



**FOLLOW-UP INSPECTION REPORT
OF CBMWTF**

**M/s Shushrutha Bio Medical Waste Management
Society, Shimoga, Karnataka**

**South Zonal
Office
Bengaluru**

Date of Re-inspection and Monitoring : July 09, 2015

A. BACKGROUND

M/s Shushrutha Bio- Medical Waste Management Society, Sy. No. 31/C, Machenahalli Industrial Area, Shimoga, was inspected and monitored by CPCB on December 08, 2011 whereby violation of the provisions of the BMW Rules were observed and accordingly show - cause directions under Section 5 of the EP Act, 1986 issued to the facility on February 21, 2012 for time bound action and bank guarantee of Rs. 10 Lacs. Latter, which was followed with Directions under Section 5 of EPA 1986 on May 15, 2013. The continual follow-up action is tabulated below:

S. No.	Follow-up action	Observation & Status of Compliance
1.	Joint inspection conducted on 23.02.2013 and its reported submitted vide no. Tech/24/Bio-Med/ZOB/20012-13 dated March 18, 2013	Facility has accomplished the works against the directions issued by CPCB and the final effluent was not meeting discharge standards with respect to pH.
2.	Second Follow-up joint inspection and monitoring was conducted on June 26, 2014, on request of H.O. vide NO.B-31011 (BMW)/30/93/HWMD/ 12448 dated March 28,2014	Follow up inspection report submitted vide Tech/45/BMW (KA)/ZOB/2014-15/543 July 17, 2014, as observed more partial /non-compliance against the directions, the unit was directed to extend the bank guarantee.
3.	CPCB directed the unit vide letter NO.B-31011 (BMW)/30/93/2014/HWMD /4375 dated October 30, 2014 to meet all non- compliances and to extend the bank guarantee	Facility has submitted the action taken against the non-compliance to comply on December 6, 2014 and requested to verify the status of compliance.
4.	CPCB Delhi requested to re inspection and report the status vide lr. NO.B-31011 (BMW)/30/93/2015/HWMD /6218 dated January 06,2015	<ul style="list-style-type: none">• Facility informed that the stack of 100kg/hr incinerator is collapsed and fallen on the roof top of the shed on January 3rd 2015 and requested time for rectification.• Secondly, facility reported vide letter dt. April 10th 2015 that the maintenance of Incinerator and installation of venturi is in progress and requested to keep the inspection after completion of work.• Facility informed that all the works are completed and vide letter June 10th 2015.

5.	CPCB. H.O. Vide lr. NO.B-31011 /BMW (46.51)2015/ HWMD /2049 dt. June 15th,2015 requested for re-inspection	Informed to the KSPCB for joint inspection and monitoring vide Lr. No. Tech/45/BMW (KA)/ZOB/ 2015-16/555-558 dt. July 06, 2015
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B. INSPECTION AND MONITORING

With the above follow ups, the team of officials Mr. G.Thirumurthy, SEE and Mr. K.Karunakaran, STS of CPCB, Zonal office, Bengaluru and Mr. R .Gurumurthy, EO, and Mrs. Sowramma, Sr.Field Attendant of KSPCB, Shimoga jointly inspected and monitored the Common Biomedical Waste Treatment Facility operated by M/s Shushrutha Bio-Medical Waste Management Society, at Sy. No. 31/C, Machenahalli Industrial Area, Shimoga, on **09.07.2015**.

During the inspection, the facility was in operation (incinerator 100 kg/hr) and verified the action taken status against the non-compliances of direction issued under Section 5 of E(P)Act, 1986 and the observation communicated vide letter NO.B-31011 (BMW)/30/93/2014/ HWMD /4375 on October 30, 2014 to the facility. The point wise compliance status, as follows:

