

Mega Vaccination Drive

Realtime Monitoring of Bio-medical Waste

21-30 June 2021



Environment Surveillance Centre

M.P. Pollution Control Board Bhopal - 462016

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1. Preamble

The COVID-19 pandemic has shaken the people world over with dramatic loss of human life and unprecedented challenge to the living beings for their survival. This has also caused economic and social disruption across the world. Although the societal disruptions and economic shocks arising from COVID-19 control and mitigation measures have been severe, the Government is making all efforts to restore the normalcy as before.

Nearly six months after the first wave of Corona virus receded in September 2020, the cases of corona virus started rising again in Madhya Pradesh from the first week of March 2021 signalling the arrival of the second wave of the pandemic. During the first wave, the GoI imposed a nationwide lockdown on 25th March 2020 which resulted in controlled infection rate but the extent and the intensity of second wave, which appeared in late February 2021, was comparatively high. As experienced during the first wave, this time too it became inevitable to impose lockdown in the Madhya Pradesh State due to unexpectedly high cases seen in shorter time. Owing to this the lockdown was imposed in the State from mid April till the end of May 2021.

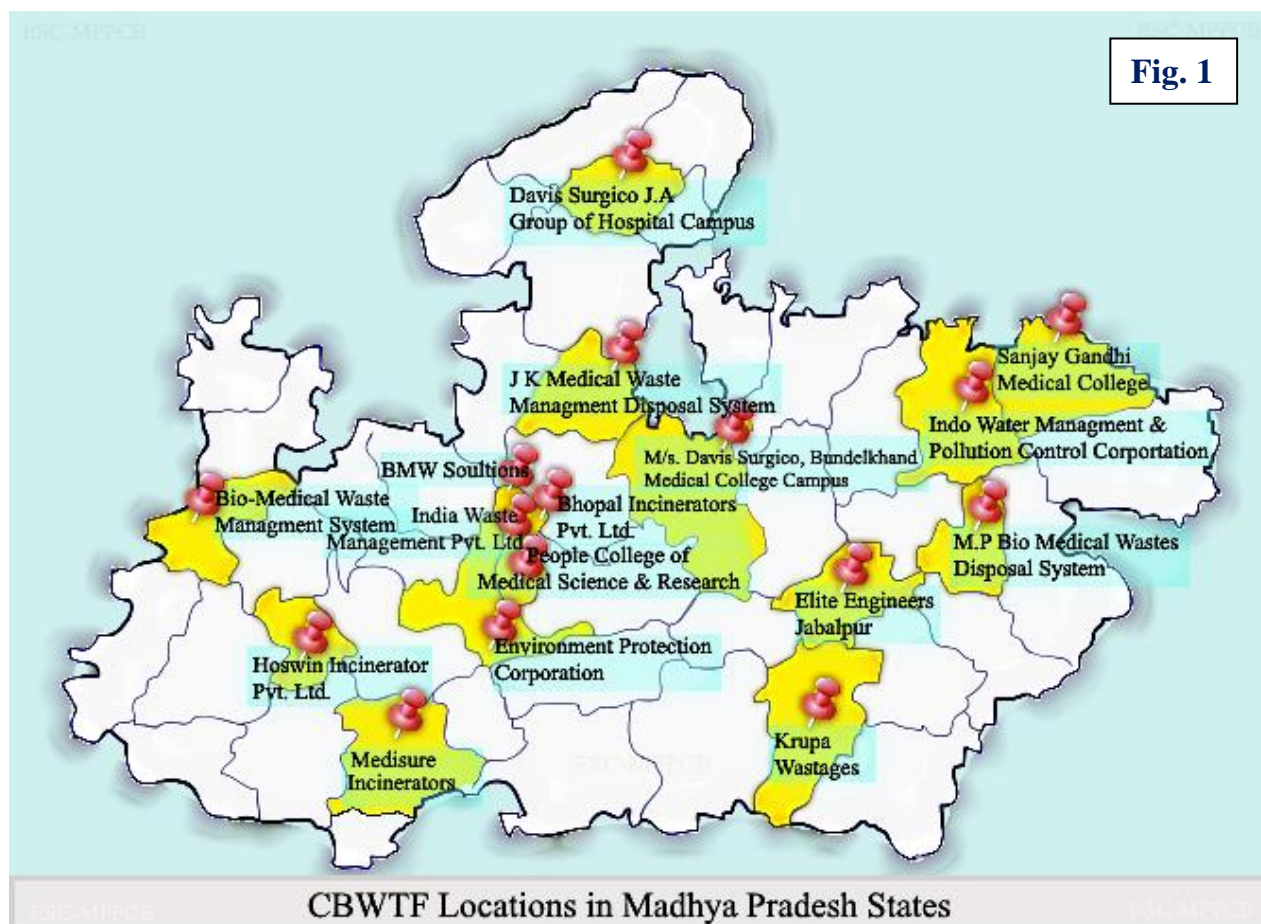
In order to ensure that the expected third wave of the Corona do not pose any impact on citizens of the State, the Madhya Pradesh Government planned a massive 10 days vaccination drive from International Yoga Day 21.06.2021 to 30.06.2021. This was as part of attempt to vaccinate more and more people ahead of the possible third wave of the coronavirus to immune and strengthen the people against the Corona virus and avoid the kind of havoc.

Under this special campaign of vaccination against Corona viruv-19, the Madhya Pradesh State took up mass inoculation at 7,000 plus centres with a target of 10-lakh vaccine doses per day. A total of 1158 Focal Points were established across the State in 51 districts to cater to the needs of 7000+ vaccination centres. The Focal Points were coordinated by 16 Regional offices of the M.P. Pollution Control Board (MPPCB). The maximum Focal points of 150 numbers were under Indore Regional office of MPPCB whereas the minimum 14 were under the Regional office of Katni.

The quantum of bio-medical waste during this mega drive was expected to go exponentially, though it included only sharps and infectious non-sharps wastes, viz. masks, head cover, disposable linen gown, leftover open vials, syringes, cotton, swabs etc. The adequate management of wates generated during immunisation activities is very important else it could pose negative health impacts on the community and the health workers. In addition to this, pollution caused due to inadequate treatment of this medical waste can cause indirect health effects in the community and severe impact on the environment.

The ESC team members, involved in the ‘mega vaccination drive’, included Shri. Pracheer Dixit, Shri Rakesh Goutam, Shri Dheeraj Wadukle, Shri Abhishek Bhasker and Shri Sukant Choukikar. The study was performed under the supervision of Shri V.K. Ahirwar Director (Environment) and Dr. Rajendra Chaturvedi, Scientist, Environment Surveillance Centre, MPPCB. This report, published in July 2021, gives

an essence of the entire activities performed during the mega vaccination drive but does not contain micro level details. However, the relevant details, not covered in this report, can be accessed on the links mentioned in the report.



2. Central Presence of MPPCB :

Looking to the large numbers of vaccination centres during mega drive, proper collection and safe disposal of biomedical waste by respective common bio-medical waste treatment facilities, preferably on the same day, was a challenging job. This was, however, done in line with the Bio-medical Wastes (Management & Handling) Rules 1998 and subsequent guidelines issued by the Central Pollution Control Board during Covid pandemic episode. The MPPCB created a Central Control Room too at Headquarter Bhopal, headed by Shri P.K. Trivedi, Director Environment, to effectively manage the issues pertaining proper and scientific disposal of bio-medical wastes generated during the 'Mega Vaccination Drive' in the State. The 1158 Focal Points, catering to 7000+ vaccination centres in the State, were coordinated by 16 Regional offices of the MPPCB. The maximum Focal points of 150 numbers were under Indore Regional office of MPPCB whereas the minimum 14 were under the Regional office of Katni.

The Environment Surveillance Centre (ESC), MPPCB kept a constant watch on the proper and timely transportation of Bio-medical wastes (BMW) from the vaccination centres, apart from the health care facilities (HCFs), which are already under special watch since the first wave of Corona-virus in March 2020. A total number of 17 CBWTFs in the State are engaged in management of BMW, including Covid waste. A total number of 93 vehicles were deployed by the CBWTFs to collect the waste from the generation point and transport the same to disposal facility. A regular online real-time tracking of all such vehicles was carried out during the 'mega vaccination drive'.
Tab. 1-5.

Tab.1 - Common Bio-medical Waste Treatment & Disposal Facilities in M. P.			
S.No.	Name of Facility	District	Coordinates
01	M/s. Bhopal Incinerators Pvt. Ltd.	Bhopal	23°16'06.5"N 77°27'05.4"E
02	M/s. Bio-Medical Waste Management System	Ratlam	23°22'28.5"N 75°01'49.1"E
03	M/s. BMW Solutions	Bhopal	23°27'34.3"N 77°24'10.4"E
04	M/s. Elite Engineers	Jabalpur	23°12'42.3"N 79°54'51.7"E
05	M/s. Environment Protection Corporation	Sehore	23°11'05.7"N 77°05'02.3"E
06	M/s. Hoswin Incinerator Pvt. Ltd.	Indore	22°46'43.7"N 75°51'06.0"E
07	M/s. Indo Water Management & Pollution Control Corporation	Satna	24°30'49.9"N 80°51'29.9"E
08	M/s. J K Medical Waste Management Disposal System	Ashoknagar	24°49'26.8"N 78°08'03.7"E
09	M/s. Krupa Wastages	Seoni	22°04'00.5"N 79°40'00.5"E
10	M/s. M.P. Bio-medical Wastes Disposal System	Umaria	23°21'40.5"N 81°19'03.2"E
11	M/s. India Waste Management Pvt. Ltd., Mandideep	Raisen	23°04'48.3"N 77°32'21.2"E
12	M/s. Davis Surgico	Gwalior	26°03'49.3"N 78°13'35.6"E
13	M/s. Medisure Incinerators	Khandwa	21°49'25.9"N 76°08'42.5"E
14	M/s. Davis Surgico	Sagar	23°50'39.6"N 78°40'25.5"E

Tab.2 - Captive Bio-medical Waste Treatment & Disposal Facilities in M. P.			
S.No.	Name of Facility	District	Coordinates
01	M/s. People's College of Medical Sciences & Research Centre	Bhopal	23°17'47.5"N 77°25'18.4"E
02	M/s. Sanjay Gandhi Medical College	Rewa	-

Tab.3 - Authorized Facilities for Collection & Transportation of BMW to other States			
S.No.	Name of Facility	District	Coordinates
1	M/s. JRR Waste Management Pvt. Ltd.	Agra (U.P.)	27°13'44.5"N 78°10'42.3"E

