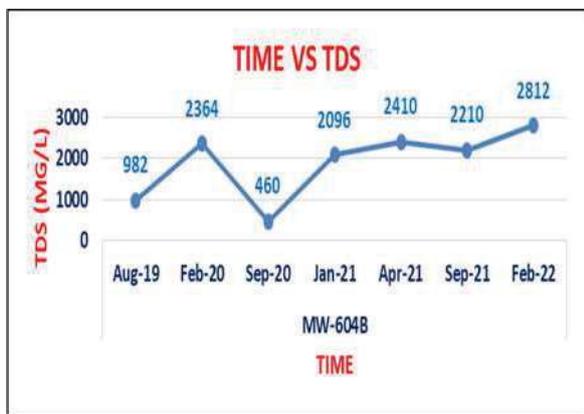
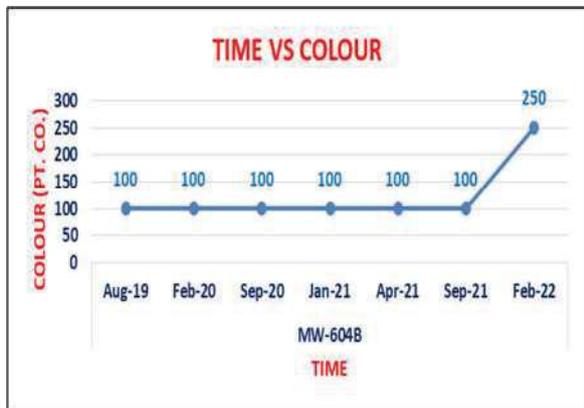
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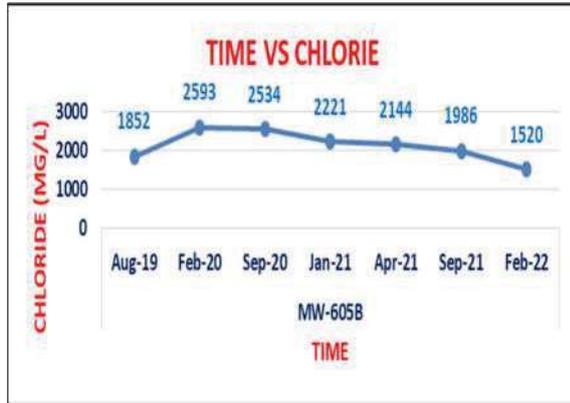
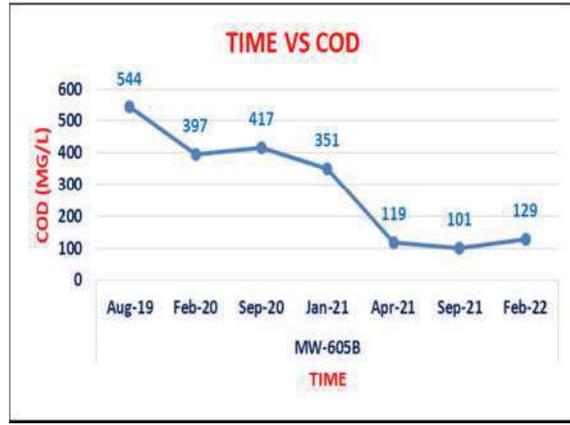
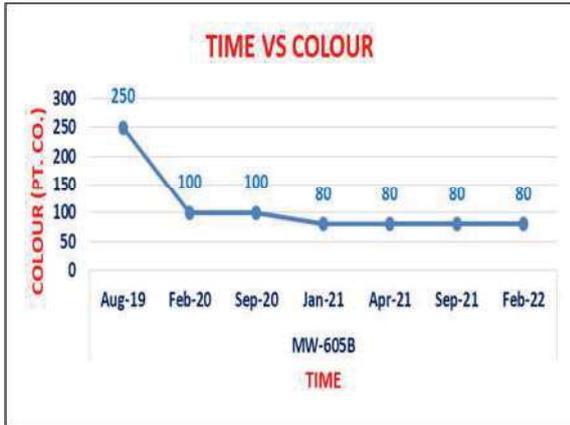
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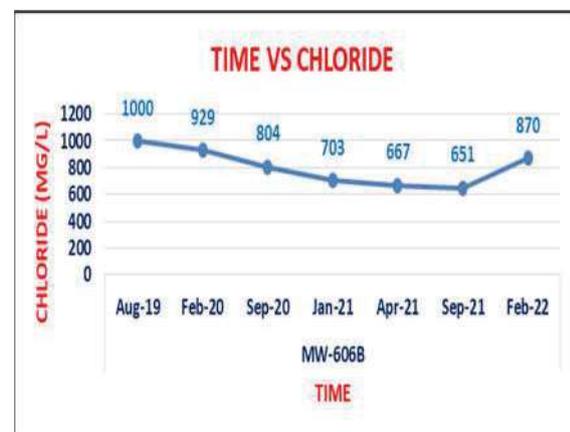
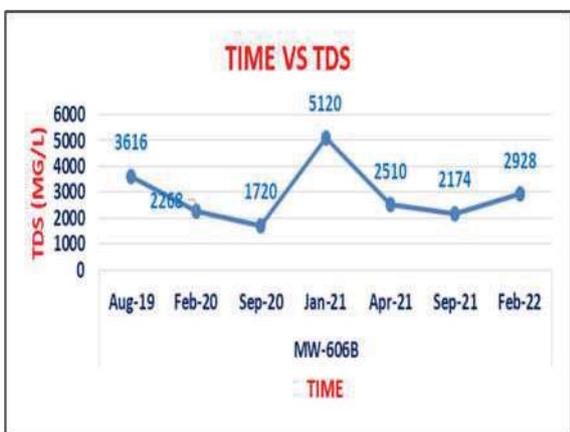
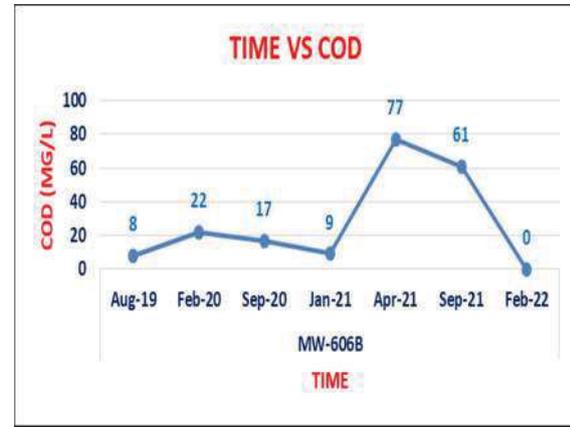
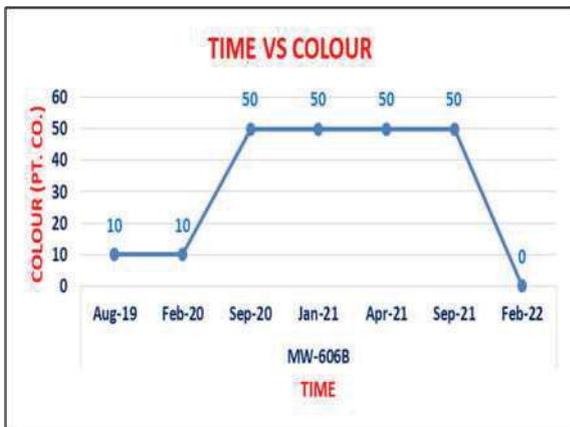
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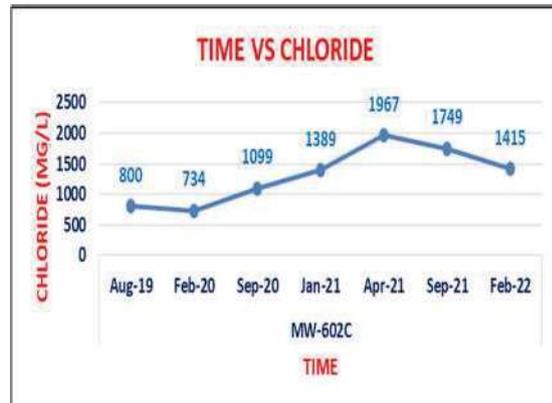
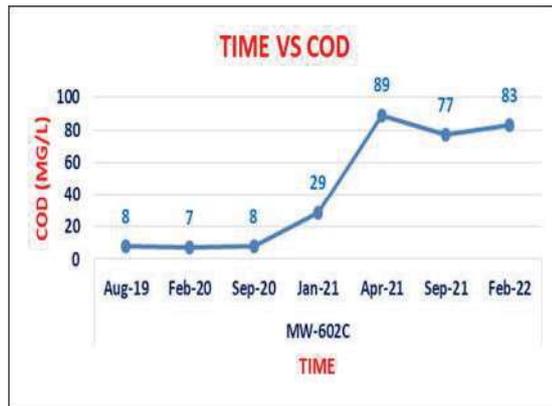
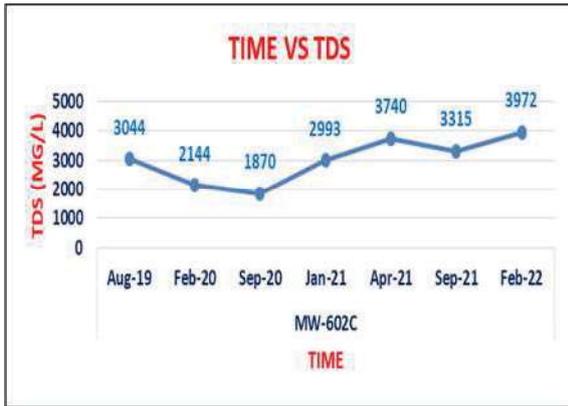
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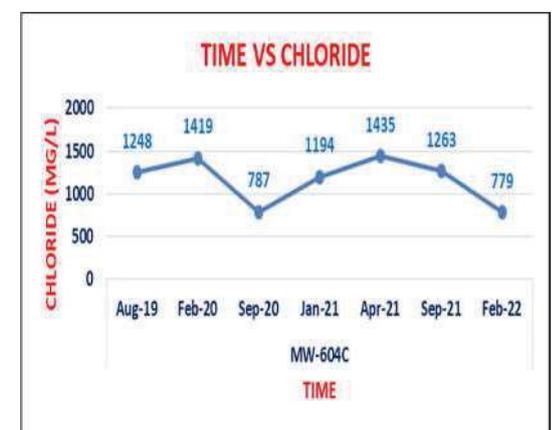
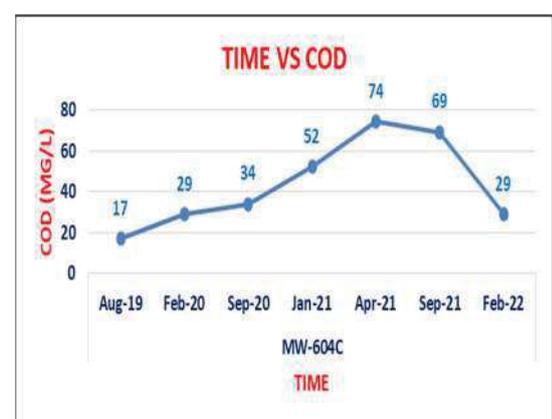
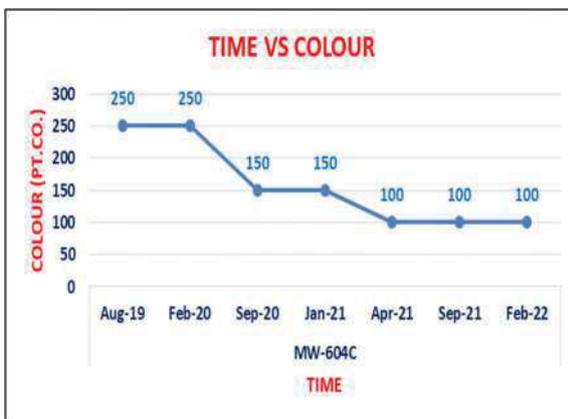
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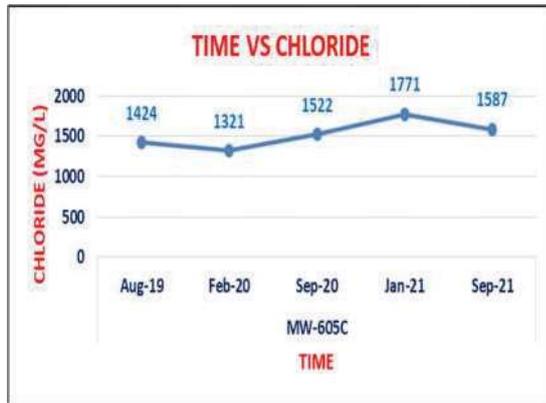
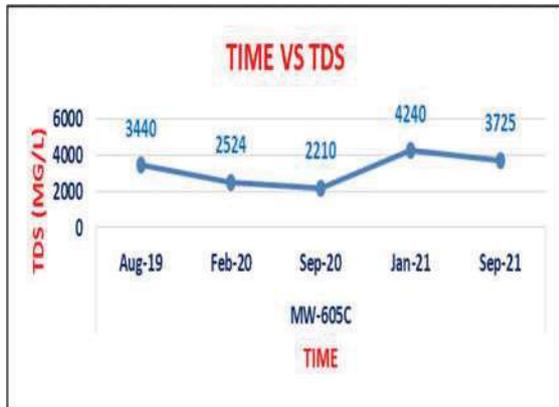
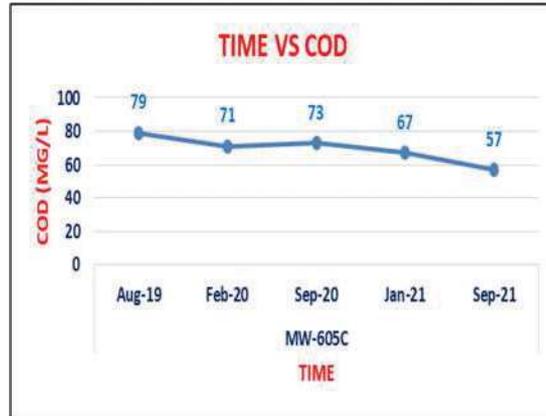
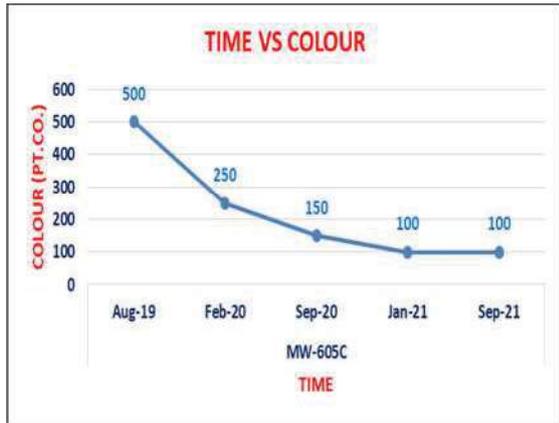
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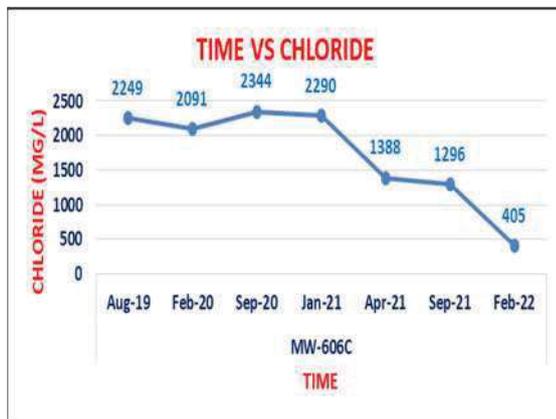
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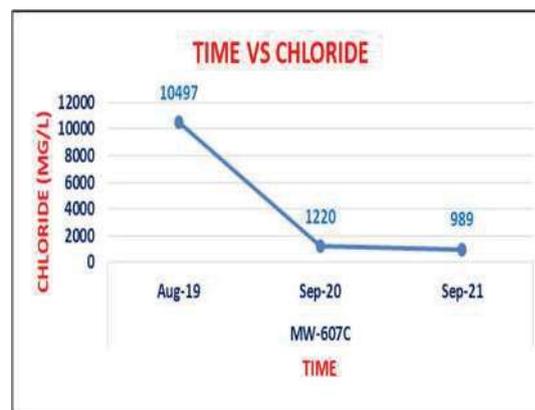
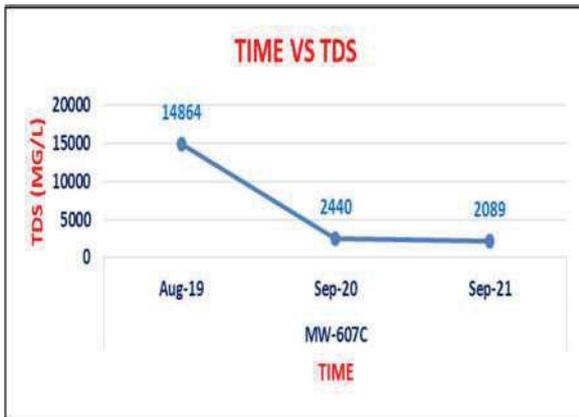
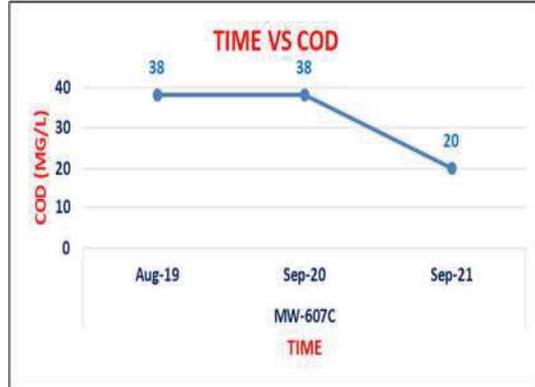
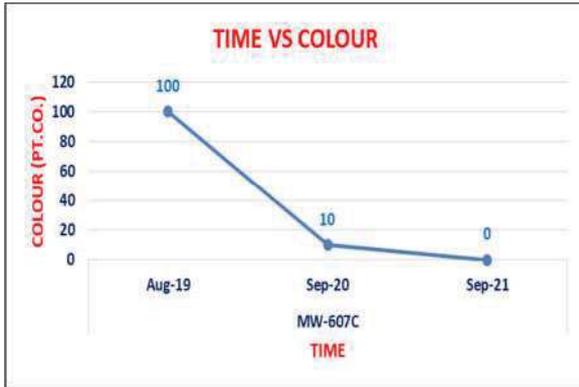
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MW-606C