C. STATUS OF COMPLIANCE AGAINST DIRECTIONS ISSUED UNDER SECTION 5 OF EPA, 1986

S. No.	Directions	Status of Compliance of Directions
a)	To complete installation of new incinerator & autoclave with all necessary provisions as per BMW Rules as well as CPCB guidelines.	<ul style="list-style-type: none"> The unit has installed new incinerator with a capacity of 100 kg/hr. with a venturi scrubber followed with stack. The unit has installed autoclave of 430 lit. Capacity. Hence the direction is complied.
b)	To submit 'No objection certificate (NOC)' obtained from KSPCB for installation of new equipment including incinerator, upon receipt of the same from KSPCB.	<ul style="list-style-type: none"> The KSPCB has issued Consent for Establishment for expansion of installation of incinerator capacity of 100 kg/hr and new autoclaves vide lr. PCB/CEO-2/EO/F-72/BMW/ 2012-13/306 dated May 27, 2013. Subsequently Consent to Operate also issued by KSPCB on July 2, 2013. Hence the direction is complied.
c)	To complete rectification of the existing incinerator to ensure provision for adequate negative draft in the primary chamber to control fugitive emission as per CPCB guidelines and operation of the existing treatment equipment in accordance with the provisions if BMW Rules with immediate effect	<ul style="list-style-type: none"> The existing incinerator of 50 kg/hr. is retrofitted with APCD and connected to a common stack. The existing incinerator is kept as standby also incorporated in the consent conditions as a standby unit. Hence the direction is complied.

	in case it is to be used, otherwise the system shall be dismantled and removed from the site immediately;	
d)	To complete installation of automatic recording of the operational parameters of the incinerator and tamperproof PLC based control system with the existing incinerator as per CPCB guidelines.	<ul style="list-style-type: none"> The unit has installed PLC system and temperature required for both primary and secondary is being maintained. During the inspection the primary and secondary chamber temperature are maintained as required. Hence the direction is complied.
e)	To complete installation of conveyer or automatic feeding device for charging the bio-medical waste into the existing incinerator as per BMW Rules as well CPCB guidelines.	<ul style="list-style-type: none"> Installed metallic conveyer system found working. Auto loading of the waste is in practice. Hence the direction is complied. Further attention is needed that the operator to improve the uniform feeding / frequency of feeding at a rated capacity i.e. 100 kg/ hr.
f)	To complete installation measuring devices for measuring negative draft in primary chamber, air flow rate in the incinerator chambers and pressure drop across venturi scrubber with the existing incinerator.	<ul style="list-style-type: none"> Pressure gauge to measure the pressure drop across the venturi scrubber is provided. Hence the direction is complied. However, it is suggested to replace with low measuring range of pressure gauge as to read the pressure drop across the scrubber well.
g)	To complete installation of venturi scrubber with mist collector with the existing incinerator as per CPCB guidelines.	<ul style="list-style-type: none"> Mist collector installed after scrubber to eliminate /minimise the moisture at the stack. Hence the direction is complied.
h)	To procure & install a flue gas analyser for regular monitoring of CO, O2 & CO2 level in the stack gases during incinerator operation & the records maintained as per CPCB guidelines and submitted to CPCB & KSPCB periodically;	<ul style="list-style-type: none"> The unit has procured flue gas analyser for monitoring of the stack emission during incineration operation. Presently <i>the probe of Flue gas analyser (testo-320) is not working. Hence, the unit shall be directed to rectify</i> the same and to do the measurement of flue gas at a regular interval during incineration and keep the record for verification accordingly. Hence, the direction is partially complied.

i)	To complete stack emission monitoring provision (such as proper platform, ladder & porthole) as per Emission Regulations, Part-3.	<ul style="list-style-type: none"> The unit has provided ladder, platform and port hole for stack emission monitoring. Hence, the direction is complied.
j)	To complete the provision for mechanical feeding system & installation of automatic recording system for the existing autoclave for recording operational parameters	<ul style="list-style-type: none"> The unit has provided the mechanical feeding system for autoclave and Auto temperature recording chart also provided to record the operating temperature. Started maintaining batch number of each batch, available for verification too. Hence, the direction is complied.
k)	To conduct strip test for every batch of the waste treated by autoclave in accordance with the BMW Rules.	<ul style="list-style-type: none"> The facility is conducting strip test with every batch and record is maintained. Hence the direction is complied.
l)	To complete augmentation of the existing Effluent Treatment Plant & ensure proper operation & maintenance of the ETP & the records maintained as per CPCB guidelines and submitted to CPCB & KSPCB periodically;	<ul style="list-style-type: none"> The unit has ETP to collect and treat the effluent from autoclaving, vehicle washing and scrubber effluent, floor washing etc. The ETP consists of collection tank, equalisation and intermediate tank to feed the water to Sand filter and activated carbon filter. The complete scrubbing waste water is not routed to ETP for treatment; it's partially reused in the scrubbing tower without removing of solids along with treated effluent. The unit unknowingly started giving alkaline dosing at all the places without knowing the concept of pH correction at appropriate locations. <i>There is need to educate and create the awareness to the facility operator about the role of each Pollution Control Devices and how to maintain the same.</i> The ETP is not giving desire result to meet the discharge standard. Hence the direction is partially complied.
m)	To complete construction of ETP sludge drying bed for drying of sludge generated from ETP	<ul style="list-style-type: none"> The unit has provided sludge drying bed for ETP sludge. Hence the direction is complied.
n)	To stop dumping of plastic, gloves and syringes segregated from untreated bio-medical waste in an	<ul style="list-style-type: none"> The unit has stopped dumping of plastic gloves, syringes segregated from BMW in an open unlined pit and developed a pit