Tab.4 - Districts being facilitated by each CBWTF in the State.			
S.No.	Name of CBWTF	No. of Districts	Name of Districts
01	M/s. BMW Solutions, Berasia, Dist. Bhopal (M.P.)	1	Bhopal
02	M/s. Bio medical Wastes Management System, Dist. Ratlam (M.P.)	3	Ratlam, Mandsaur, Neemuch
03	M/s. Elite Engineers, Dist. Jabalpur (M.P.)	3	Jabalpur, Katni, Narsinghpur
04	M/s. Environment Protection Corporation, Dist. Sehore (M.P.)	6	Sehore, Betul, Harda, Hoshangabad, Vidisha, Bhopal
05	M/s. Hoswin Incinerators Pvt. Limited, Dist. Indore (M.P.)	9	Indore, Badwani, Dhar, Ujjain, Dewas, Shajapur, Jhabua, Alirajpur, Agar Malwa
06	M/s. Indo water Management & Pollution Control Corpn., Dist. Satna (M.P.)	7	Satna, Panna, Chhatarpur, Damoh, Rewa, Sidhi, Singrauli
07	M/s. India Waste Management Pvt. Ltd., Mandideep (M.P.)	2	Bhopal, Raisen
08	M/s. J.K. Medical waste Management System, Dist. Ashoknagar (M.P.)	6	Ashoknagar, Guna, Shivpuri, Rajgarh, Tikamgarh, Niwari
09	M/s. Davis Surgico, J.A.Group of Hospital Campus, Gwalior (M.P.)	3	Gwalior, Datia, Sheopur
10	M/s. Krupa Wastages, Dist. Seoni (M.P.)	5	Seoni, Mandla, Balaghat, Chhindwara, Dindori
11	M/s. M.P. Biomedical Wastes Disposal System, Dist. Umaria (M.P.)	3	Shahdol, Anuppur, Umaria,
12	M/s. People's College of Medical Sciences & Research Centre, Bhopal (M.P.)	1	Bhopal

13	M/s. Bhopal incinerator Pvt. Ltd., Dist. Bhopal (M.P.)	1	Bhopal
14	M/s. Medisure Incinerators, Khandwa (M.P.)	3	Khandwa, Khargone, Burhanpur
15	M/s. Davis Surgico, Bundelkhand Medical College, Sagar (M.P.)	2	Sagar, Damoh
16	M/s. Sanjay Gandhi Medical College, Rewa (M.P.)	1	Rewa
17	M/s. JRR Waste Management Pvt. Limited, Dist. Agra (U.P.)	2	Morena, Bhind

Tab.5 - Vehicles Deployed by CBWTFs for BMW Management

S.no.	Name of Facility	Total Vehicle	Vehicles
1	M/s. Bhopal Incinerators Pvt. Ltd., Bhopal (M.P.)	9	MP04GD4616
			MP04LC8287
			MP04LC8945
			MP04LD3531
			MP04LC8944
			MP04LD0736
			MP04LC8288
			MP04LC8289
			MP04LD3611
2	M/s. Bio-Medical Waste Management System, Ratlam (M.P.)	5	MP43G2988
			MP43G3596
			MP43G4210
			MP43G4369
			MP43L1901
3	M/s. BMW Solutions, Bhopal (M.P.)	2	MP04GB3759
			MP04LD4571
4	M/s. Elite Engineers, Jabalpur (M.P.)	9	MP20GB0487
			MP20LA5134
			MP20LA5576
			MP20LA7292
			MP20LB1714
			MP20MB4357
			MP20GB0578
			MP20LB0633
			MP20GB1370
5	M/s. Environment Protection Corporation, Sehore (M.P.)	9	MP05LA0636
			MP04LC9886
			MP04GA5957
			MP04GA7672

			MP04LC7757
			MP48LC1729
			MP04GA0729
			MP04LC1305
			MP04GB4220
6	M/s. Hoswin Incinerator Pvt. Ltd., Indore (M.P.)	14	MP45G1381
			MP09GH2147
			MP09GH4968
			MP09GH1107
			MP09GG5670
			MP09GG0720
			MP09GG8523
			MP09GG0810
			MP09GH4923
			MP09GG6489
			MP09GH1062
			MP09GH1098
			MP09GG8370
			MP09GG8532
7	M/s. Indo Water Management & Pollution Control Corporation, Satna (M.P.)	12	Singroli Baidhan
			Sadik REWA 1160
			RIWA DIST CHOTU
			Damoh cite Suresh
			MP17B3206छोट्टु मैहर Hanumna
			SATNA CITY 0638
			Damoh Suresh
			Chhatarpur-santosh
			Sadik- sidhi, Jahir-chitra.
			Jahir-Chitrakoot, Jahir- Chhatarpur
			INDO CBWTF
			Sidhi-Singroli
8	M/s. J K Medical Waste Management Disposal System, Chanderi, Dist. Ashoknagar (M.P.)	6	MP67G0615
			MP67G0705
			MP67G1038
			MP04GB1982
			MP67G0752
			MP04GB4118
9	M/s. Krupa Wastages, Seoni (M.P.)	5	MP22G3741
			MP22G3924
			MP22G3984
			MH35K3348

			MH35K1449
10	M/s. M.P. Bio-medical Wastes Disposal System, Umaria (M.P.)	6	MP18L0853
			MP18L1084
			MP18L1085
			MP18L0559
			MP18L1347
			MP18L1348
11	M/s. People's College of Medical Sciences & Research Centre, Bhopal (M.P.)	1	WETRACK2-71487
12	M/s. Davis Surgico, J.A.Group of Hospital Campus, Gwalior (M.P.)	7	MP30G1351
			MP07L2246
			MP07L5588
			MP07L5589
			MP07L5591
			MP07L5592
			MP07L5593
13	M/s. Davis Surgico, Bundelkhand Medical College Campus, Tili road, Sagar (M.P.)	3	MP15G4152
			MP15G3641
			MP15LA1039
14	M/s. Medisure Incinerators, Khandwa (M.P.)	3	MP09 LQ 8643
			MP41 GA 3174
			MP09 LQ 9551
15	M/s. JRR Waste Management Pvt. Ltd., Agra (U.P.)	2	UP83BT8883
			MP30G0765
Total Vehicles Deployed »		93	

3. Monitoring Mechanism During Mega Vaccination Drive :

The crisis of pandemic during the second wave was prominent in the Madhya Pradesh State. This situation raised alarm due to probable multifold increase in the Covid-19 affected cases and an unexpected volume of bio-medical waste generation from the health care centres. The Government took all possible measures to content the crisis and started a giant move to vaccinate the people to make them immune and resistant as part of preventive measure against the deadly virus. The Mega Vaccination Drive was a part of that movement to sensitize people for a better cause. A total of 7000+ vaccination centres were established in the State to meet the goal. The generation of bio-medical wastes was eminent from these vaccination centres, besides routine daily waste generation from the medical establishments. A timely handling and proper

disposal was the priority to avoid any secondary contagion to the people. This led to the immediate requirement to ensure that the wastes generated from these ‘vaccination centres’ and other health care facilities needs to be collected properly and transported to the disposal site in time. In order to address the issue, an effective online mechanism, including tracking of vehicles of CBWTFs on real-time basis, was planned by the Environment Surveillance Centre, MPPCB.

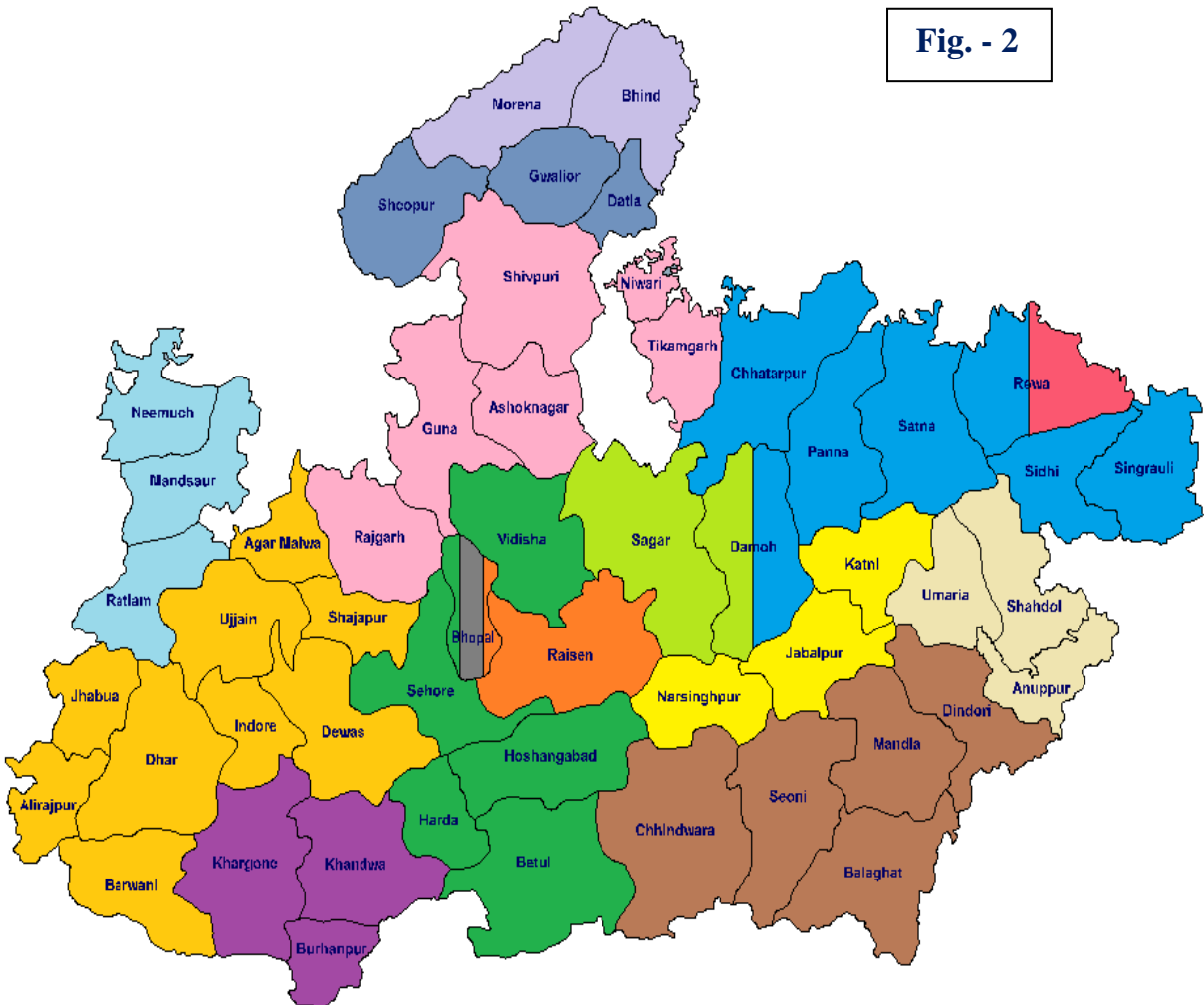
Each of the CBWTFs has a defined area under its jurisdiction, based on the MoU signed between HCFs and the Service provider. The route under jurisdiction area of all the CBWTFs has been geofenced by the E.S.C. for surveillance purpose. The jurisdiction details are shown in the Fig. 2.