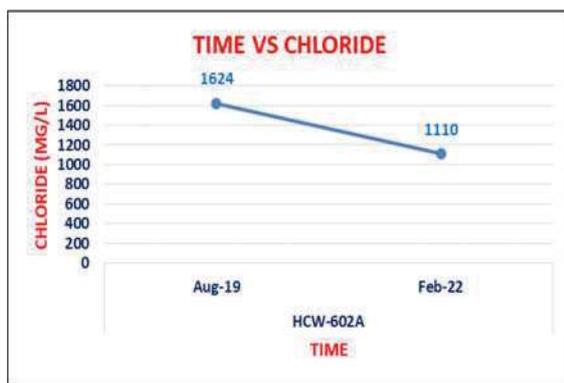
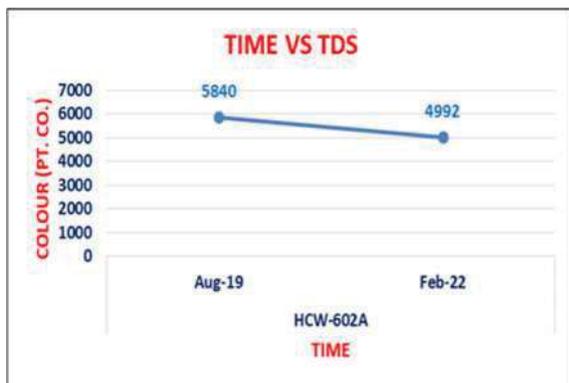
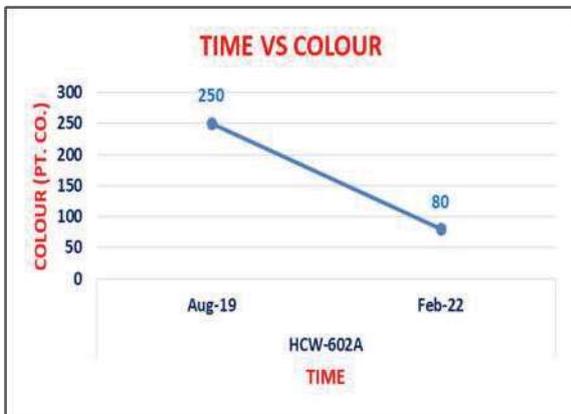


