CENTRAL POLLUTION CONTROL BOARD
(Hazardous Waste Management Division)
DELHI –110 032

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Minutes of 13th Meeting of the Expert Committee on Bio-medical Waste Management for evaluation of the new State-of-the-Art-Treatment Technologies for treatment of bio-medical waste held on June 28, 2012 at CPCB, Delhi

1. The list of the participants of the meeting is enclosed at ***Annexure I***.

2. Shri J.S.Kamyotra Member Secretary, CPCB welcomed members of the Expert Committee and apprised about the follow-up actions taken in light of the decisions of the last meeting of the Expert Committee. The members were also appraised of the letter of Principal Secretary, Forest & Environment Department, Govt. of Gujarat, to consider the representation of M/s Bhagwati Pyrotech Ltd. Ahmedabad for inclusion of category 07 waste as given in Schedule 1 of BMW Rules, for treatment adopting 'Plasma Pyrolysis Technology'. He also informed about the "PAB Reactor Technology" proposed by Dr. A.K.Sabhapathy of Krishna Nursing Home, Ernakulam, Cochin. Shri Kamyotra informed that two proponents namely M/s S.S.Medical Systems (India) Pvt. Ltd on AMB, Belgium's Ecosteryl 125/250 Microwave Technology & M/s Krishna Patient Care Systems India Pvt. Ltd. on 'MediVac – MetaMizer 240SSS (MM 240SSS)' have not come and about the new proposal received from M/s Surgikit on the product of M/s ECODAS, France. He thanked all the members for sparing valuable time to participate in the meeting inspite of changed schedule of the meeting.

3. **Opening remarks by the Chairman of the Expert Committee: D.T.K.Joshi,** Chairman, Expert Committee informed members that the issues pertaining to M/s Krishna Hospital, Cochin is already known to the members, however, a lot of work has been done on this issue and requested Shri J.C. Babu, Sc. 'C' to give a brief on this issue as well as other issues /proposals to be discussed in the meeting.

4. **Briefing by Shri J.C.Babu, Sc. 'C':** Shri J.C.Babu mentioned that as per records available with CPCB, the PABR technology adopted by Krishna Nursing Home was evaluated earlier in the year 2005 by a team comprising officials of CPCB, Kerala SPCB, Dr. Anita Arora, Member of the Committee & Microbiologist, Escort Heart Institute, New Delhi, after visiting few installations in Kerala adopting this technology. The team felt that the said technology is not suitable for treatment of bio-medical waste. Later, vide letter dated August 01, 2005, CPCB communicated the recommendations of the Committee about unsuitability of the system. Subsequently, CPCB also filed the counter affidavit in the Hon'ble High Court of Kerala. He also informed that in February, 2012, an application was submitted by Dr. A.K.Sabhapathy enclosing with it a copy of the letter addressed to the Secretary, MoEF to consider inclusion of PAB Reactor Technology as an option for treatment of bio-medical waste under schedule I of the BMW Rules alongwith a copy of the Judgment of Hon'ble High Court of Kerala dated 19th December, 2011 in the matter of Writ Petition (C) No. 35951/2007 (Krishna Nursing Home, Chittoor Road, Ernakulum Vs Union of India & Others). In compliance to the judgement of the Honble Court, CPCB invited the petitioner to make technical presentation in CPCB on 16/02/2012, but Dr. A.K.Sabhapathy expressed his inability to present the technical

details in the said meeting. Thereafter, CPCB, Zonal Office, Bengaluru filed an affidavit in the Hon'ble High Court of Kerala and the said application came up for consideration before the Court on 10/04/2011. The counsel for petitioners in the writ petition sought time for filing counter to this application and the case stands posted after summer vacation when the court will reopen on 21/05/2012. Presently, matter is sub-juidice.

As regards other porposals, Shri Babu informed that as suggested in the last meeting, the proponent M/s S.S.Medical Systems (India) Pvt. Ltd has submitted additional information and have been asked to presentation in this meeting but the proponent did not turn up to appraise the members. M/s Krishna Patient Care Systems India Pvt. Ltd. submitted proposal on 'MediVac – MetaMizer 240SSS (MM 240SSS)' and was also invited for making presentation on their technology, but the proponent has not turned up.

He also briefed about the new proposal received from M/s Surgikit on the product of M/s ECODAS, France, which is a combination of shredding followed by autoclave by direct heated steam and at high pressure. Apart from that, representation of M/s Bhagwati Pyrotech Pvt. Ltd. through 'Principal Secretary, Ministry of Forest & Environment Department, Gujarat Govt. is also proposed to be discussed.