The vehicles deployed by the CBWTFs for the collection and transportation of waste have Global Positioning System (GPS) facility for satellite navigation and the same was used for tracking actual ground position of vehicles. A total of 17 CBWTFs deployed 93 vehicles for collection and transportation of wastes from Vaccination Centres and HCFs to the disposal facilities. The number of vehicles deployed by each CBWTF varied on each day depending on the quantum of waste. A concise report on movement of each CBWTF’s vehicles is shown in table 7-a to 7-i. The tracking report of each vehicles is also shown in the subsequent web-links. The route travelled by each waste collection vehicle has been geo-fenced and the sample route of vehicles is depicted in Fig. 5-a to 5-i. A comprehensive vehicle-wise and day-wise report is shown in the subsequent web-links.

Fig. - 2

**Environment Surveillance Centre, MPPCB
(Jurisdiction of CBWTF)**

- M/s. India Waste Management Pvt. Ltd., Raisen
- M/s. Bio-Medical Waste Management System, Ratlam
- M/s. BMW Solutions, Bhopal
- M/s. Elite Engineers, Jabalpur
- M/s. Environmental Protection Corporation, Sehore
- M/s. Hoswin Incinerator Pvt. Ltd., Indore
- M/s. Indo Water Management & Pollution Control Corporation, Satna
- M/s. JK Medical Waste Management System, Ashok Nagar
- M/s. Krupa Wastages, Seoni
- M/s. M.P. Bio-Medical Waste Disposal System, Umaria
- M/s. Medisure Incinerators, Khandwa (M.P.)
- M/s. Davis Surgico, J.A.Group of Hospital Campus, Gwalior
- M/s. Davis Surgico, Bundelkhand Medical College, Sagar
- M/s. Bhopal Incinerator Ltd., Bhopal
- M/s. JRR Waste Management Pvt. Ltd., Agra (U.P.)
- M/s. People's College of Medical Science & Research Centre, Bhopal
- M/s. Sanjay Gandhi Medical College, Rewa (M.P.)



**Tab. 6 - Performance Status of CBWTFs during Mega Vaccination Drive
(21.06.2021 to 30.06.2021)**

Sr. No.	CBWTF	HCFs Counts Covered	No of Vehicles Deployed	Operation hours (HH:MM)	Violation of Primary stage Temp (%)	Violation of Secondary stage Temp (%)	Data Availability (%)
1	M/s. BMW Solutions, Bhopal	496	30	13:15	55.30%	55.70%	06.13%
2	M/s. Elite Engineers, Jabalpur	991	67	67:45	74.10%	94.40%	31.36%
3	M/s. Environmental Protection Corporation, Sehore	676	70	53:00	30.60%	31.90%	23.54%
4	M/s. Hoswin Incinerator Pvt. Ltd., Indore	1421	77	215:45	0.00%	0.00%	89.89%
5	M/s. India Waste Management Pvt. Ltd., Raisen	-	-	99:15	20.10%	22.30%	45.95%
6	M/s. JK Medical Waste Management System, Ashok Nagar	-	-	52:30	02.90%	09.80%	21.87%
7	M/s. Davis Surgico, J.A.Group of Hospital Campus, Gwalior	1824	72	21:30	99.00%	100.00%	08.95%
8	M/s. Krupa Wastages, Seoni	-	-	45:00	0.00%	0.00%	18.75%
9	M/s. People's College of Medical Science & Research Centre, Bhopal	-	-	25:45	32.30%	100.00%	20.96%
10	M/s. Medisure Incinerators, Khandwa	471	29	21:30	00.00%	20.20%	17.71%
11	M/s. Bhopal Incinerator Ltd. , Bhopal	1473	57	-	-	-	-
12	M/s. M.P. Bio-Medical Waste Disposal System, Umaria	381	50	-	-	-	-
13	M/s. Davis Surgico, Bundelkhand Medical College, Sagar	88	20	-	-	-	-

Fig. 3 - HCFs attended by CBWTF Vehicles during Mega Vaccination Drive

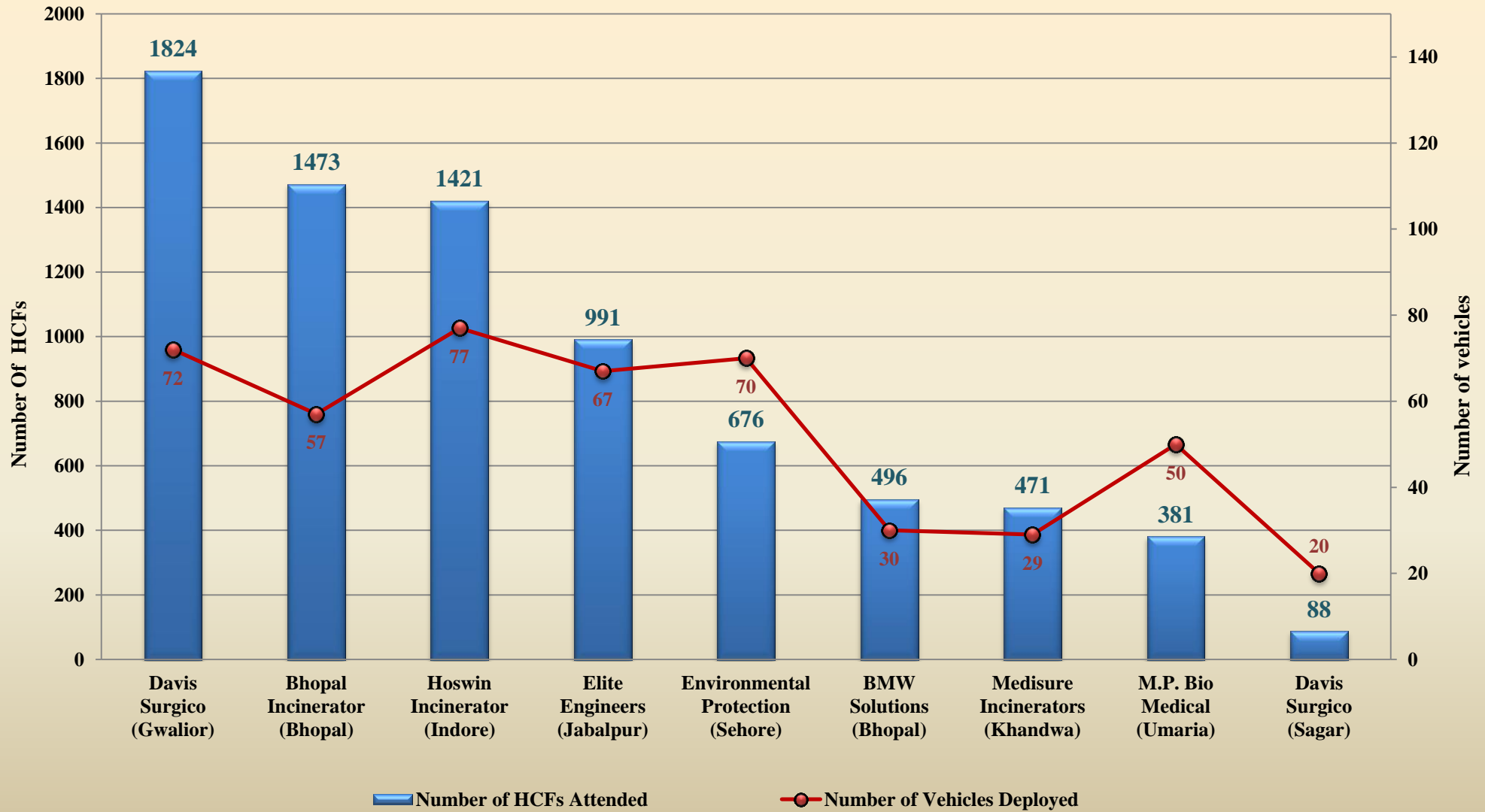
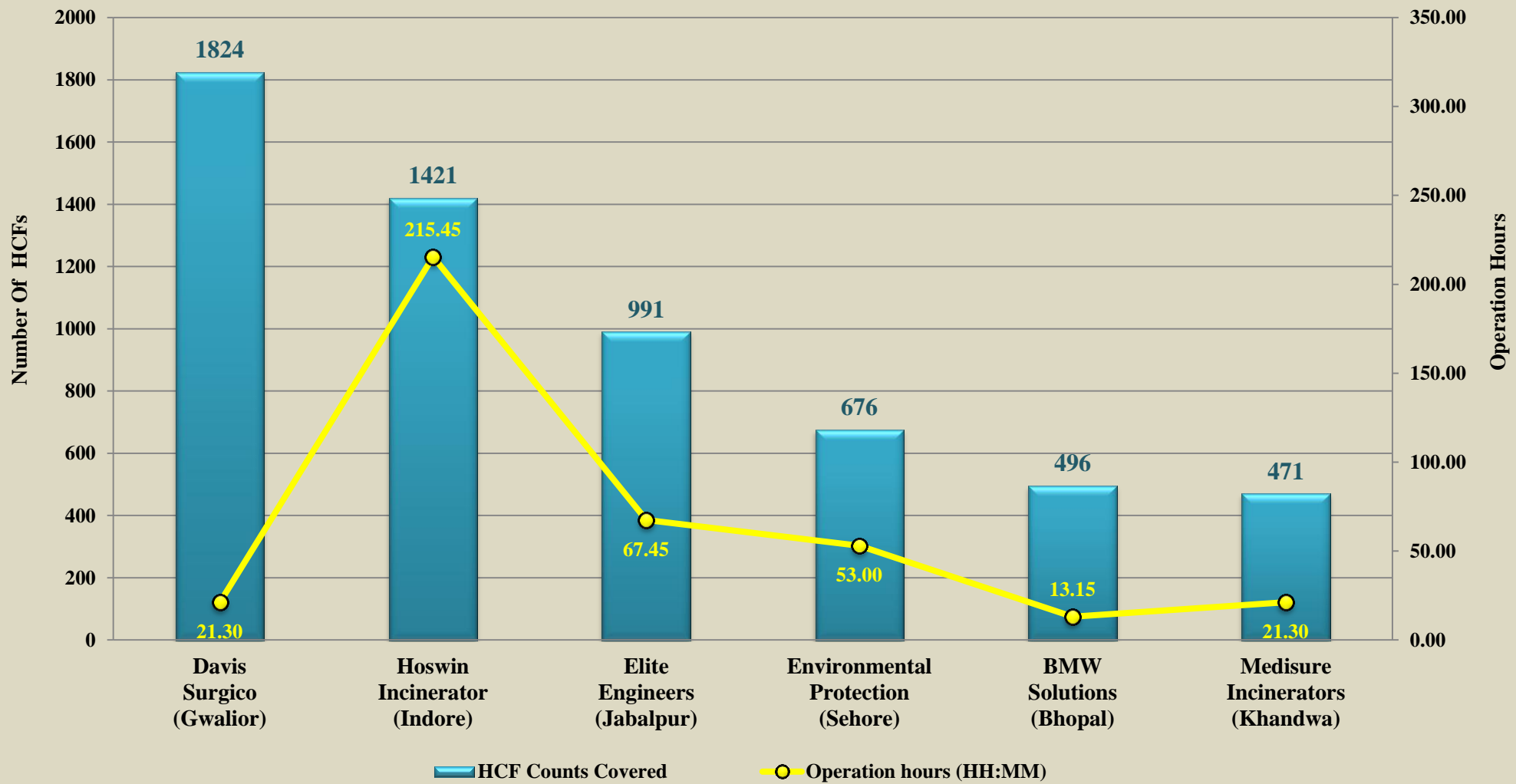


Fig. 4 - Operation Hours of Incinerator & Number of HCFs Visited during Mega Vaccination Drive



4. Monitoring of Movement of CBWTF Vehicles

The movement of all the 93 vehicles on daily basis during 10 days mega vaccination drive was on the MPPCB's scanner. A concise report is tabulated below, 7-a to 7-i. A comprehensive report on the same, stating details of each location visited by the vehicles, duration of movement and halt of each vehicle, info about stoppage of vehicles at unknown or unidentified locations etc. can be referred on the subsequent web-links shown on the last page of this report.