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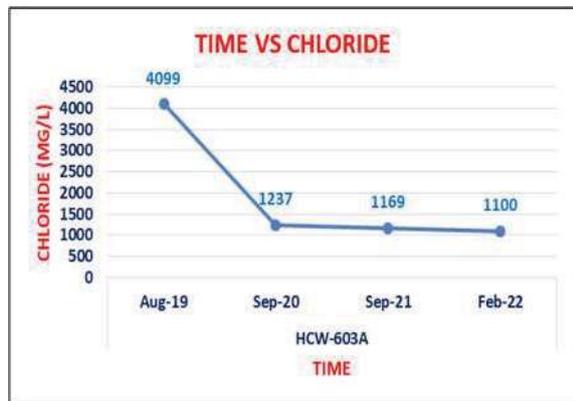
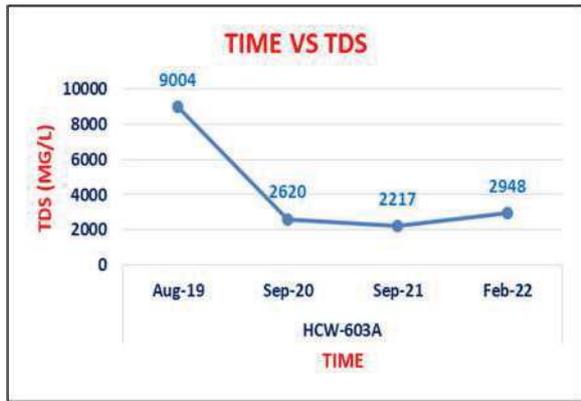
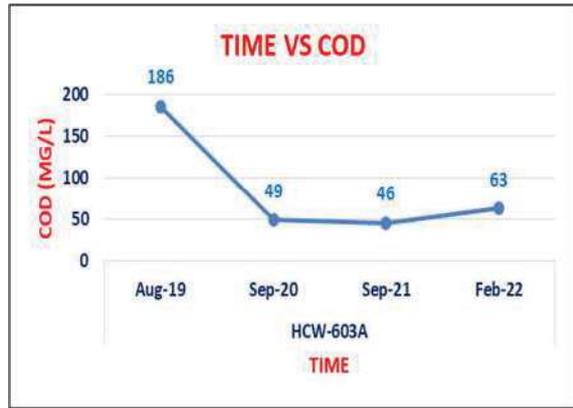
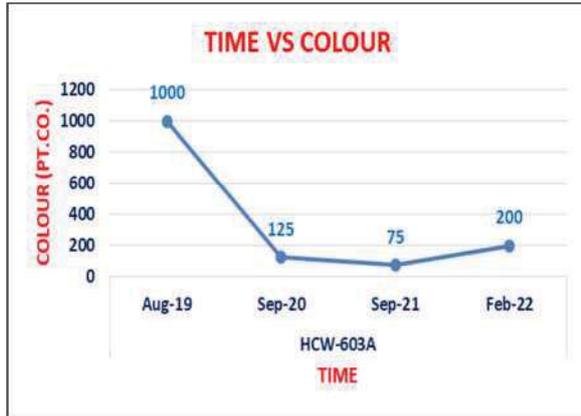


2.4.2 Hydraulic Containment Wells

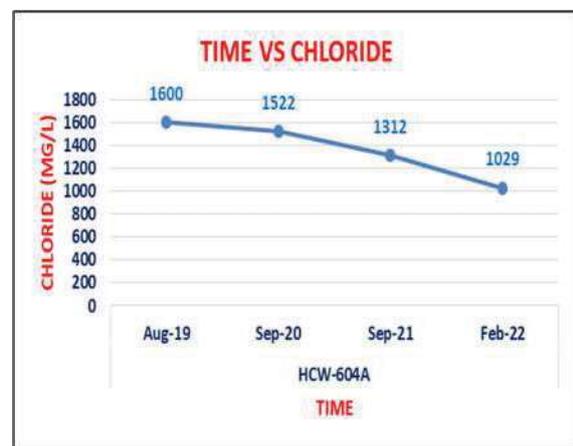
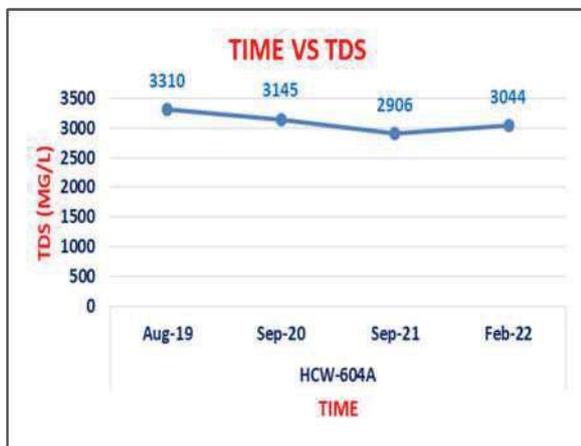
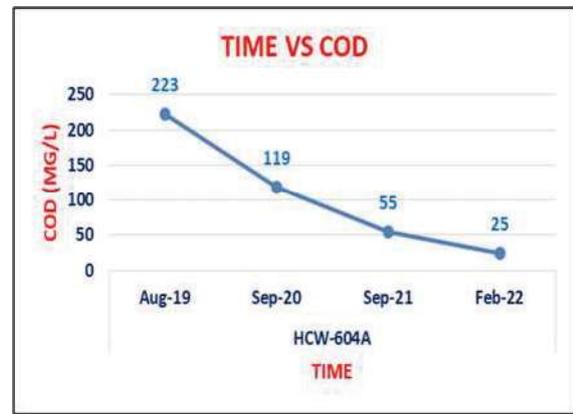
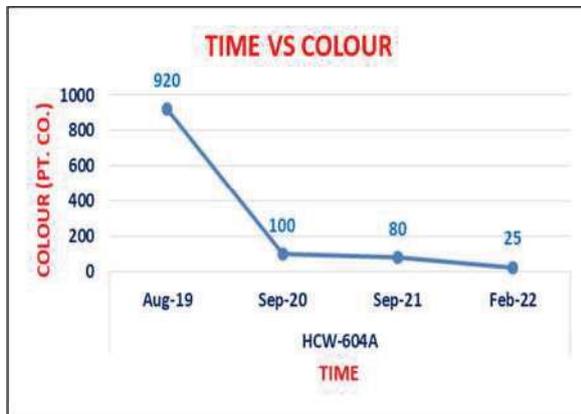
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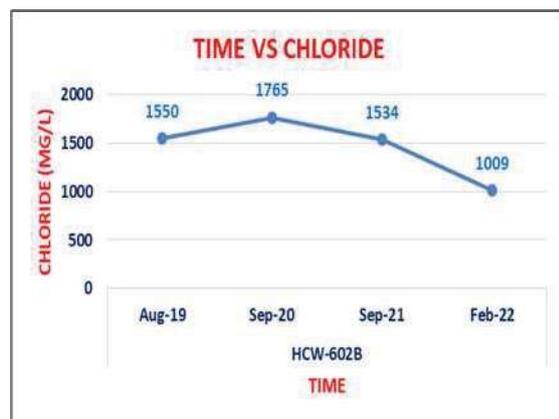
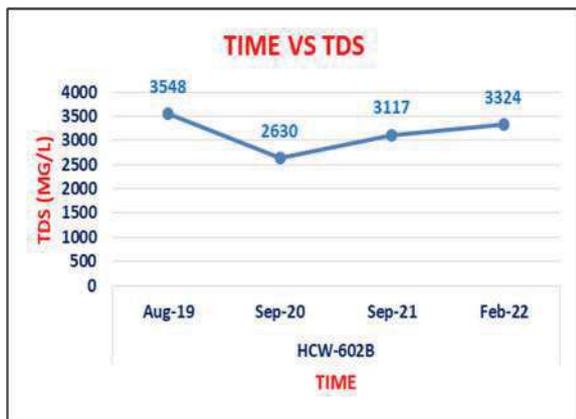
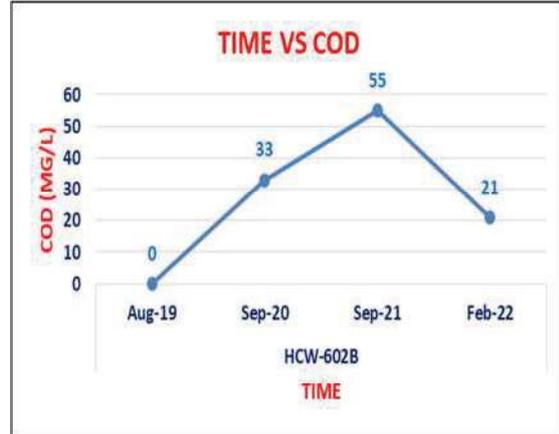
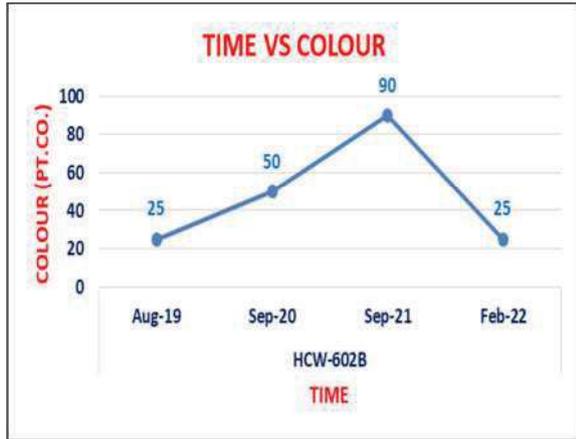
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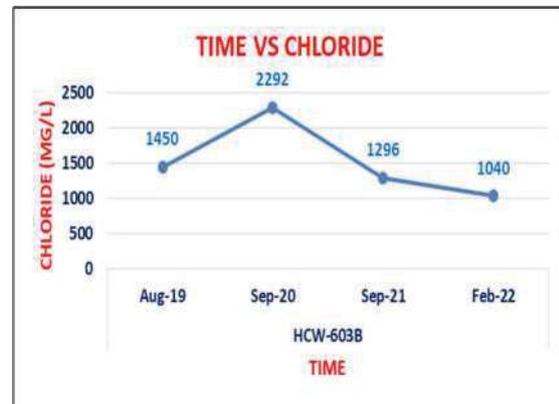
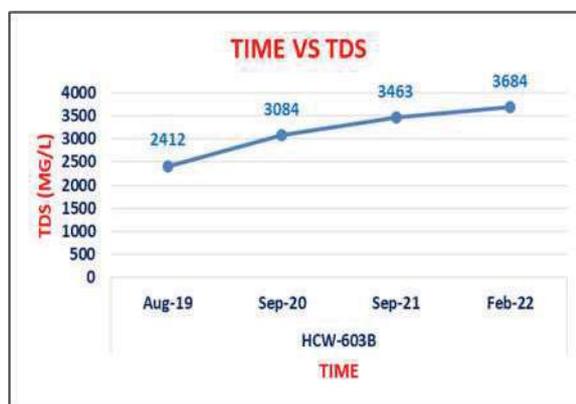
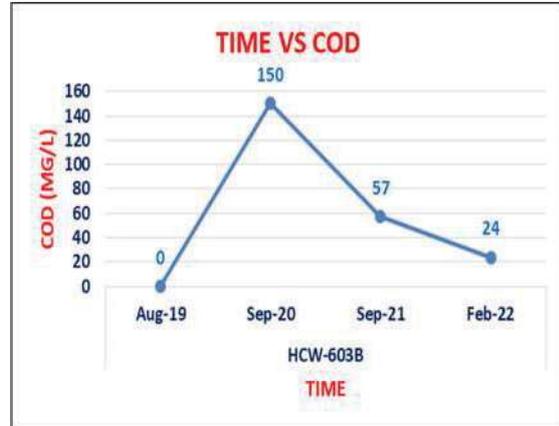
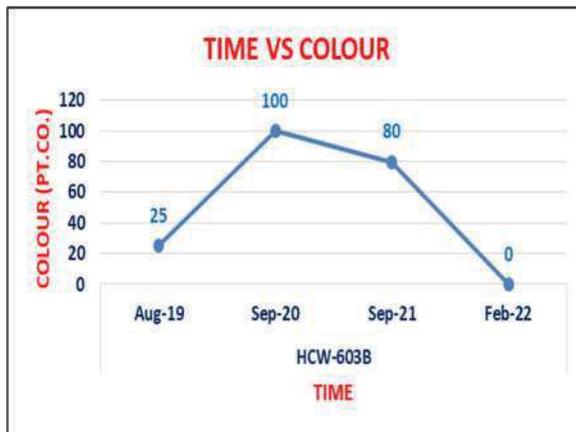
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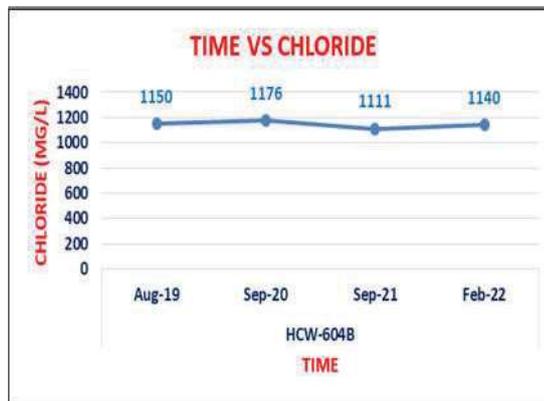
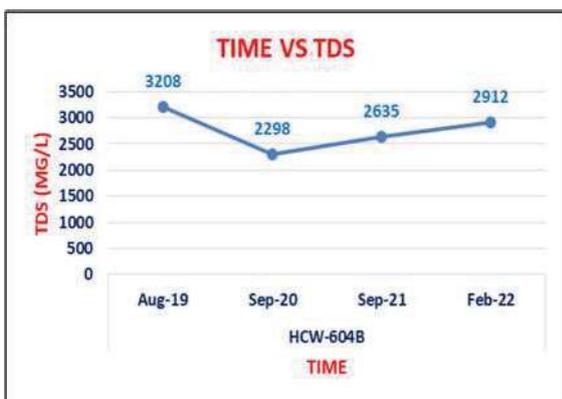
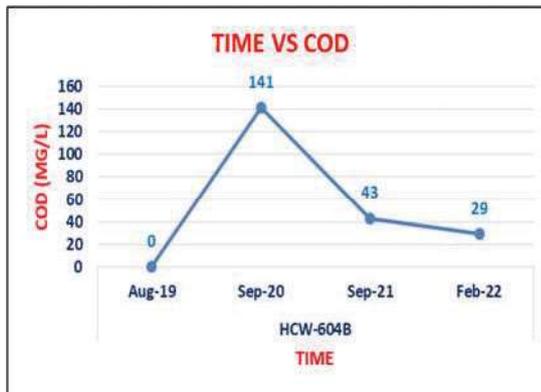
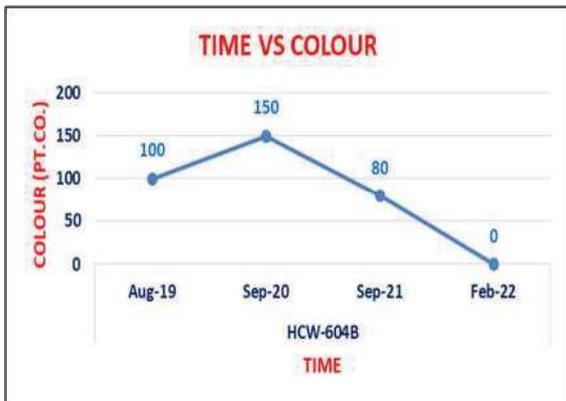
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HCW-603B