	open unlined pit with immediate effect & shall make provision for storage of treated sharps & dried ETP sludge prior to its final disposal, & ensure disposal of the dried ETP sludge through TSDF located in Karnataka.	for storage of treated sharps and room is provided for the storage of incinerator ash. Also become a member of TSDF to dispose of ETP Sludge. Hence the direction is complied.
o)	To ensure treatment & disposal of bio-medical waste collected from member HCFs within 48 hours of its generation, in accordance with the provisions of the BMW Rules with immediate effect;	<ul style="list-style-type: none"> The unit is equipped to dispose of the bio medical waste collected from Member HCF's within 48 hours of its generation. On the day of inspection, there was no accumulated waste noticed. Hence the direction is complied.
p)	To stop segregation of untreated bio-medical waste within the facility with immediate effect and shall ensure that the bio-medical waste is segregated at the HCFs in accordance with the BMW Rules;	<ul style="list-style-type: none"> The unit has constituted inspection team to inspect the HCF to segregate the waste at source and to stop unsegregated waste to come to the facility. There was no much of unsegregated waste found on the day of inspection. Hence the direction is complied.
q)	To ensure disposal of plastic wastes only after treatment by autoclaving followed by shredding through a plastic waste recycler authorized.	<ul style="list-style-type: none"> The unit is disposing plastic wastes after treatment followed by shredding through KSPCB authorised plastic recycler i.e. M/s Yarab Plastic, Bangalore. Hence the direction is complied.
r)	To maintain the records pertaining to operation of treatment equipment, handling of bio-medical waste, its disposal as well as training given to the member HCFs.	<ul style="list-style-type: none"> The unit is maintaining the records of operation and maintenance of equipment. Few training was conducted to their staff and Staff of HCF etc. Hence the direction is complied. <i>However, the unit shall be directed to strengthen to organise the training to HCF and staff regularly, as the staff keep changing at all HCFs.</i>
s)	To complete construction of demarcated platform as per CPCB guidelines for washing of vehicle/ containers used for handling & transportation of bio-medical waste;	<ul style="list-style-type: none"> The unit has demarcated the area for washing of vehicle/ containers etc. The wash water is channel to ETP. Hence the direction is complied.
t)	That the unit shall organize training programmes periodically for all the workers engaged in the facility on aspects relating to handling of bio-medical waste & carry out awareness campaign for the member Healthcare Facilities on regular basis & records	<ul style="list-style-type: none"> The unit has organised a training programme to the HCFs and their staffs (field and plant). However the same shall be conducted at regularly to make them more aware. Hence the direction is complied.