Environment Surveillance Centre, MPPCB, Bhopal (M.P.)

Cumulative Information on CBWTF Vehicles Movement

(Total CBWTF 17 & Total Vehicles 93)

Tab. 7-a : M/s. Bhopal Incinerators Pvt. Ltd., Bhopal (M.P.)

Date »	Number of HCFs visited	No of Vehicle Deployed	No. of visits to own CBWTF	No. of Visits to Petrol Pump	No. of Halts at Unknown Location
21-06-2021	155	6	17	2	27
22-06-2021	178	6	22	6	37
23-06-2021	142	6	22	1	26
24-06-2021	188	6	20	7	28
25-06-2021	186	7	21	2	46
26-06-2021	204	7	21	10	30
27-06-2021	13	1	5	0	7
28-06-2021	192	7	25	1	40
29-06-2021	150	7	21	4	38
30-06-2021	65	4	10	1	25

Tab. 7-b : M/s. Elite Engineers, Jabalpur (M.P.)

Date	Number of HCFs visited	No of Vehicle Deployed	No. of visits to own CBWTF	No. of Visits to Petrol Pump	No. of Halts at Unknown Location
21-06-2021	129	7	9	8	46
22-06-2021	73	7	11	10	90
23-06-2021	92	7	7	7	50
24-06-2021	126	7	10	0	51
25-06-2021	103	7	10	7	66
26-06-2021	106	7	10	8	74
27-06-2021	18	2	0	0	2
28-06-2021	107	7	11	3	60
29-06-2021	120	8	9	3	70
30-06-2021	117	8	7	2	55

Tab. 7-c : M/s. Hoswin Incinerators Pvt. Ltd., Indore (M.P.)

Date »	Number of HCFs visited	No of Vehicle Deployed	No. of visits to own CBWTF	No. of Visits to Petrol Pump	No. of Halts at Unknown Location
21-06-2021	149	8	29	4	63
22-06-2021	141	7	25	8	63
23-06-2021	152	8	87	12	77
24-06-2021	150	8	45	7	54
25-06-2021	160	8	45	9	65
26-06-2021	168	8	57	5	53
27-06-2021	61	6	23	6	28
28-06-2021	161	8	41	2	48
29-06-2021	162	8	36	6	34
30-06-2021	117	8	34	8	32

Tab. 7-d : M/s. Medisure Incinerators, Khandwa (M.P.)

Date	Number of HCFs visited	No of Vehicle Deployed	No. of visits to own CBWTF	No. of Visits to Petrol Pump	No. of Halts at Unknown Location
21-06-2021	45	3	10	5	22
22-06-2021	28	3	1	8	15
23-06-2021	18	3	1	5	15
24-06-2021	75	3	12	12	32
25-06-2021	38	3	7	4	26
26-06-2021	58	2	8	4	12
27-06-2021	37	3	10	4	21
28-06-2021	64	3	6	7	16
29-06-2021	51	3	9	3	19
30-06-2021	57	3	9	6	17

Tab. 7-e : M/s. BMW Solutions, Bhopal (M.P.)

Date	Number of HCFs visited	No of Vehicle Deployed	No. of visits to own CBWTF	No. of Visits to Petrol Pump	No. of Halts at Unknown Location
21-06-2021	59	3	5	0	6
22-06-2021	50	3	9	0	10
23-06-2021	56	3	5	0	6
24-06-2021	52	3	4	0	2
25-06-2021	58	3	3	0	7
26-06-2021	50	3	10	0	7
27-06-2021	3	3	0	0	0
28-06-2021	47	3	3	0	6

29-06-2021	52	3	5	0	8
30-06-2021	59	3	7	0	7

Tab. 7-f : M/s. Davis Surgico, Sagar (M.P.)

Date	Number of HCFs visited	No of Vehicle Deployed	No. of visits to own CBWTF	No. of Visits to Petrol Pump	No. of Halts at Unknown Location
21-06-2021	10	2	1	1	1
22-06-2021	19	2	3	2	7
23-06-2021	20	2	2	1	3
24-06-2021	19	2	3	2	4
25-06-2021	20	2	1	0	4
26-06-2021	0	2	0	0	8
27-06-2021	0	2	0	0	0
28-06-2021	0	2	0	0	9
29-06-2021	0	2	0	0	6
30-06-2021	0	2	0	0	4

Tab. 7-g : M/s. Davis Surgico, Gwalior (M.P.)

Date	Number of HCFs visited	No of Vehicle Deployed	No. of visits to own CBWTF	No. of Visits to Petrol Pump	No. of Halts at Unknown Location
21-06-2021	173	7	15	2	43
22-06-2021	192	8	19	2	32
23-06-2021	183	8	15	0	35
24-06-2021	160	7	16	0	30
25-06-2021	189	7	20	0	48
26-06-2021	152	7	16	0	21
27-06-2021	158	7	16	0	32
28-06-2021	210	7	18	0	29
29-06-2021	210	7	19	0	27
30-06-2021	197	7	21	0	20

Tab. 7-h : M/s. Environment Protection Corporation, Sehore (M.P.)

Date »	Number of HCFs visited	No of Vehicle Deployed	No. of visits to own CBWTF	No. of Visits to Petrol Pump	No. of Halts at Unknown Location
21-06-2021	60	7	2	1	24
22-06-2021	73	7	2	1	26
23-06-2021	88	7	2	3	29
24-06-2021	85	7	5	0	17
25-06-2021	66	7	2	0	16
26-06-2021	64	7	3	0	19
27-06-2021	47	7	2	0	4

28-06-2021	48	7	3	2	20
29-06-2021	70	7	2	0	21
30-06-2021	75	7	2	1	20

Tab. 7-i : M/s. M.P. Bio-medical Wastes Disposal System, Umaria (M.P.)

Date	Number of HCFs visited	No of Vehicle Deployed	No. of visits to own CBWTF	No. of Visits to Petrol Pump	No. of Halts at Unknown Location
21-06-2021	39	5	18	7	36
22-06-2021	44	5	1	3	48
23-06-2021	63	5	24	4	33
24-06-2021	41	5	3	4	43
25-06-2021	41	5	3	11	43
26-06-2021	47	5	15	3	24
27-06-2021	28	5	1	8	30
28-06-2021	25	5	7	1	36
29-06-2021	30	5	7	4	38
30-06-2021	23	5	2	3	20

5. Geo-fenced Route Maps of CBWTF Vehicles

The routes travelled by each vehicle for collection of bio-medical wastes have been geo-fenced for the real-time monitoring purpose. Few of the routes of vehicles are depicted below, Fig. 5-a to 5-i. A comprehensive vehicle-wise and day-wise report is shown in the subsequent web-links shown on the last page of this report.

Environment Surveillance Centre, MPPCB, Bhopal (M.P.) Geo-fenced Route Map of CBWTF Vehicles

Fig. 5-a : M/s. Bhopal incinerator Pvt. Ltd., Bhopal

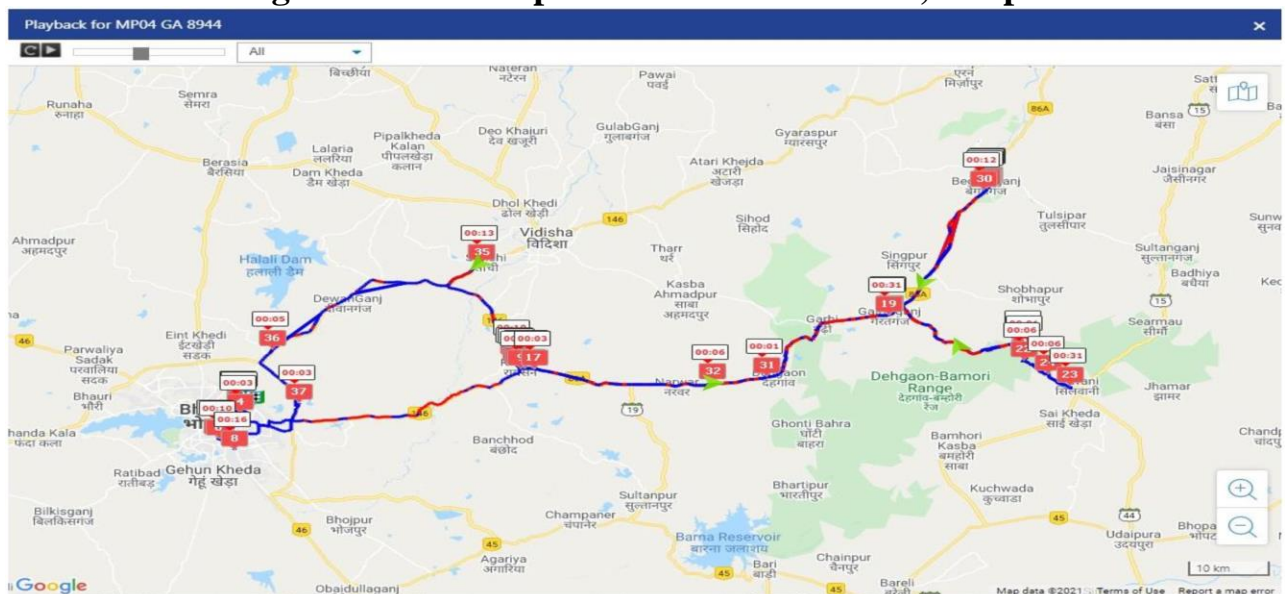


Fig. 5-b : M/s. BMW Solutions, Berasia, Dist. Bhopal (M.P.)