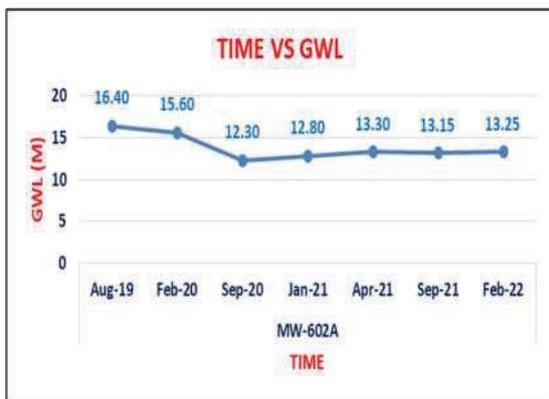


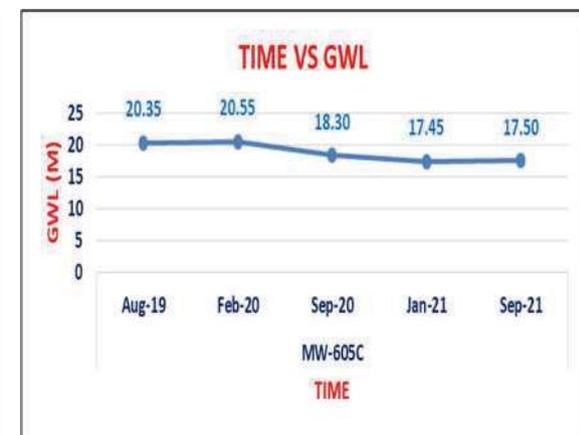
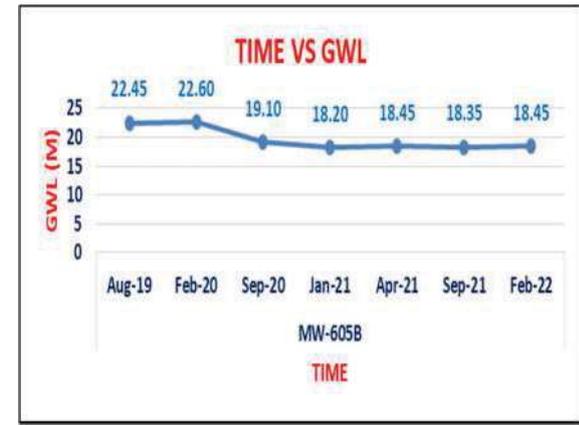
HCW-604B



2.5 Graph of Time vs. Groundwater Level trend

The graph showing trend of groundwater level in shallow, intermediate and deep monitoring wells from August 2019 to February 2022 is shown below.







2.6 Groundwater abstraction & its utilization

The total groundwater abstraction and its utilization from 7 Nos. of Hydraulic Containment Wells (HCWs) is as shown below in **Table 2-3**.

Table 2-3: Groundwater abstraction & its utilization from HCWs

Sr. No.	Month	Shallow Wells (30 m) (KL/Month)				Intermediate Wells (55m) (KL/Month)		
		601A	602A	603A	604A	602B	603B	604B
1	Feb-19	45	271	228	386	28	31	10
2	Mar-19	646	3315	1677	3623	334	481	239
3	Apr-19	379	3955	3267	3668	609	789	31
4	May-19	99	4461	3940	4527	255	178	49
5	Jun-19	628	4613	1305	4164	595	394	101
6	Jul-19	0	0	0	0	3321	4202	4765
7	Aug-19	0	0	62	460	5533	4263	5726
8	Sep-19	3	731	347	812	4645	4590	5175
9	Oct-19	0	29	2	31	5109	5720	4146
10	Nov-19	4	0	12	171	4756	5791	3385
11	Dec-19	259	11	157	391	4856	4686	3804
12	Jan-20	352	1	229	219	3633	3145	4020
13	Feb-20	127	5	15	380	2684	2285	2852
14	Mar-20	47	0	10	383	2807	2626	2743
15	Apr-20	0	0	0	0	0	0	0
16	May-20	0	0	0	54	529	327	450
17	Jun-20	0	0	7	123	2396	413	2742
18	Jul-20	0	0	0	0	4036	227	3952
19	Aug-20	0	0	0	0	2961	252	5209
20	Sep-20	0	0	2	205	2930	2490	3638
21	Oct-20	18	0	8	221	2888	2927	4878
22	Nov-20	0	0	0	51	1530	1510	2149
23	Dec-20	0	0	0	164	3915	2557	4100
24	Jan-21	0	0	16	202	2851	1692	3551
25	Feb-21	0	0	0	44	2952	1710	3959
26	Mar-21	0	0	8	71	2427	2160	3112

Sr. No.	Month	Shallow Wells (30 m) (KL/Month)				Intermediate Wells (55m) (KL/Month)		
		601A	602A	603A	604A	602B	603B	604B
27	Apr-21	0	5	16	281	3460	2789	4385
28	May-21	0	1	3	123	3252	3038	3858
29	Jun-21	0	0	0	42	2546	5684	2782
30	Jul-21	0	1	2	6	3279	4656	3278
31	Aug-21	0	0	0	14	3818	3657	3900
32	Sep-21	0	0	0	39	3662	3701	3661
33	Oct-21	12	0	6	5	3834	3767	3655
34	Nov-21	0	1	1	3	3332	2979	3647
35	Dec-21	3	0	0	3	3557	3698	3907
36	Jan-22	2	0	0	2	3492	3558	3936
37	Feb-22	141	4	5	8	3159	3217	3430
	Total GW Abstraction	2765	17404	11327	20876	105970	96188	115223
	Average/Month	173	1160	472	633	2944	2672	3201
	Average/Day	6	39	16	21	98	89	107
	Total GW Abstraction/Day (KLD)	375						

3 CONCLUSION & RECOMMENDATIONS

3.1 Conclusion

3.1.1 Groundwater Quality

There is general reduction of colour in monitoring and hydraulic containment wells from August 2019 to February 2022 as shown in **Table 3-1**. The location wise Time-Colour trend in Abstraction Wells is shown in **Figure 2**. The plume based on colour quality in shallow, intermediate and deep wells is shown respectively in **Figure 3, Figure 4** and **Figure 5**.