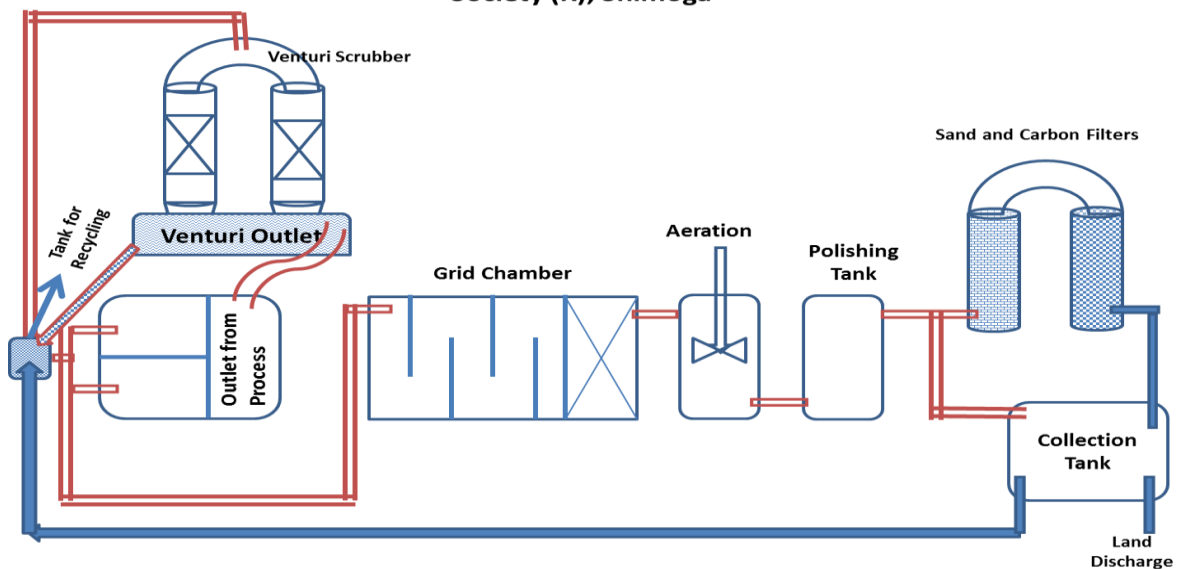
maintained;

D. Other Observations

a. Effluent Treatment Plant (ETP):

The facility is having 3KLD ETP and collects wastewater from autoclaving, vehicle washing and venturi scrubber, floor washing etc. The ETP consists of collection tank, sand bed filter, grid chamber, settling tank, aeration tank, dual sand and carbon filter and collection tank. The treated effluent collected in the collection tank partially used for gardening inside the premises and for recycling in to the process. The existing flow diagram of ETP is shown below.

ETP Flow Diagram Adopted in M/s Shushrutha Bio-Medical Waste Management Society (R), Shimoga



- The unit only supposed to maintain the pH of scrubbing solution in alkaline say pH 9 and above to neutralise the flue gas which is in general acidic in nature due to HCL. But the unit started dosing alkaline in entire ETP at various places to maintain the alkaline pH. Secondly, the scrubbed liquid is not taken 100% to the ETP to remove the solids present (in the form of carbon) and for further treatment, the same is recirculated (about more than 50% of effluent). *The unit shall stop dosing of alkali at all places and only treated effluent shall be re-circulated to scrubbing tank with pH correction at feed tank to neutralise the flue gas. The solid presents in the scrubbing liquid (un treated) might also contributing to high level of dust in the stack due to carryover along with flue gas and frequent chances of nozzle chocking at Venturi, which may restrict the proper quenching and scrubbing, resulted in high concentration of PM.*
- The unit has added the surface aerator at the ETP, but the aerator is not installed at surface level to aerate the effluent. The aerator is submerged inside the tank, which only works as stirrer rather than an aerator. The unit shall be directed accordingly to install the aerator. The inspection team collected the treated effluent (Grab) sample after activated carbon filter (outlet) to verify the compliance of the discharge standard. The analysis results are as follows:

Analysis Results of Treated Effluent

S. No.	Parameters	Unit	Waste water Sample	KSPCB Standard
1.	pH	-	9.3	6.5 to 9
	EC	µs/cm	4330	-
2.	TSS	mg/l	16.0	100
	TDS	mg/l	2464	-
3.	COD	mg/l	38.3	250
4.	BOD	mg/l	11.3	30

The treated effluent with respect to all parameters is meeting the standard of KSPCB, except pH, which is due to alkaline dosing at all the places.

- The existing dual sand and carbon filter provided is not enough to handle the present volume of effluent generated to recycle 100%. The facility shall add one more unit of dual media filter / carbon filter to handle the entire quantity of effluent for reuse.

b. Incinerator and its flue gas treatment:

- The incinerator of 100kg/hr is maintained with desired primary and secondary temperatures during the operation. The loading of waste are carried out by the conveyor. The facility also equipped with Auto clave and shredder which found to in operation and records for the same is maintained.
- The facility has erected a new stack and provided with required platform & porthole etc. for emission monitoring. The team conducted source emission monitoring and the monitoring results are as follow:

Sl. No.	Details	Incinerator Stack
1.	Date of Monitoring	09.07.2015
2.	Fuel used	Diesel
3.	Pollution Control Devices attached	Scrubber
4.	Temperature (°K)	422
5.	Stack Diameter (M)	0.4
6.	Height (M)	30
7.	P.M. Emission Standard (mg/Nm ³)	150*
8.	Monitoring Results (Mg/Nm³)	
	Particulate Matter	4054
	CO ₂ Measured %	9.2
	O ₂ Measured%	8.6

The unit is not meeting the emission standard prescribed by KSPCB for Particulate Matter i.e. 150 mg/Nm³. The particulate matter concentration was found very high in the stack emission which might have caused the above said reason and due to non-uniformed feeding (time interval) of waste w.r.t to rated capacity of 100kg/hr. Also the unit informed that the supplier of APCD did not carry out the performance test and not issued performance certificate.

E	Recommendations:	
	<p>The unit has taken initiation and necessary steps to comply with the directions issued. Also, the old stack was replaced with the new stack and APCD; however which is not meeting the emission standard. The supplier of the APCD (scrubber) didn't provide the performance certificate. Secondly, as the facility is operated by the Doctors Association and they need to understand the role of each Pollution Control Devices and its maintenance in depth. There is no environmental engineer to operate and maintain the plant. The facility may be issued with following directions:</p> <ol style="list-style-type: none"> 1. To remove the all unwanted alkali dosing at many places in ETP and to maintain the alkali dosing only in the scrubber feed tank. 2. To install the aerator in the aeration tank appropriately to optimise the aeration/ treatment. 3. To use only treated wastewater along with fresh make-up water for scrubbing and to treat the wastewater fully before its reuse. 4. To enhance the capacity of dual media filter / carbon filter to treat and reuse the wastewater fully. 5. To optimise the operation and maintenance of Incinerator / APCD as to comply with particulate matter emission standard. To improve and maintain the uniform feeding / frequency of feeding at a rated capacity i.e. 100 kg/ hr. 6. To repair & maintain the flue gas analyser for measuring the flue gas and to maintain the measurement records regularly. 7. To appoint an Environmental Engineer / Environment Science graduate to supervise, operate and maintain the facility on daily basis. 	
13	Date of Inspection	: July 09, 2015
14	Inspection Team	: <ol style="list-style-type: none"> 1. Mr. G.Thirumurthy, SEE, CPCB 2. Mr. K.Karunagaran STS, CPCB 3. Mr. R. Gurumurthy, EO, KSPCB 4. Mrs. Sowramma, Sr.F.Asst., KSPCB (G.Thirumurthy) SEE, CPCB
15	Action Recommended: The inspection team has observed and confirmed that directions issued by CPCB have been partially complied. In view of the deviation observed in the compliance of the directions, the unit shall be directed to take appropriate action to comply the directions immediately. Also, the unit shall be asked to look into other recommendations as noted by the team and instruct to submit time bound action plan to comply with other remaining points. In the meantime KSPCB shall be asked to keep a strict vigil on the unit to observe the compliance to all consent conditions at all point of time.	
	Recommending officers name, Designation and signature	: (S. Suresh) Zonal Officer

Photographs of M/s Shushrutha Bio- Medical Waste Management Society, Shimoga



Fig.1: Incinerator of 100 kg/hr. with scrubber followed with Mist eliminator



Fig.2: Conveyor system developed for auto loading of BM waste



Fig.3: Auto-clave in-use



Fig.4: Stack with required platform



Fig.5: Effluent Treatment Plant

F.Tech/45/BMW (KA)/ZOB/2015-16/

July 28, 2015

To

The Member Secretary
Central Pollution Control Board
Parivesh Bhawan
East Arjun Nagar
Delhi-110 032

Sub: Follow- up inspection of M/s Shushrutha Bio – Medical Waste Management Society, Shimoga, Karnataka.

Ref.: CPCB letter NO.B-31011 (BMW)/30/93/2015/ HWMD /6218 on January 06, 2015

Sir,

With reference to the above subject, M/s Shushrutha Bio – Medical Waste Management Society, Shimoga was inspected on 9th July, 2015 to verify the compliance status of CPCB's directions issued on May 15, 2013. The inspection team has observed and confirmed that stack emission with respect to particulate matter is not meeting the standards & needs immediate improvement. In view of that the unit shall be directed to take appropriate action to comply the direction and recommendations immediately.

The inspection report of the same is submitted for kind perusal.

Yours faithfully

Encl.: As above

(S. Suresh)
Zonal Officer