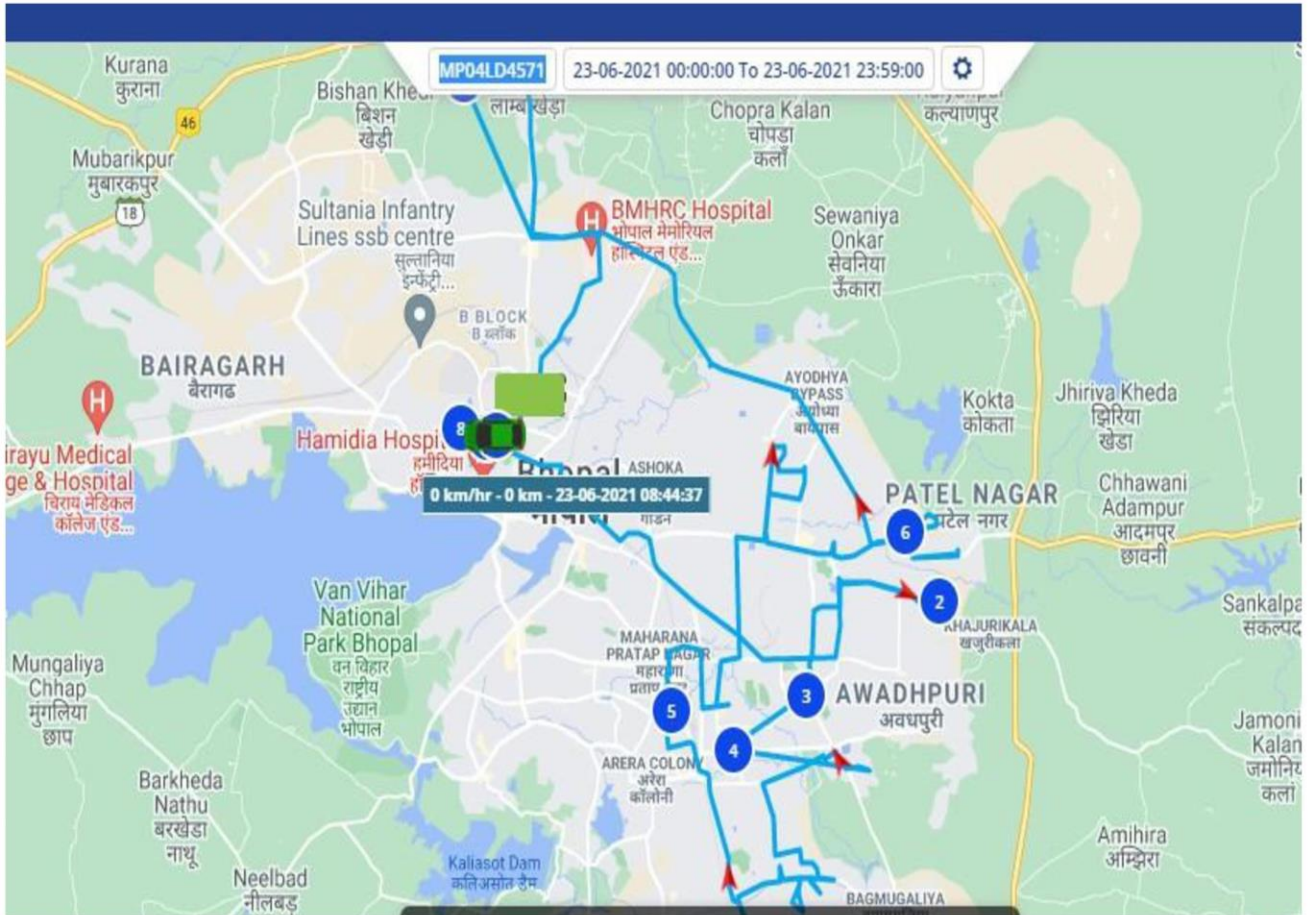


Fig. 5-c : M/s. Davis Surgico, J.A.Group of Hospital Campus, Gwalior (M.P.)

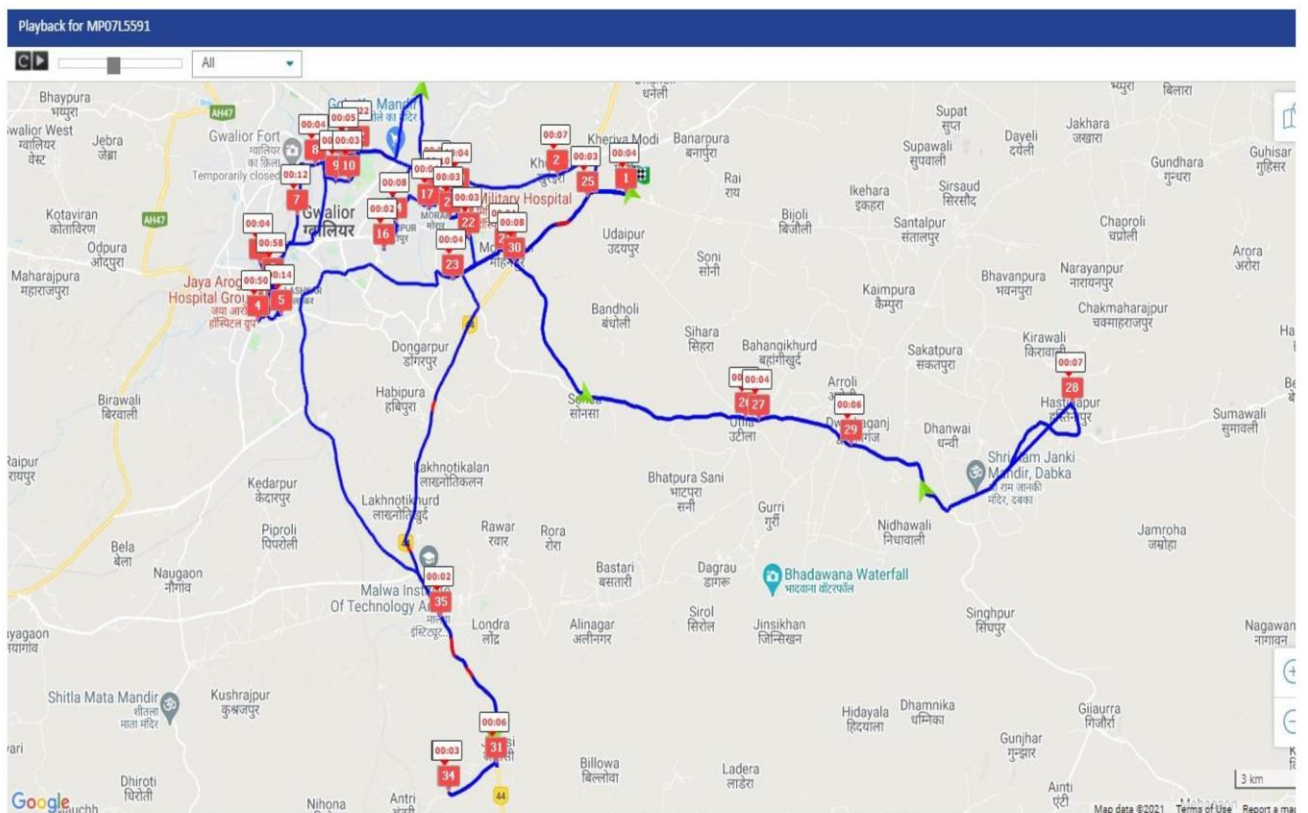


Fig. 5-d : M/s. Davis Surgico, Bundelkhand Medical College, Sagar (M.P.)

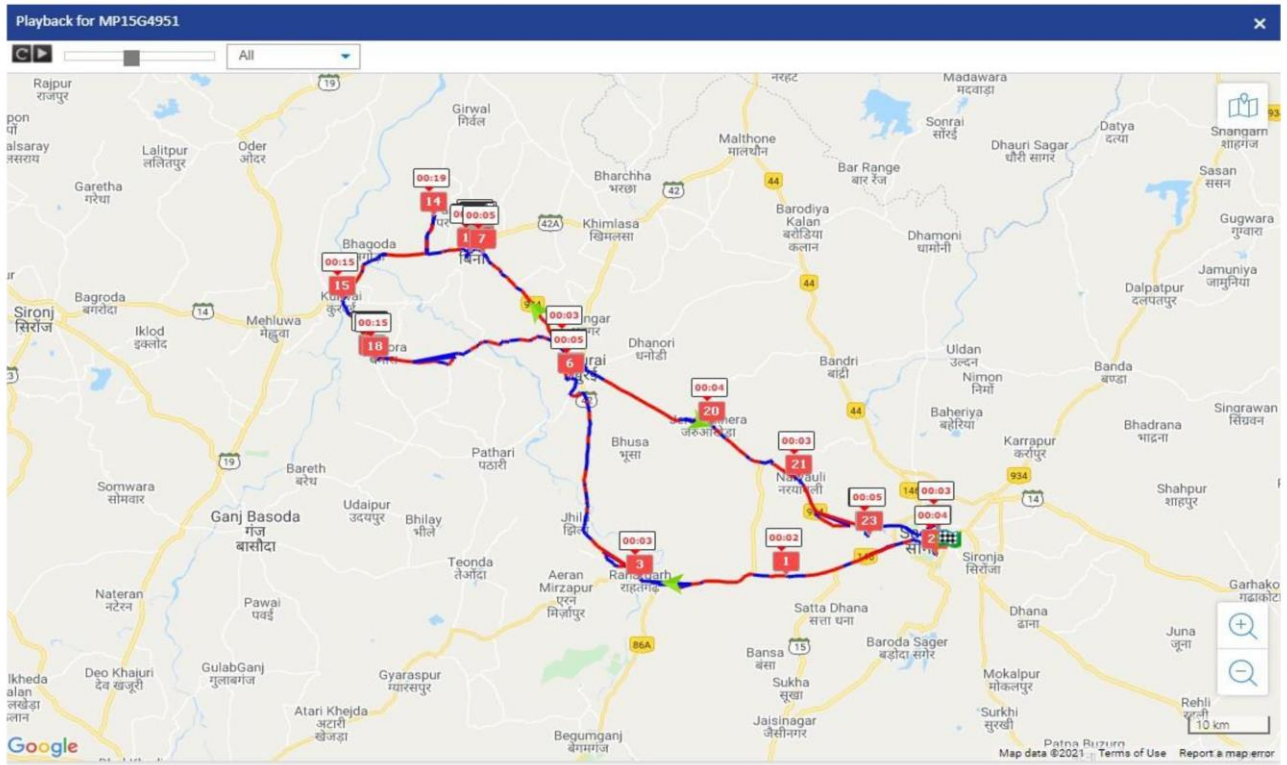


Fig. 5-e : M/s. Elite Engineers, Dist. Jabalpur (M.P.)