Table 3-1: Trend of colour quality in Monitoring & Hydraulic Containment Wells

Sr. No.	Name of Monitoring Wells (MW)/ Hydraulic Containment Wells (HCW)	Colour (Pt. Co.)		Increase/ Decrease (%) / Constant
		Aug 2019	Feb 2022	
1	MW-602A (25m)	100	25	75% Decrease
2	MW-604A (25m)	500	25	95% Decrease
3	MW-605A (25m)	250	100	60% Decrease
4	MW-606A (25m)	250	200	20% Decrease
5	MW-602B (50m)	200	80	60% Decrease
6	MW-603B (50m)	25	<1	100% Decrease
7	MW-604B (50m)	100	250	60% Increase
8	MW-605B (50m)	250	80	68% Decrease
9	MW-606B (50m)	10	<1	100% Decrease
10	MW-602C (65m)	150	25	83% Decrease
11	MW-604C (65m)	250	100	60% Decrease
12	MW-606C (65m)	500	25	95% Decrease
13	HCW-601A (30m)	--	25	--
14	HCW-602A (30m)	250	80	68% Decrease
15	HCW-603A (30m)	1000	75	93% Decrease
16	HCW-604A (30m)	920	25	97% Decrease
17	HCW-602B (55m)	25	25	Constant
18	HCW-603B (55m)	25	<1	100% Decrease
19	HCW-604B (55m)	100	<1	100% Decrease

Figure 2: Location wise Time-Colour trend in Monitoring & Hydraulic Containment Wells

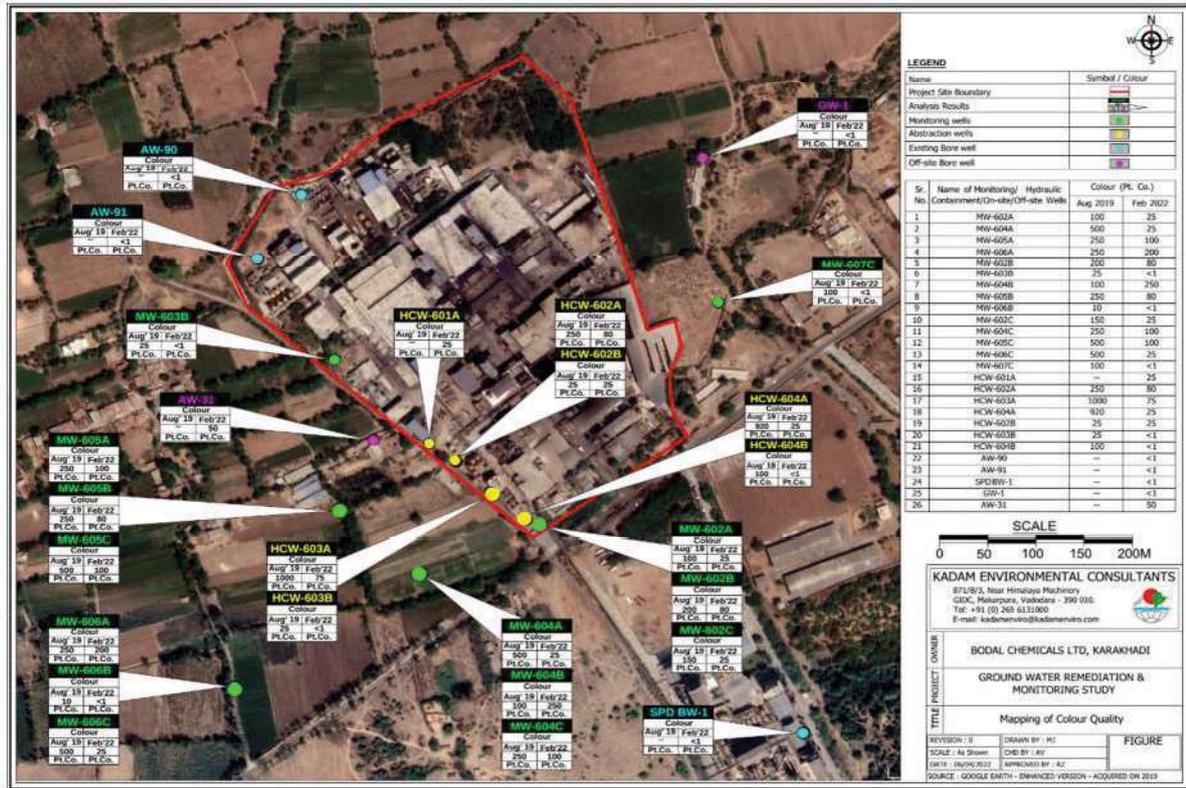


Figure 3: Plume based on colour quality in shallow wells

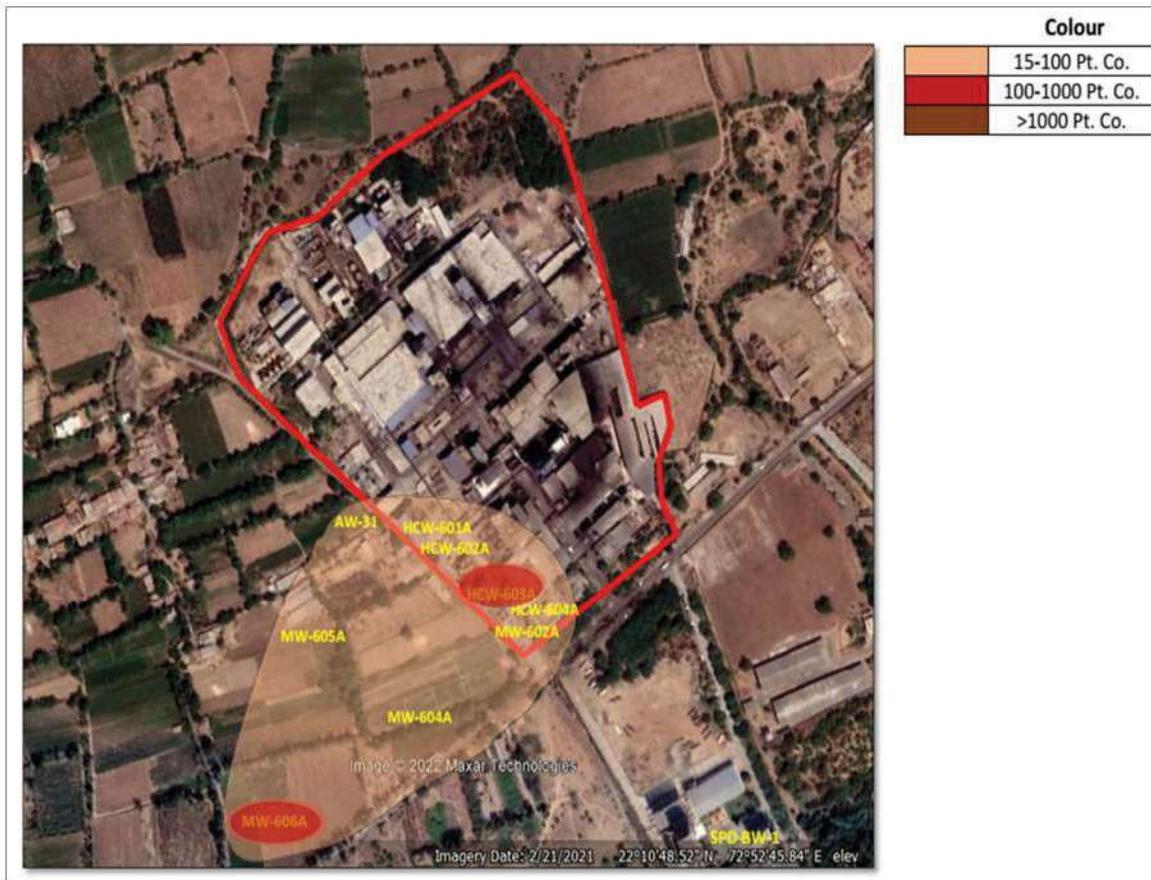


Figure 4: Plume based on colour quality in intermediate wells

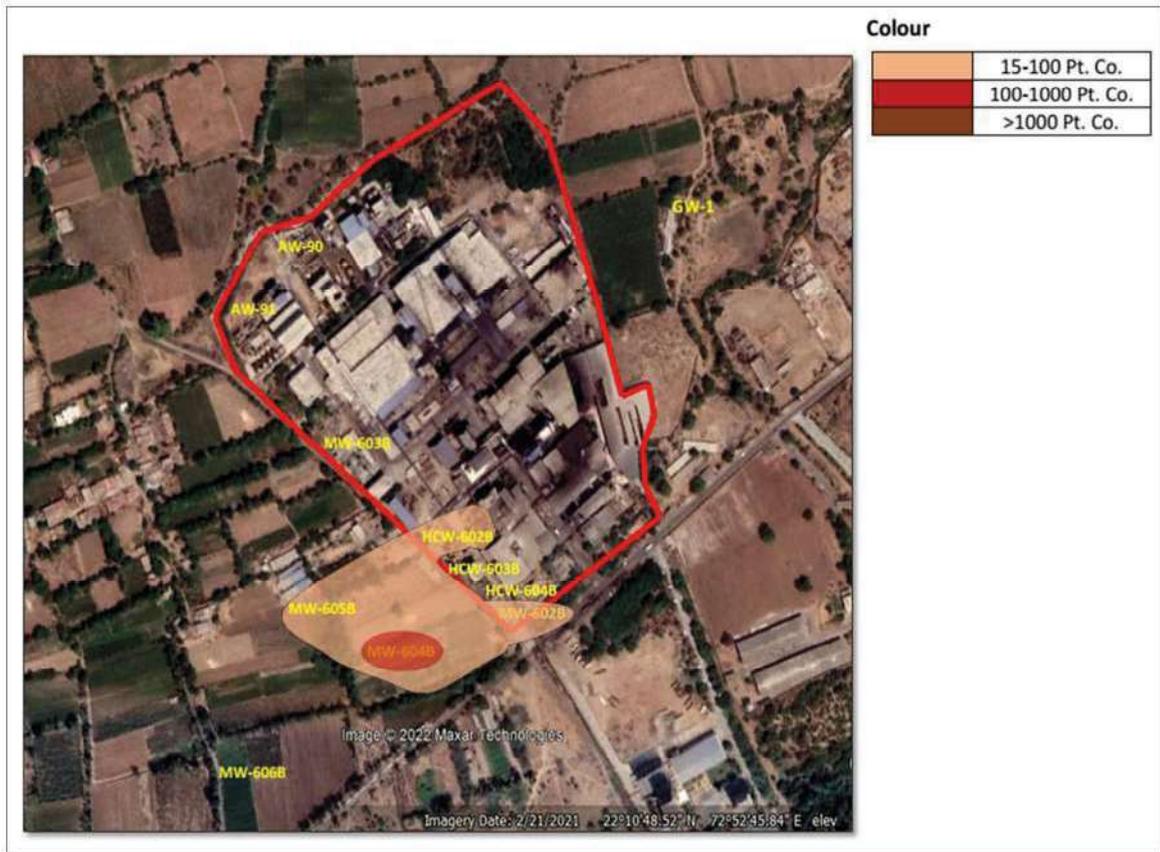
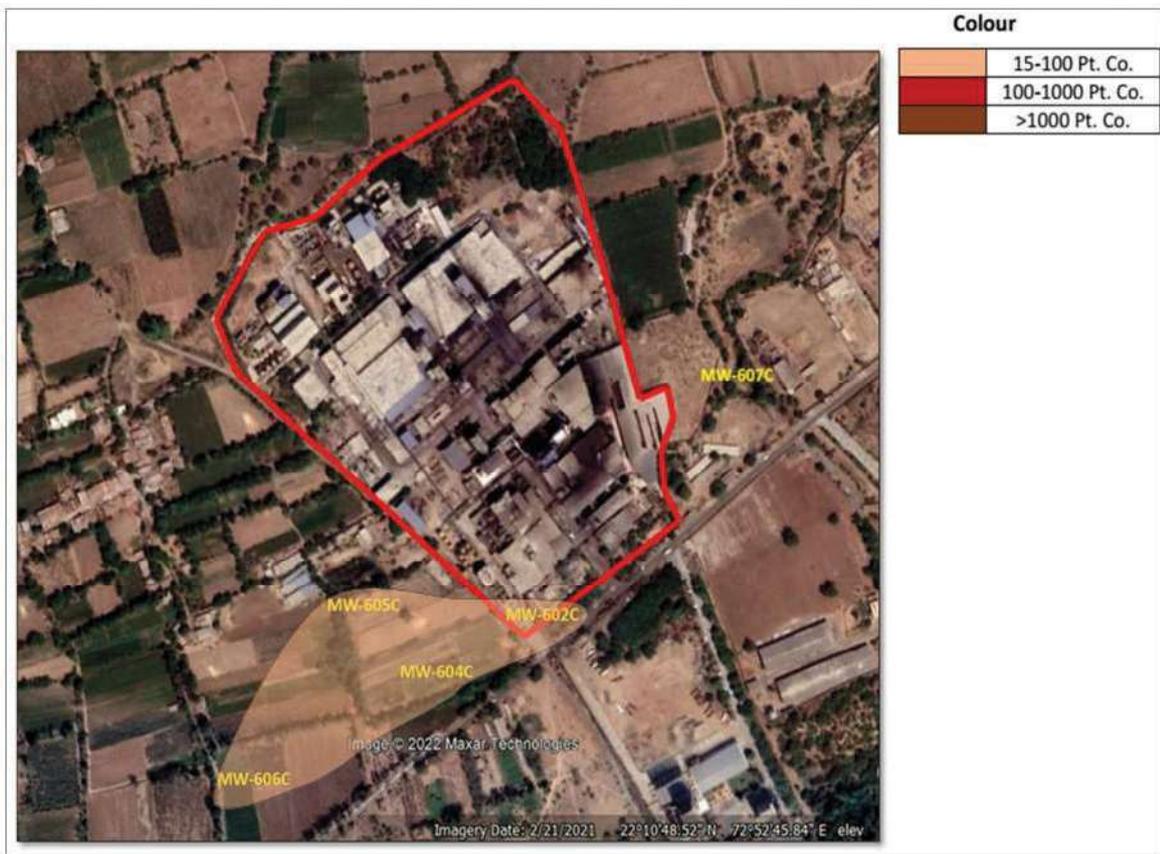


Figure 5: Plume based on colour quality in deep wells



3.1.2 Groundwater Levels

There is general rise in groundwater levels in all shallow, intermediate and deep monitoring wells from August 2019 to February 2022 as shown in **Table 3-2**.

Table 3-2: Trend of groundwater level in Monitoring Wells

Sr. No.	Type of Monitoring Wells	Groundwater Level (m)		Rise/ Fall (%)
		Aug 2019	Feb 2022	
1	MW-602A (25m)	16.40	13.25	19% Rise
2	MW-604A (25m)	16.10	12.85	20% Rise
3	MW-605A (25m)	16.85	15.00	11% Rise
4	MW-606A (25m)	15.40	14.15	8% Rise
5	MW-602B (50m)	17.10	18.20	6% Fall
6	MW-603B (50m)	22.30	18.80	16% Rise
7	MW-604B (50m)	16.80	15.05	10% Rise
8	MW-605B (50m)	22.45	18.45	18% Rise
9	MW-606B (50m)	20.25	17.95	11% Rise
10	MW-602C (65m)	21.95	18.80	14% Rise
11	MW-604C (65m)	21.20	17.75	16% Rise
12	MW-606C (65m)	20.20	17.25	15% Rise

3.2 Recommendations

To continue abstraction from existing intermediate Hydraulic Containment Wells as it is showing fairly good reduction in colour values in adjoining Monitoring Wells.



Kadam

Environmental Consultants
www.kadamenviro.com

Environment for Development

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Sector 48, Gurgaon, Haryana 122018

E-mail: delhi@kadamenviro.com; **T:0124-4242430 to 436 (7 lines)**

A handwritten signature in black ink, appearing to read 'Rohit'.

True Copy



GPCB

GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN

Sector-10-A, Gandhinagar 382 010

Phone : (079) 23222425

(079) 23232152

Fax : (079) 23232156

Website : www.gpcb.gov.in

In exercise of the power conferred under section-25 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution) Act-1981 and Authorization under rule 6(2) of the Hazardous And Other Waste (Management And Transboundary Movement) Rules-2016 framed under the Environment (Protection) Act-1986. This Board is empowered to grant CC&A.

And whereas Board has received consolidated consent application vide No.183517 Dated: 23/11/2020 for the consolidated consent and authorization (CC & A-Renewal) of this Board under the provisions / rules of the aforesaid Acts. Consent & Authorization is hereby granted as under.

CONSENT AND AUTHORISATION:

(Under the provisions / rules of the aforesaid environmental acts)

To,

M/s. Bodal Chemicals Ltd. Unit-7 (Sulfur Div.)**Survey No.525, 532, 555, 556, 560/1, 795-800,****Vill: Dudhwada, Tal: Padra,****Dist: Vadodara-382340.**

1. Consent Order no.: AWH-111308. Date of issue: 30/01/2021.
2. The consent shall be valid up to 30/09/2025 for the use of outlet for the discharge of treated effluent & air emission and to operate industrial plant for manufacture of the following items / products:

Sr. No.	Product	Quantity
1	Sulphuric Acid (98%) and/or Oleum (23%) and/or Oleum (65%)	500 MT/day 200 MT/day 75 MT/day
2	Liquid So ₃	50 MT/day
3	Chlorosulphonic Acid	150 MT/day
4	Sulphuric Acid-70%	200 MT/day
5	Generation of Power through waste heat recovery system	1.76 MW
6	Thionyl Chloride	3000 MT/Month
By-Product		
1	Waste - Steam	20 T/hour

3. SPECIFIC CONDITIONS:

- 3.1 Applicant shall not carry out any activity which attracts provisions of Environment Impact Assessment Notification 2006.
- 3.2 Applicant shall obtain prior permission of Ground Water Authority for withdrawal of ground water/use of bore wells. (if applicable)
- 3.3 Management of Solid Waste generated from industrial activities shall be as per Solid Waste Management Rules-2016 (solid waste as defined in Rule-3(46)).
- 3.4 As per provision of Rule-18 of Solid Waste Management Rules-2016 all industrial units using fuel and located within 100 km from the refused derived

fuel (RDF) plant shall made an arrangement to replace at least five percent of their fuel requirement by refused derived fuel so produced.

4. CONDITION UNDER THE WATER ACT 1974:

- 4.1 The quantity of the industrial effluent to be generated from the manufacturing process and other ancillary industrial operations shall be not exceed 475 KL/Day.
- 4.2 The quantity the domestic wastewater (sewage) shall not exceed 8 KL/Day.
- 4.3. The applicant shall provide adequate effluent treatment system in order to achieve the quality of the treated effluent as per norms mentioned in column No.3.

1	2	3
Sr. No.	Parameters	VECL Inlet Norms
1.	pH	6.5 to 8.5
2.	Temperature	40° C
3.	Colour (pt.co.scale) in units	100 units
4.	Suspended Solids	100 mg/l
5.	Oil and Grease	10 mg/l
6.	Phenolic Compounds	1 mg/l
7.	Cyanides	0.2 mg/l
8.	Fluorides	1.5 mg/l
9.	Sulphides	2 mg/l
10.	Ammonical Nitrogen	50 mg/l
11.	Arsenic	0.2 mg/l
12.	Total Chromium	2.0 mg/l
13.	Hexavelant Chromium	0.1 mg/l
14.	Copper	3 mg/l
15.	Lead	0.1 mg/l
16.	Mercury	0.01 mg/l
17.	Nickle	3 mg/l
18.	Zinc	5 mg/l
19.	BOD (5 days at 20°C)	100mg/l
20.	COD	250 mg/l
21.	Chlorides	600 mg/l
22.	Sulphates	1000 mg/l
23.	Total dissolved solids	5000 mg/l
24.	Insecticides/Pesticides	Absent
25.	Bio-assay test	90 % Survival of fish after 96 hours in 100% effluent

- All efforts shall be made to remove color & unpleasant odor as far as practicable.
- 4.4. The effluent shall be transferred by pumping to the final treated effluent sump of the ETP at existing Dyes & Dyes Intermediate manufacturing sister concern unit namely Bodal Chemicals Ltd. (Unit-7) situated at S. No.804, 805, 807 to 822, 824 to 839 & 849, Vill: Dudhwada, Tal: Padra, Dist: Vadodara through over head pipeline and from there the effluent conforming to the above standards shall be



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discharged into the ECP channel and shall be ultimately conveyed up to the estuary of river Mahi.

- 4.5. Sewage shall be disposed of through septic tank/soak pit system.

5 CONDITIONS UNDER AIR ACT 1981:

- 5.1 The following shall be used as fuel.

Sr. No.	Fuel	Quantity
1.	Diesel	100lit/hr
2.	Waste Steam	---

- 5.2 The applicant shall install & operate air pollution control system in order to achieve norms prescribed herewith.

- 5.3 The flue gas emission through stack attached to D. G. Set shall conform to the following standards:

Sr. No.	Stack Attached To	Stack Height	APCM	Parameter	Permissible Limit
1.	D.G. Set (750KVA)	As per condition no. 5.10 (a)	Acoustic Measures	Particulate Matter SO ₂ NO _x	150 mg/NM ³ 100 ppm 50 ppm

- 5.4 The process gas emission through stack/vent attached to various reactors, process vessel shall conform to the following standards:

Stack No.	Stack Attached To	Stack Height	APCM	Parameter	Permissible Limit
1	Vent from final absorption tower in sulphuric acid plant	50 Meter	Alkali scrubber	SO ₂ Acid mist/ SO ₃	1.5kg/MT of 100% conc. Sulphuric acid production 50mg/NM ³
2	Vent of HCl scrubber in CSA plant	30 Meter	Two stage scrubber	HCL	20mg/NM ³
3	Oleum and CSA plant storage tank	11 Meter	H ₂ SO ₄ scrubber	Acid mist/ SO ₃	50mg/NM ³
4	HCL Scrubber	11 Meter	Water scrubber	HCL	20mg/NM ³
5	CPT Scrubber- CSA plant	20 Meter	Chloro scrubber followed by alkali scrubber	HCL	20mg/NM ³
6	Sulphuric acid storage tanks	11 Meter	Alkali scrubber	SO ₂ Acid mist/ SO ₃	1.5kg/MT of 100% conc. Sulphuric acid production 50mg/NM ³

7	Catalytic convertor of SDC reactor for TC product (new)	15 Meter	Alkali scrubber	SO ₂	40mg/NM ³
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- 5.5 Stack monitoring facilities like port hole, platform/ladder etc., shall be provided with stacks/vents Chimney in order to facilitate sampling of gases being emitted into the atmosphere.
- 5.6 The concentration of the following parameters in the ambient air within the premises of the industry and a distance of 10meters from the source) other than the stack/vent) shall not exceed the following levels. Applicant shall comply with the National Ambient Air Quality Standards notified by Central Pollution Control Board, New Delhi time to time under the provision of the Environment (Protection) Act-1986.