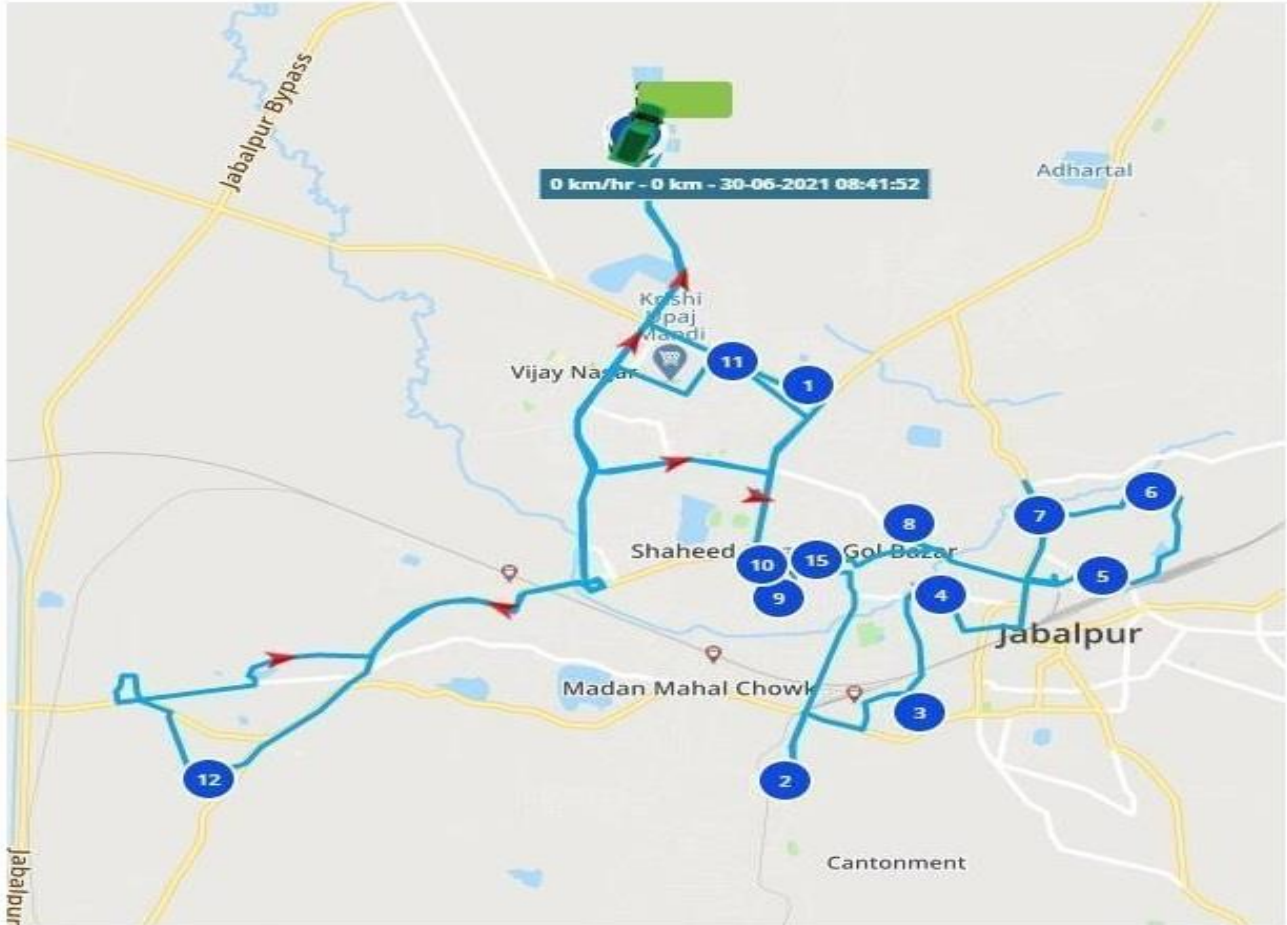


Fig. 5-f : M/s. Environment Protection Corporation, Dist. Sehore (M.P.)

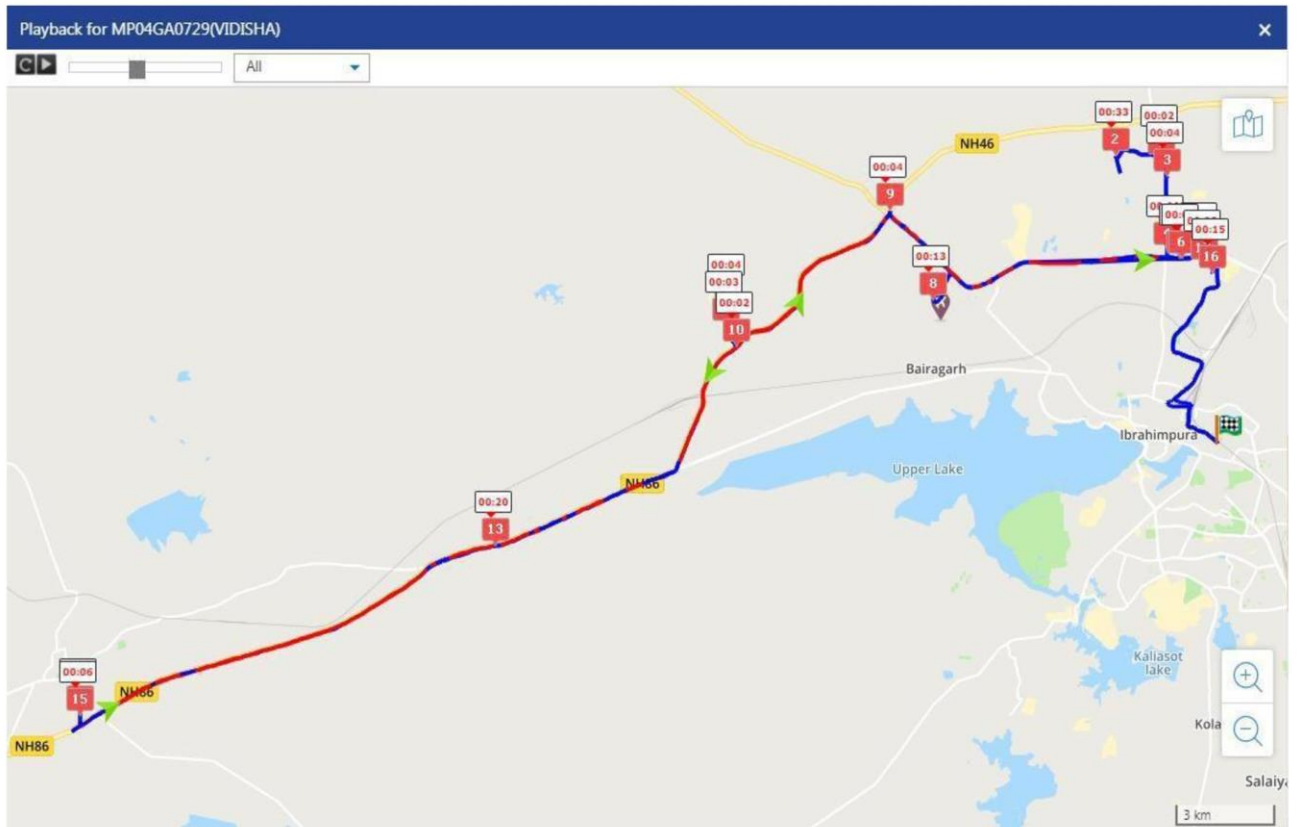


Fig. 5-g : M/s. Hoswin Incinerators Pvt. Limited, Dist. Indore (M.P.)

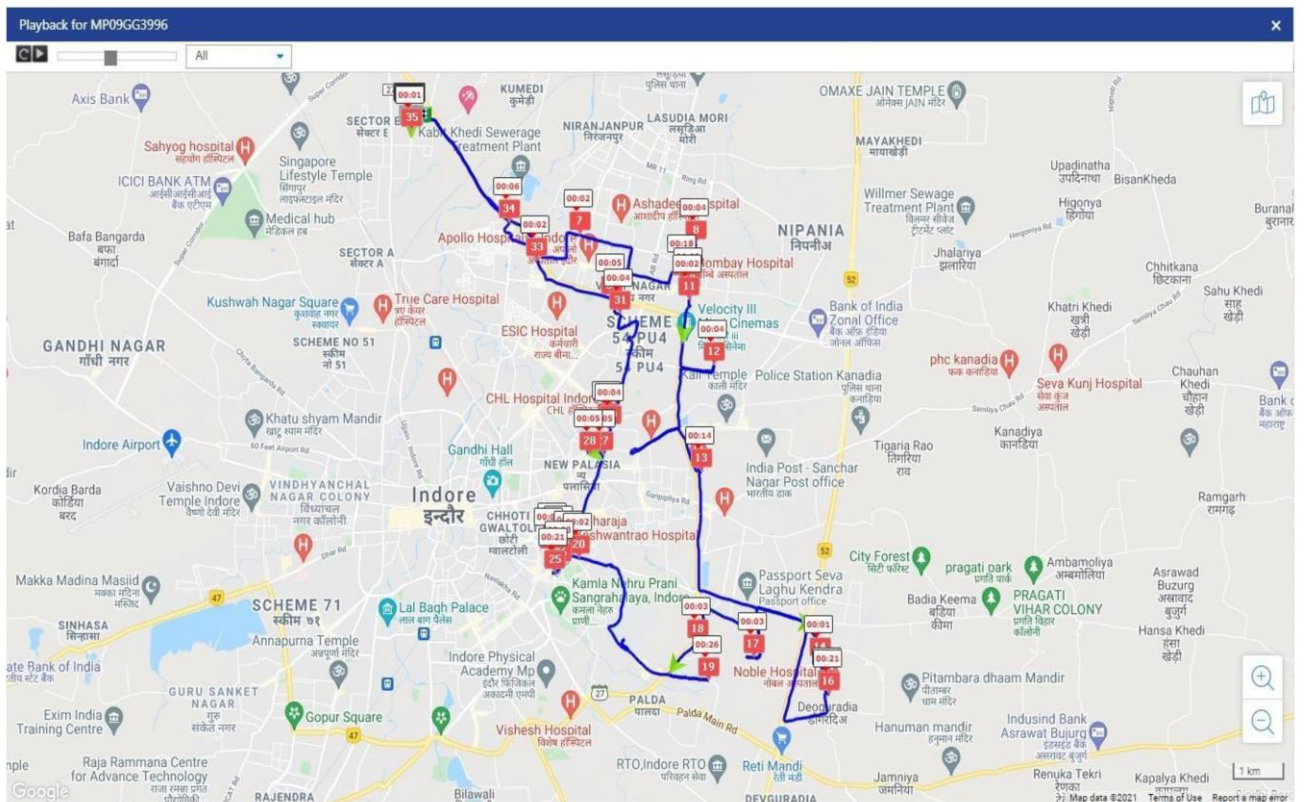


Fig. 5-h : M/s. M.P. Biomedical Wastes Disposal System, Dist. Umaria (M.P.)