Parameter	Permissible Limit Annual	Permissible Limit 24 Hrs. Average
Particulate matter-10[PM10]	60Microgram /m ³	100Microgram /m ³
Particulate matter-2.5[PM2.5]	40Microgram /m ³	60Microgram /m ³
Sulphur Dioxide	50Microgram /m ³	80Microgram /m ³
Nitrogen Dioxide	40Microgram /m ³	80Microgram /m ³
HCL	-----	200Microgram /m ³
Cl ₂	-----	100Microgram /m ³

- 5.7 The applicant shall provide portholes, ladder, platform etc at chimney(s) for monitoring the air emissions and the same shall be open for inspection to/and for use of Board's staff. The chimney(s) vents attached to various sources of emission shall be designed by numbers such as S-1, S-2, etc. and these shall be painted/ displayed to facilitate identification.
- 5.8 There shall no any fugitive emission and/or odour pollution due to manufacturing activities and ancillary operations. Adequate measures shall be taken thereof.
- 5.9 The Industry shall take adequate measures for control of noise levels from its own sources within the premises so as to maintain ambient air quality standards in respect of noise to less than 75 dB(A) during day time and 70 dB(A) during night time. Daytime is reckoned in between 6 a.m. and 10 p.m. and nighttime is reckoned between 10 p.m. and 6 a.m.
- 5.10. D. G. Set standards:- The flue gas emission through stack attached to D. G. Set shall conform to the following standards.
- The minimum height of stack to be provided with each of the generator set shall be $H=h + 0.2 (KVA)^{1/2}$, where H= Total stack height in meter, h= height of the building in meters where or by the side of which the generator set is installed.
 - Noise from DG set shall be controlled by providing an acoustic enclosure or by treating the room acoustically, at the users end.
 - The acoustic enclosure or acoustic treatment of the room shall be designed for minimum 25 dB (A) insertion loss or for meeting the ambient noise standards, whichever is on the higher side (if the actual ambient noise is on the higher side, it may not be possible to check the performance of the acoustic enclosure/ acoustic treatment. Under such circumstances the

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GPCB

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performance may be checked for noise reduction (to actual ambient noise level, preferably, in the night time). The measurement for insertion loss may be done at different points at 0.5 m from the acoustic enclosure/room, and the averaged.

- d) The D.G. Set shall be provided with proper exhaust muffler with insertion loss of minimum 25 dB (A).
- e) All efforts shall be made to bring down the noise level due to the D.G.Set, outside the premises, within the ambient noise requirements by proper siting and control measures.
- f) Installation of a D.G.Set must be strictly in compliance with the recommendations of the D.G.Set manufacturer.
- g) A proper routine and preventive maintenance procedure for the D.G.Set should be set and followed in consultation with the DG Set manufacture which would help prevent noise levels of the DG Set from deteriorating with use.

6. GENERAL CONDITIONS: -

- 6.1 Any change in personnel, equipment or working conditions as mentioned in the consents form/order should immediately be intimated to this Board.
- 6.2 Applicant shall also comply with the general conditions given in annexure- I.
- 6.3 If the products/process falls in SCHEDULE-I or II of the Environmental Audit Scheme, as specified in the order dated 13/3/97 of Hon. High Court in MCA NO.326/97 in SCA No.770/95, the applicant shall also abide by the said scheme.

7. AUTHORIZATION UNDER HAZARDOUS AND OTHER WASTE (MANAGEMENT AND TRANSBOUNDARY MOVEMENT) RULES-2016 FORM-2 (See rule 6(2)).

- 7.1 Number of authorization and date of issue: AWH-111308 dated: 30/01/2021.
- 7.2 Reference of application No.183517 Dated: 23/11/2020.
- 7.3 M/s. Bodal Chemicals Ltd.Unit-7 (Sulfur Div.) is hereby granted an authorization based on the enclosed signed inspection report for generation, collection, treatment, storage, transport of hazardous wastes on the premises situated at - Survey No.525, 532, 555, 556, 560/1, 795-800, Vill: Dudhwada, Tal: Padra, Dist: Vadodara-382340.
- 7.4 Details of Authorization.

Sr. No	Category of Hazardous waste as per the Schedules	Authorized Mode of disposal	Quantity
1.	5.1- Schedule-I (Used Spent Oil)	Disposal by selling to registered /authorized refiner having valid CCA of SPCB & Rule-9 permission under HWM Rule-2016 by use of GPS enable vehicle and xgn generated manifest.	0.30 MT/Year

2	35.3 – Schedule-I (ETP Sludge (Sulphur containing residue))	Disposal by sending to approved authorized TSDF having valid CCA of SPCB by use of GPS enable vehicle and xgn generated manifest.	720 MT/Year
3	17.2–Schedule-I (Spent Catalyst)		4 MT/Year
4	36.1 –Schedule-I (Sludge from wet scrubber)		24 MT/Year

- 7.4.1 The Authorization shall be valid for a period of 30/09/2025.
- 7.4.2 The Authorization is subject to the following general and specific conditions:
- 7.5 GENERAL CONDITIONS UNDER HAZARDOUS AND OTHER WASTES (M&TM) RULES-2016.
- 7.5.1 The Authorized person shall comply with the provisions of the Environment (Protection) Act, 1986, and the rules made there under.
- 7.5.2 The Authorization or its renewal shall be produced for inspection at the request of an officer Authorized by the State Pollution Control Board.
- 7.5.3 The person Authorized shall not rent, lend, sell, transfer or otherwise transport the hazardous and other wastes except what is permitted through this authorization.
- 7.5.4 Any unauthorized change in personnel, equipment or working conditions as mentioned in the application by the person authorized shall constitute a breach of his authorization.
- 7.5.5 The person authorized shall implement Emergency Response Procedure (ERP) for which this authorization is being granted considering all site specific possible scenarios such as spillages, leakages, fire etc. and their possible impacts and also carry out mock drill in this regard at regular interval of time;
- 7.5.6 The person authorized shall comply with the provisions outlined in the Central Pollution Control Board guidelines on “Implementing Liabilities for Environmental Damages due to Handling and Disposal of Hazardous Waste and Penalty”
- 7.5.7 It is the duty of the authorized person to take prior permission of the State Pollution Control Board to close down the facility.
- 7.5.8 The imported hazardous and other wastes shall be fully insured for transit as well as for any accidental occurrence and its clean-up operation.
- 7.5.9 The record of consumption and fate of the imported hazardous and other wastes shall be maintained.
- 7.5.10 The hazardous and other waste which gets generated during recycling or reuse or recovery or pre-processing or utilization of imported hazardous or other wastes shall be treated and disposed of as per specific conditions of authorization.
- 7.5.11 The importer or exporter shall bear the cost of import or export and mitigation of damages if any.
- 7.5.12 An application for the renewal of an authorization shall be made as laid down under these Rules.

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7.5.13 Any other conditions for compliance as per the Guidelines issued by the Ministry of Environment, Forest and Climate Change or Central Pollution Control Board from time to time.

7.5.14 Annual return shall be filed by June 30th for the period ensuring 31st March of the year.

7.6 SPECIFIC CONDITIONS UNDER HAZARDOUS AND OTHER WASTES (M&TM) RULES-2016.

7.6.1 The authorized actual user of hazardous and other wastes shall maintain records of hazardous and other wastes purchased in a passbook issued by the State Pollution Control Board along with the authorization.

7.6.2 Handing over of the hazardous and other wastes to the authorized actual user shall be only after making the entry into the passbook of the actual user.

7.6.3 In case of renewal of authorization, a self-certified compliance report in respect of effluent, emission standards and the conditions specified in the authorization for hazardous and other wastes shall be submitted to SPCB.

7.6.4 The occupier of the facility shall comply Standard operating procedure/ guidelines published by MoEF&CC or CPCB or GPCB from time to time.

7.6.5 Unit shall comply provisions of E-Waste Management Rules-2016.

7.6.6 The disposal of Hazardous Waste shall be carried out as per the waste Management hierarchy.

For and on behalf of
Gujarat Pollution Control Board

D.P. Shah

(D.P. Shah)

Environmental Engineer

NO.GPCB/CCA-VRD-1181(3)/ID:33329/582982

Date: 06/02/2021

Issued To:

M/s. Bodal Chemicals Ltd. Unit-7 (Sulfur Div.)

Survey No.525, 532, 555, 556, 560/1, 795-800,

Vill: Dudhwada, Tal: Padra,

Dist: Vadodara-382340.

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For and on behalf of
Gujarat Pollution Control Board

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Environmental Engineer

NO.GPCB/CCA-VRD-1181(3)/ID:33329/582982

Date: 06/02/2021

Issued To:

M/s. Bodal Chemicals Ltd. Unit-7 (Sulfur Div.)

Survey No.525, 532, 555, 556, 560/1, 795-800,

Vill: Dudhwada, Tal: Padra,

Dist: Vadodara-382340.

Port

True Copy

Certificate of Membership



Vadodara Enviro
Channel Limited

Certificate No. : VECL/32/2022-23

Date : 1ST April 2022

To Whomsoever It May Concern

This is to certify that M/s. Bodal Chemicals Ltd. (Unit - VII)

*Located at Block No. 804, Village: Dudhwada,
Ta. Padra, Dist: Vadodara.*

is a Valid Member for the Conveying system of VECL for the safe disposal of Treated Waste water in Zone Three of VECL.

The committed quantity for the discharge in to the conveying system is 949.000 M³/Day only.

This Certificate is Valid from APRIL 1ST 2022 to MARCH 31ST 2023 only.

True Copy

For & Behalf of
Vadodara Enviro Channel Limited

Managing Director

Regd. Office: Plot No. 304/1, 317 & 318, At & Post : Dhanora, Dist. Vadodara-391 346, Gujarat-India
Phone : +91-265-2232349, E-mail : envservices@envirochannel.in Web : www.envirochannel.in



ISO 14001
503343 UM



Safely conveying treated wastewater from industrial units from in & around Vadodara District through **a 55 km long Channel** in to the Bay of Khambhat

626

O/C

ANNEXURE R4-37



PCB ID: 21752
Dated: 21/04/2022

To,
Unit Head Vadodara,
Gujarat Pollution Control Board,
"Paryavaran Bhawan", Sector-10A,
Gandhinagar (Gujarat)

Dear Sir,

Sub: Correction in Existing CCA

Ref: Consent Order no.: AWH-88988 Date of issue: 26/07/2017 and its amendment.

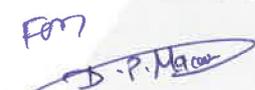
In continuance with the subject mentioned above, we would like to request you to consider our request as follows:

As per granted CCA for Bodal Chemicals Ltd. Unit-VII (Sulphur Product Division) Annexure-A, Board permits us to treat effluent of both Bodal Chemicals Ltd. Unit-VII and Unit-VII (Sulphur Product Division) together at Unit-VII and discharge as per prescribed norms into VECL Channel. That is missed out during amendment of Consent. We herewith attached CTE of Appollo Dye-Chem Pvt. Ltd. (Now merged with Unit-VII) as Annexure-B for your ready reference, wherein it is evidently mention that treated effluent of Bodal Chemicals Ltd. Unit-VII (Sulphur Product Division) shall be discharge in to VECL through ETP of Bodal chemicals Ltd (Unit-VII).

We herewith humble request to kindly consider our request letter & provide us corrected Consent copy.

Thanking you.

For: Bodal Chemicals Limited


Director/Authorized Signatory

Enclosure: As mentioned above

CC: Regional Officer, GPCB-Vadodara, Gujarat

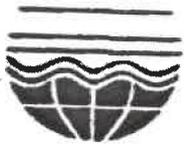

21/04/22
Gujarat Pollution Control Board
Head Office
Sector No.-10-A,
Gandhinagar-382010

HEAD OFFICE :
Plot No. 123-124, Phase-1,
G.I.D.C, Vatva, Ahmedabad-382 445.
Gujarat, India.

Tel : +91 - 99099 50855
+91 - 99099 50856
E-mail : info@bodal.com

PLANT OFFICE :
UNIT - VII
Plot No. 804, Village : Dudhwada,
Ta. : Padra - 391450.

Tel : +91 - 99099 50852
+91 - 99099 50853
E-mail : info@bodal.com



GUJARAT POLLUTION CONTROL BOARD

Paryavaran Bhavan

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By R.P.A.D.

In exercise of the power conferred under section-25 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution) Act-1981 and Authorization under rule 3(c) & 5(5) of the Hazardous Waste (Management, Handling and Trans boundary Movement) Rules 2008 framed under the Environment (Protection) Act-1986. This Board is empowered to grant CC&A.

And whereas Board has received consolidated consent application vide No.98439, Dated 09/10/2015 for the consolidated consent and authorization (CCA- Renewal) of this Board under the provisions / rules of the aforesaid Acts. Consent & Authorization is hereby granted as under.

CONSENT AND AUTHORISATION:

(Under the provisions / rules of the aforesaid environmental acts)

To,

M/s. Bodal Chemicals Ltd. Unit-7 (Sulfur Div.)

Survey No.525, 532, 555, 556, 560/1, 795-800,

Vill: Dudhwada, Tal: Padra,

Dist: Vadodara-382340.

1. Consent Order No.: AWH-75247, Date of issue 09/10/2015.
2. The consent shall be valid up to 08/10/2020 for the use of outlet for the discharge of treated effluent & air emission and to operate industrial plant for manufacture of the following items / products:

Sr. No.	Product	Quantity
1	Sulphuric Acid (98%) and/or Oleum (23%) and/or Oleum (65%)	500MT/day 200MT/day 75MT/day
2	Liquid SO_2	50MT/day
3	Chlorosulphonic Acid	150MT/day
4	Sulphuric Acid-70%	200MT/day
5	Generation of Power through waste heat recovery system	1.76MW
6	Thionyl Chloride	3000MT/Month
By-Product		
1	Waste - Steam	20T/hour

3. SPECIFIC CONDITIONS:

- 3.1 Applicant shall not carry out any activity which attracts provisions of Environment Clearance Notification 2006.

4. CONDITION UNDER THE WATER ACT:

- 4.1 The quantity of the industrial effluent to be generated from the manufacturing process and other ancillary industrial operations shall be not exceed $475m^3/day$.
- 4.2 The quantity the domestic wastewater (sewage) shall not exceed $8m^3/day$.

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4.3 TRADE EFFLUENT:

4.3.1 The applicant shall provide adequate effluent treatment system in order to achieve the quality of the treated effluent as per norms mentioned in column No.3.

1	2	3
Sr. No.	Parameters	VECL Inlet Norms
1.	pH	6.5 to 8.5
2.	Temperature	40° C
3.	Colour (pt.co.scale) in units	100 units
4.	Suspended Solids	100 mg/l
5.	Oil and Grease	10 mg/l
6.	Phenolic Compounds	1 mg/l
7.	Cyanides	0.2 mg/l
8.	Fluorides	1.5 mg/l
9.	Sulphides	2 mg/l
10.	Ammonical Nitrogen	50 mg/l
11.	Arsenic	0.2 mg/l
12.	Total Chromium	2.0 mg/l
13.	Hexavalent Chromium	0.1 mg/l
14.	Copper	3 mg/l
15.	Lead	0.1 mg/l
16.	Mercury	0.01 mg/l
17.	Nickle	3 mg/l
18.	Zinc	5 mg/l
19.	Cadmium	--
20.	BOD (5 days at 20°C)	100mg/l
21.	COD	250 mg/l
22.	Chlorides	600 mg/l
23.	Sulphates	1000 mg/l
24.	Total dissolved solids	5000 mg/l
25.	Free Ammonia	--
26.	Sodium absorption ratio	--
27.	Insecticides/Pesticides	Absent
28.	Bio-assay test	90 % Survival of fish after 96 hours in 100% effluent

• All efforts shall be made to remove color & unpleasant odor as far as possible.

4.3.2. The effluent shall be transferred by pumping to the final treated effluent sump of the ETP at existing Dyes & Dyes Intermediate manufacturing sister concern unit namely Bodal Chemicals Ltd. (Unit-7) situated at S. No.804, 805, 807 to 822, 824 to 839 & 849, Vill: Dudhwada, Tal: Padra, Dist: Vadodara through over head pipeline and from there the effluent conforming to the above standards shall be discharged into the ECP channel and shall be ultimately conveyed up to the estuary of river Mahi.

Outward No: 38296

GUJARAT POLLUTION CONTROL BOARD

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- 4.4 Sewage shall be disposed of through septic tank/soak pit system or sewage shall be treated along with industrial effluent or it shall be treated separately to conform to the following standards and shall be discharge into ECP system and shall ultimately be conveyed to estuary of river Mahi for final disposal.

Parameter	Permissible Limit
BOD (5days at 20°C)	Less than 20mg/l
Suspended Solids	Less than 30mg/l
Residual Chlorine	Minimum 0.5mg/l

5 CONDITIONS UNDER AIR ACT 1981:

- 5.1 The following shall be used as fuel in D. G. Set/waste heat recovery boiler.

Sr. No.	Fuel	Quantity
1.	Diesel	100lit/hour
2.	Waste Steam	---

- 5.2 The applicant shall install & operate air pollution control system in order to achieve norms prescribed herewith.

- 5.3 The flue gas emission through stack attached to D. G. Set shall conform to the following standards:

Sr. No.	Stack Attached To	Stack Height	APCM	Parameter	Permissible Limit
1.	D.G. Set (750KVA)	As per condition no. 5.10 (a)	Acoustic Measures	Particulate Matter SO ₂ NO _x	150 mg/NM ³ 100 ppm 50 ppm

- 5.4 The process gas emission through stack/vent attached to various reactors. process vessel shall conform to the following standards:

Stack No.	Stack Attached To	Stack Height	APCM	Parameter	Permissible Limit
1	Vent from final absorption tower in sulphuric acid plant	50 Meter	Alkali scrubber	SO ₂ Acid mist/ SO ₃	1.5kg/MT of 100% conc. Sulphuric acid production 50mg/NM ³
2	Vent of HCL scrubber in CSA plant	30 Meter	Two stage scrubber	HCL	20mg/NM ³
3	Oleum and CSA plant storage tank	11 Meter	H ₂ SO ₄ scrubber	Acid mist/ SO ₃	50mg/NM ³
4	HCL Scrubber	11 Meter	Water scrubber	HCL	20mg/NM ³
	CPT Scrubber- CSA plant	20 Meter	Chloro scrubber	HCL	20mg/NM ³

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[Handwritten Signature]

			followed by alkali scrubber		
6	Sulphuric acid storage tanks	11 Meter	Alkali scrubber	SO ₂ Acid mist/ So ₃	1.5kg/MT of 100% conc. Sulphuric acid production 50mg/NM ³
4	Catalytic convertor of SDC reactor for TC product (new)	15 Meter	Alkali scrubber	SO ₂	40mg/NM ³

- 5.5 Stack monitoring facilities like port hole, platform/ladder etc., shall be provided with stacks/vents /chimney in order to facilitate sampling of gases being emitted into the atmosphere.
- 5.6 The concentration of the following parameters in the ambient air within the premises of the industry and a distance of 10meters from the source) other than the stack/vent) shall not exceed the following levels.

Parameter	Permissible Limit Annual	Permissible Limit 24 Hrs. Average
Particulate matter- ₁₀ [PM10]	60Microgram /NM ³	100Microgram /NM ³
Particulate matter- _{2.5} [PM2.5]	40Microgram /NM ³	60Microgram /NM ³
Oxides of Sulphur	50Microgram /NM ³	80Microgram /NM ³
Oxides of Nitrogen	40Microgram /NM ³	80Microgram /NM ³
HCL	--	200Microgram /NM ³
Cl ₂	--	100Microgram /NM ³

- 5.7 The applicant shall provide portholes, ladder, platform etc at chimney(s) for monitoring the air emissions and the same shall be open for inspection to/and for use of Board's staff. The chimney(s) vents attached to various sources of emission shall be designed by numbers such as S-1, S-2, etc. and these shall be painted/ displayed to facilitate identification.
- 5.8 There shall no any fugitive emission and/or odour pollution due to manufacturing activities and ancillary operations. Adequate measures shall be taken thereof.
- 5.9 The Industry shall take adequate measures for control of noise levels from its own sources within the premises so as to maintain ambient air quality standards in respect of noise to less than 75 dB(A) during day time and 70 dB(A) during night time. Daytime is reckoned in between 6 a.m. and 10 p.m. and nighttime is reckoned between 10 p.m. and 6 a.m.
- 5.10 D. G. Set standards:- The flue gas emission through stack attached to D. G. Set shall conform to the following standards.
- a) The minimum height of stack to be provided with each of the generator set shall be $H=h + 0.2 (KVA)^{1/2}$, where H= Total stack height in meter, h=