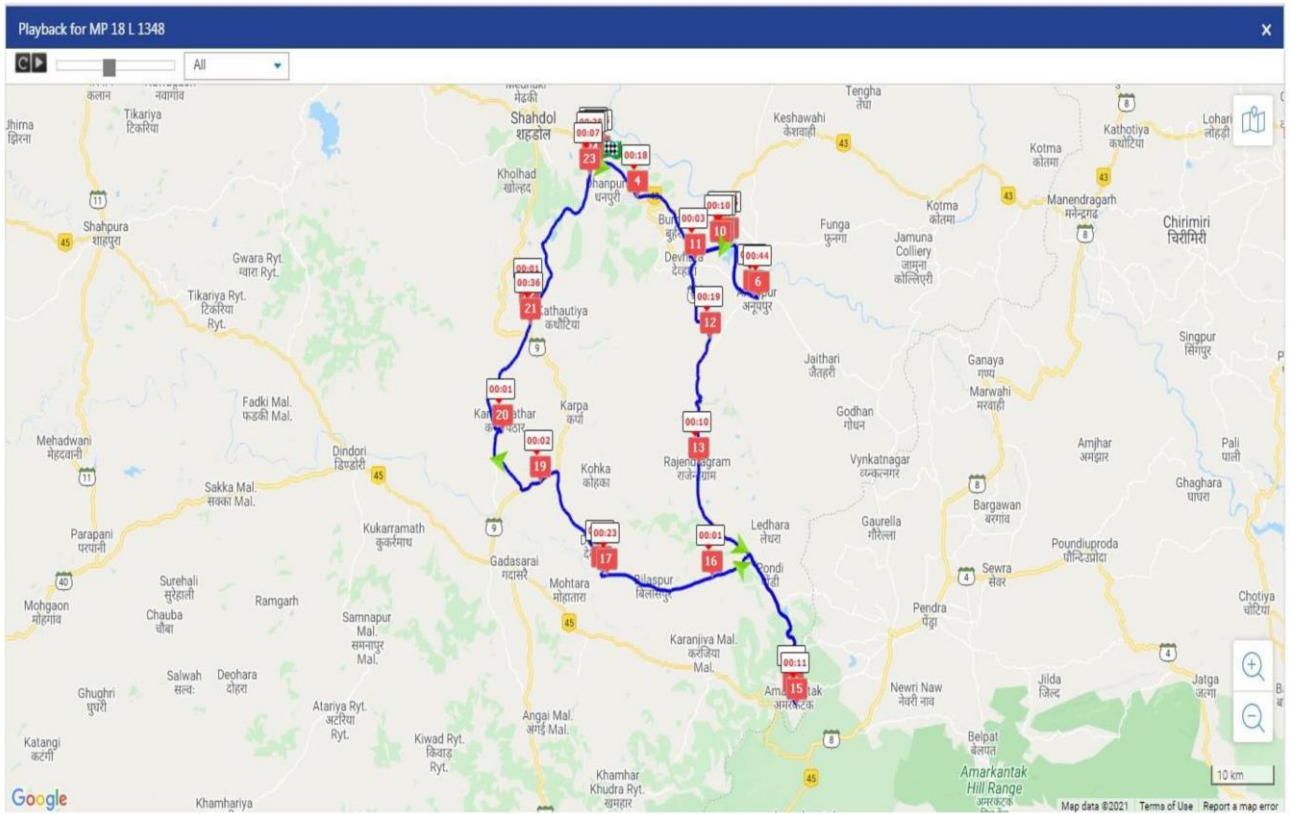
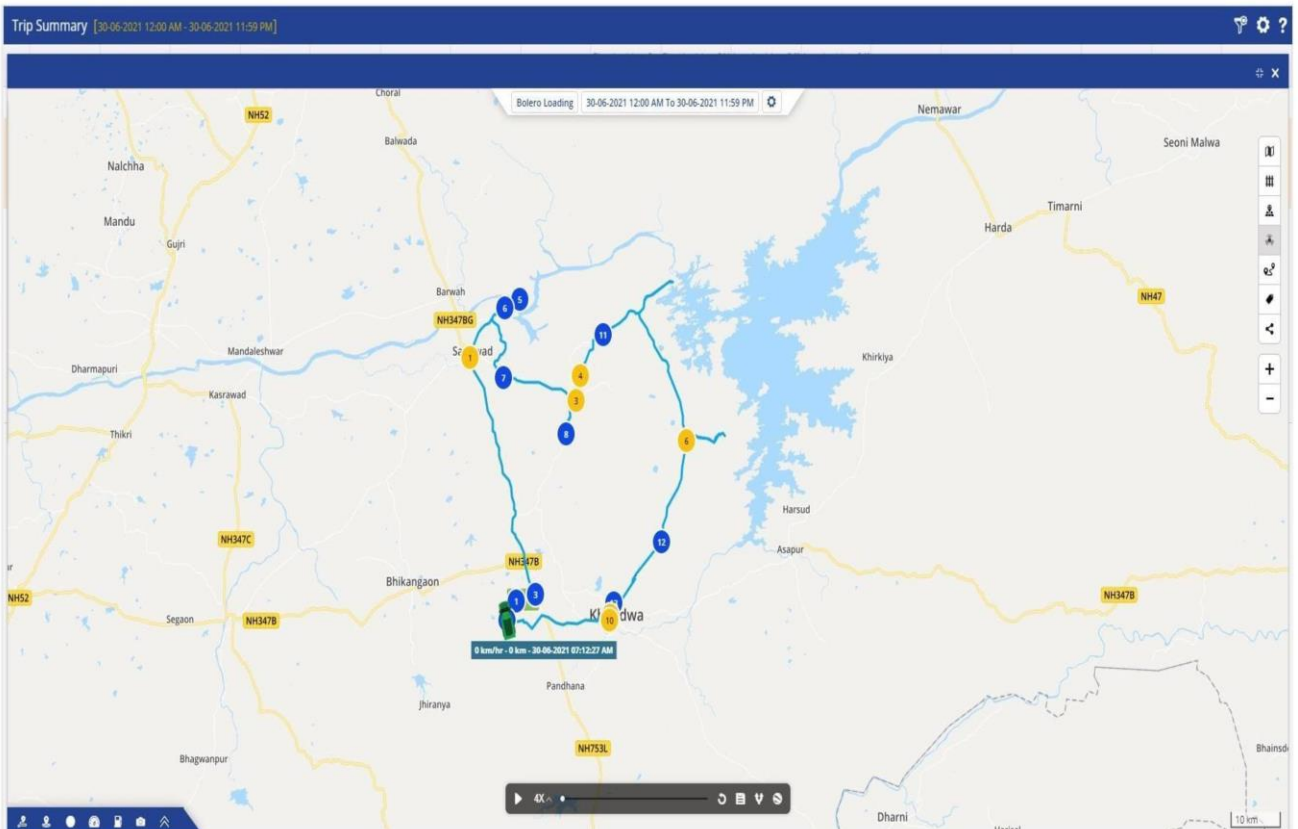


Fig. 5-i : M/s. Medisure Incinerators, Khandwa (M.P.)



6. Real-time Emission Monitoring of CBWTFs

All the common biomedical wastes treatment facilities (CBWTFs) that are equipped with real-time monitoring systems were remotely monitored by the Environment Surveillance Centre, MPPCB. Proper incineration of bio-medical wastes at defined temperature is very essential for effective destruction and to avoid any possibility of formation of hazardous intermediate compounds. The temperature in the primary chamber and the secondary chamber plays a significant role in destruction of wastes and, therefore, incessant monitoring of CBWTFs was practiced during the entire mega vaccination drive period. A summarised report and snapshots in this regard are given in Table 6-8 and Fig. 6 & 7. The operational details, including hours of operation, of each CBWTF is shown in Table 6.

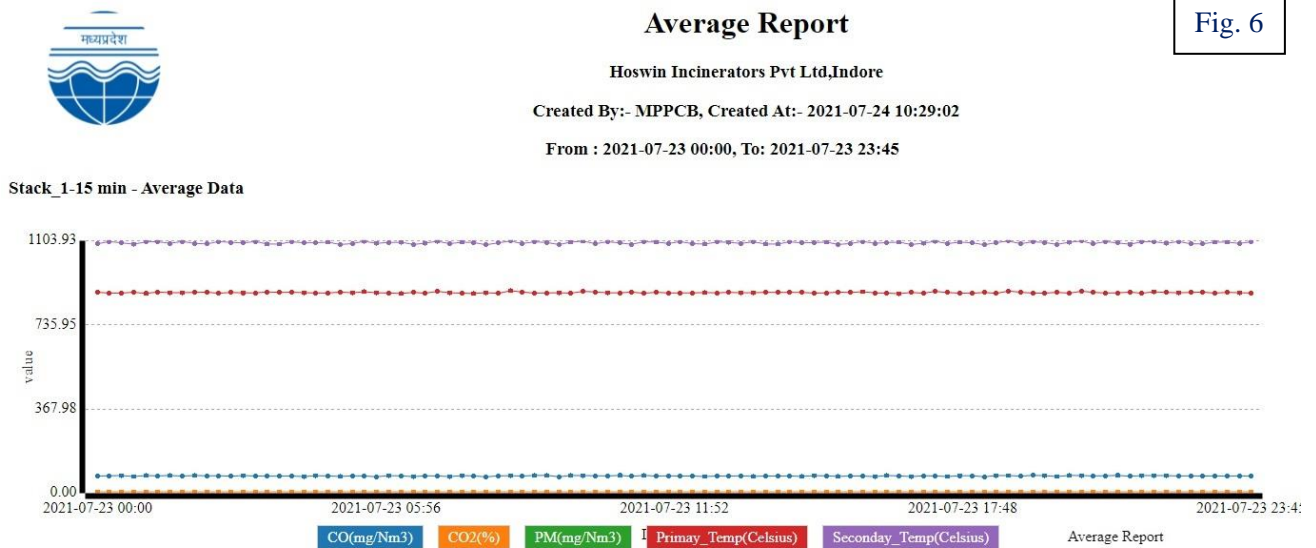


Fig. 6

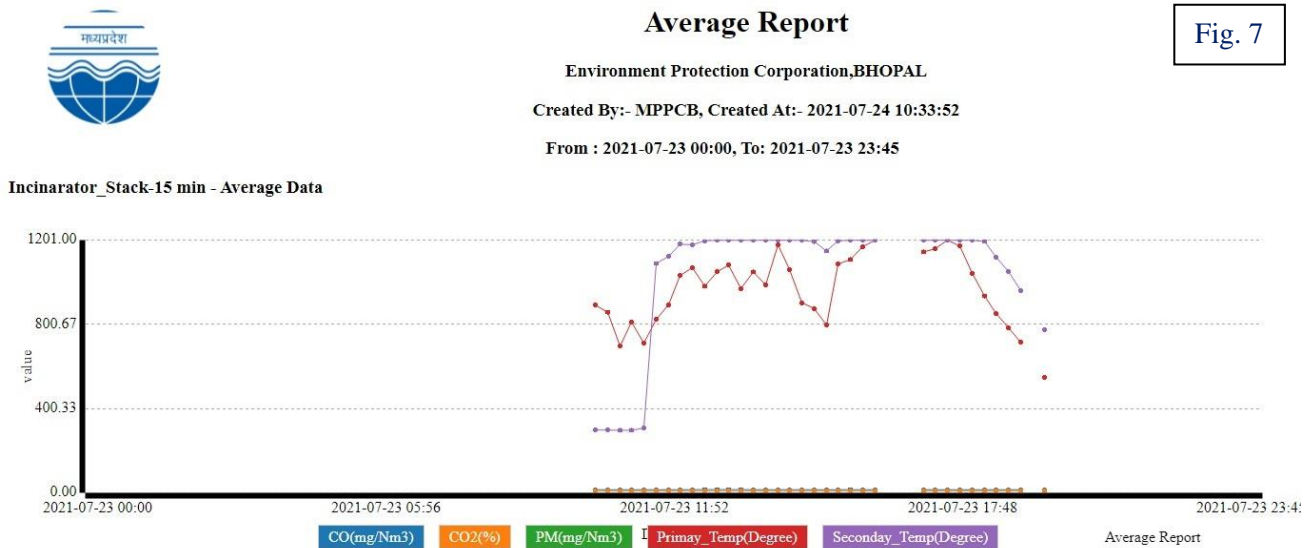


Fig. 7



Madhya Pradesh Pollution Control Board

Environmental Surveillance Center

Paryavaran Parisar, E-5, Arera Colony, Bhopal - 462016 (M.P.)

Ph : 0755-2469180, Fax : 0755-2463742, E-mail : ercmppcb@nic.in, Web : www.erc.mp.gov.in

Real Time Data Acquisition And Monitoring

Average Report

Industry Name : Hoswin Incinerators Pvt Ltd

City : Indore

R.O. : Indore

Time Criteria : 15 min

Period : From Date: 23-07-2021T00:00:34Z To Date: 24-07-2021T00:00:34Z

Description	Stack_1-CO(mg/Nm3)	Stack_1-CO2(%)	Stack_1-PM(mg/Nm3)	Stack_1-Primay_Temp(Celsius)	Stack_1-Seconday_Temp(Celsius)
Prescribed Standards	0 -	7 -	0 -	800 -	1000 -
Maximum Data	77.83	6.21	NA	885.41	1102.93
Minimum Data	71.48	5.9	NA	872.48	1086.17
Geometric Mean	75.29	6.09	NA	877.14	1095.1
Median	75.5	6.1	NA	876.55	1095.49
Standard Deviation	1.61	0.06	NA	2.51	4.56
Maximum Value At Time	2021-07-23 19:15:00	2021-07-23 08:30:00	NA	2021-07-23 08:30:00	2021-07-23 08:30:00
Minimum Value At Time	2021-07-23 08:00:00	2021-07-23 09:30:00	NA	2021-07-23 16:30:00	2021-07-23 18:15:00
Valid Data Points	96	96	0	96	96
Total Data Points	96	96	96	96	96
Data Availability %	100.0%	100.0%	0.0%	100.0%	100.0%

Sl No	Time	Stack_1-CO(mg/Nm3)	Stack_1-CO2(%)	Stack_1-PM(mg/Nm3)	Stack_1-Primay_Temp(Celsius)	Stack_1-Seconday_Temp(Celsius)
1	2021-07-23 00:00:00	74.72	6.13	NA	878.52	1090.59
2	2021-07-23 00:15:00	76.10	6.04	NA	875.24	1100.38
3	2021-07-23 00:30:00	77.00	6.15	NA	875.31	1094.90
4	2021-07-23 00:45:00	72.86	6.03	NA	878.59	1088.83
5	2021-07-23 01:00:00	77.14	6.12	NA	873.38	1099.14
6	2021-07-23 01:15:00	75.62	6.12	NA	879.86	1099.79
7	2021-07-23 01:30:00	77.21	6.12	NA	876.72	1092.76

Tab. 8



Madhya Pradesh Pollution Control Board

Environmental Surveillance Center

Paryavaran Parisar, E-5, Arera Colony, Bhopal - 462016 (M.P.)

Ph : 0755-2469180, Fax : 0755-2463742, E-mail : ercmppcb@nic.in, Web : www.erc.mp.gov.in

Real Time Data Acquisition And Monitoring

Average Report

Industry Name : Environment Protection Corporation

City : BHOPAL

R.O. : BHOPAL

Time Criteria : 15 min

Period : From Date: 23-07-2021T11:00:34Z To Date: 24-07-2021T00:00:34Z

Description	Incinarator_Stack-CO(mg/Nm3)	Incinarator_Stack-CO2(%)	Incinarator_Stack-PM(mg/Nm3)	Incinarator_Stack-Primay_Temp(Degree)	Incinarator_Stack-Seconday_Temp(Degree)
Prescribed Standards	0 -	0 -	0 -	800 -	1000 -
Maximum Data	15.47	8.17	NA	1200.0	1200.0
Minimum Data	14.56	8.17	NA	547.79	297.36
Geometric Mean	14.82	8.17	NA	980.69	1103.77
Median	14.7	8.17	NA	1032.12	1199.79
Standard Deviation	0.23	0.0	NA	166.78	231.92
Maximum Value At Time	2021-07-23 12:30:00	2021-07-23 11:00:00	NA	2021-07-23 16:00:00	2021-07-23 12:45:00
Minimum Value At Time	2021-07-23 11:00:00	2021-07-23 11:00:00	NA	2021-07-23 19:30:00	2021-07-23 11:00:00
Valid Data Points	31	31	0	31	31
Total Data Points	52	52	52	52	52
Data Availability %	59.62%	59.62%	0.0%	59.62%	59.62%

SI No	Time	Incinarator_Stack-CO(mg/Nm3)	Incinarator_Stack-CO2(%)	Incinarator_Stack-PM(mg/Nm3)	Incinarator_Stack-Primay_Temp(Degree)	Incinarator_Stack-Seconday_Temp(Degree)
1	2021-07-23 11:00:00	14.56	8.17	NA	811.67	297.36
2	2021-07-23 11:15:00	14.95	8.17	NA	710.84	306.66
3	2021-07-23 11:30:00	14.64	8.17	NA	824.17	1089.64

Tab. 9

7. Key Observations :

It was noticed that M/s Davis Surgico, Gwalior attended the highest number 1824 of HCFs during the mega vaccination drive followed by M/s Bhopal Incinerators Limited, Bhopal with 1473 HCFs and Hoswin Incinerators Pvt. Ltd., Indore with 1421 HCFs. Likewise, among all the CBWTFs, M/s Davis Surgico, Sagar attended the least number of HCFs, i.e. 88, during mega vaccination drive. It was also observed that the highest number of HCFs attended in a day was 210 by M/s Davis Surgico, Gwalior on 29.06.2021 followed by single day maximum visit to 204 numbers of HCFs by M/s Bhopal Incinerators Limited, Bhopal and 168 HCFs by M/s Hoswin Incinerators Pvt. Ltd., Indore. Fig. 3.

It was also observed that M/s Hoswin Incinerators Pvt. Ltd, Indore deployed average 8 vehicles per day during the mega vaccination drive for bio-medical wastes collection and transportation. This was followed by 7 numbers of vehicles deployed per day on an average basis by M/s Davis Surgico, Gwalior and M/s Environment Protection Corporation, Sehore. The data also reveal that M/s Davis Surgico, Sagar deployed only 2 vehicles per day followed by M/s BMW Solutions, Bhopal which deployed average 3 vehicles per day for wastes collection during 'mega vaccination drive'. Fig. 3 & Tab. 6.

The analysis also show that M/s Hoswin Incinerators Pvt. Ltd, Indore recorded a Data Capture Rate (DCR) of >89.89% and complied the criteria of >85% DCR set by the Central Pollution Control Board. None other CBWTF complied the DCR criteria. M/s BMW Solutions, Bhopal had the lowest Data Capture Rate with data availability of only 6.13% followed by M/s Davis Surgico, Gwalior with only 8.95% availability of data, thus failed to comply the CPCB's DCR criteria. Tab. 6.

As far as compliance of temperature in incineration chamber is concerned, only M/s Hoswin Incinerators Pvt. Ltd, Indore complied 100% during the mega vaccination drive. M/s Krupa Wastages, also complied the temperature norms to 100% but there was shortfall in data capture rate alongwith few other gaps. M/s Davis Surgico, Gwalior and M/s People's Medical College, Bhopal were non compliant and violated the temperature norms 100% followed by M/s Elite Engineers, Seoni with non-compliance rate of 94.4%. Tab. 6.

As far as operation hours of incinerators at CBWTFs are concerned M/s Hoswin Incinerators Pvt. Ltd, Indore was the highest with 215 hours 45 min of operation time followed by M/s India Wastes Management Pvt. Ltd, Mandideep which operated for 99:15 hours during the mega vaccination drive. M/s BMW Solutions, Bhopal operated the least 13:15 hours during mega vaccination drive. The incinerator at M/s Davis Surgico Gwalior, which attended the highest number of HCFs with 1824, operated only for 21:30 hours during the 10 days vaccination drive. The comparison reveal that M/s Davis Surgico, Gwalior attended much higher number of HCFs than M/s Hoswin Incinerators Pvt. Ltd, Indore but it operated only 1/10th of time than M/s hoswin Incinerators Pvt. Limited. Tab. 6 & Fig. 4.

Tab.10 -Web Links for Comprehensive Info on CBWTF Vehicles Movement

Sr No.	CBWTF	Route Map	Vehicle Movement
1	M/s. Bhopal Incinerator Ltd. , Dist. Bhopal	Bpl_Route.pdf	21,22,23,24,25,26,27,28,29,30
2	M/s. BMW Solutions, Dist. Bhopal	Bmw_Route.pdf	21,22,23,24,25,26,27,28,29,30
3	M/s. Davis Surgico, Dist. Sagar	DavisSgr_Route.pdf	21,22,23,24,25,26,27,28,29,30
4	M/s. Davis Surgico, Dist. Gwalior	DavisGwl_Route.pdf	21,22,23,24,25,26,27,28,29,30
5	M/s. Elite Engineers, Dist. Jabalpur	Elite_Route.pdf	21,22,23,24,25,26,27,28,29,30
6	M/s. Environmental Protection Corporation, Dist. Sehore	EnvPro_Route.pdf	21,22,23,24,25,26,27,28,29,30
7	M/s. Hoswin Incinerator Pvt. Ltd., Dist. Indore	Hoswin_Route.pdf	21,22,23,24,25,26,27,28,29,30
8	M/s. M.P. Bio-Medical Waste Disposal System, Dist. Umaria	MPBio_Route.pdf	21,22,23,24,25,26,27,28,29,30
9	M/s. Medisure Incinerators, Dist. Khandwa	Medisure_Route.pdf	21,22,23,24,25,26,27,28,29,30