5. **Presentations by the proponents on the Technologies for treatment of Bio-medical waste:**

a) **Presentation on Placenta Anaerobic Bio-Reactor (PAB) by Dr. A.K.Sabhapathy of M/s Krishna Nursing Home (presently known as M/s Krishna Hospital), Cochin:**

Dr. A.K.Sabhapathy of M/s Krishna Nursing Home, Ernakulam, gave brief introduction about their technology namely 'Placenta Anaerobic Bio-reactor (PAB)'. He stated that the PAB reactor works on the principle of bio-degradation of organic waste like Placenta in very environment friendly manner (anaerobic condition). He informed that Dr. V. Sivanandan Achari of Cochin University who is associated with this project will make presentation on the technical aspects. He informed that due to high water table in Kerala, treatment options like Deep Burial may not be feasible while incineration for treatment of bio-medical waste categories 1 & 2 as stipulated may not be feasible in view of the stack emissions. He also informed that Hon'ble High Court of Kerala has also considered the matter and in its judgment the Court has suggested MoEF and CPCB to assess suitability of the said technology for inclusion in the BMW Rules as an option for treatment.

Dr. Achari, Associate Professor, School of Environment Studies, Cochin University of Science & Technology in his presentation claimed that the proposed technology is outcome of 10 years rigorous research. As per their quantification study, bio-medical waste generation rate is 1.1. Kg/bed/day and in every human birth, about 1.5 liters of placenta & blood is generated. Dr. Achari explained that minimum 10 Placenta can be fed into the PAB reactor, which can be disinfected by anaerobic digestion process using inoculums developed by them without any emissions, within a period of 7 to 8 days. He also informed that preliminary study & experiments on fluid analysis indicates that it is free from HIV virus, Hepatitis B & C virus as well as E-Colli culture and no survival of infectious microorganism (pathogens) found in the

final treated liquid. This method can also be adopted for continuous treatment of placenta by adding additional reactors in series. The final effluent generated from the reactor can be treated by disinfection followed by disposal in soak pit. He also informed that the byproduct of PAB reactor is only methane gas and no other odour is produced.

He informed that this technology was already in use in around 20 hospitals including Krishna Hospital in Cochin but without taking approval from Pollution Control Authorities and so the same has been withdrawn from many of the hospitals. However, the technology is still being used in hospitals located in Srilanka and Karnataka.

On querry by the Committee members, Dr. Anita Arora, informed about her earlier visit to some of the installations in Cochin alongwith the members of the Committee in 2005 and validation test for testing of efficacy of the process using spores/vials need to be clarified by the proponent. Also, she was of the opinion that survival of three lakhs E-coli pathogens for 7-8 days which does not indicate good technology and PAB reactor has been developed as a replacement for deep burial option quoting the problem of high water table existence in Kerala and septic tank too may not be operated in high water table zone.

To the query of Dr. M.Subba Rao, as regards to the applicability of the proposed technology to treat Placenta alone or to other human and anatomical waste, Dr. Sabhapathy clarified that the PABR technology can also be adopted for the human and anatomical waste but the present proposal is for treatment of placenta only.

Dr. T.K.Joshi expressed that the efforts of Dr.Sabhapathy for development of the technology is appreciable. However, he was of the view that the System is not foolproof to ersure that the effluent is free from harmful pathogens.

The members had reservations on the issues including type of waste, disinfection of waste, standardization of the reactor designs, capacity of the reactor, need for the ETP, retention time of the reactor, manual handling, safety aspects of the workers, possibilities of multiplication/escape of micro-organisms while handling liquid effluent, possible odour & infection etc. and opined a need for field visit.

b) **M/s Surgikit on the product of M/s ECODAS, France:**

Mr. David Squalli, Vice President, M/s ECODAS, France made a presentation on the 'ECODAS system'. He stated that the system has been designed for treatment of Bio-medical waste following shredding cum sterilization processes which complete the treatment cycle in 30 to 60 minutes. The system uses direct heated steam under pressure to completely sterilize the infectious waste with 80% volume reduction of the waste and claimed that it surpasses traditional autoclaving by rendering the waste unrecognizable because of its unique internal integrated shredder system. The temperature, pressure and time are continuously monitored through computerized system attached with the system. Mr. Squalli also showed video on working of the 'ECODAS system' informed that the product is available in five different capacities and types of the ECODAS configuration. The system is suitable for

on-site treatment of bio-medical waste which contains infected material, syringes and other type of sharps, glass ware and different types of paper and plastic material as specified in the waste categories no. 1, 2,3,4,6 & 7 stipulated under BMW Rules. While describing the technical aspects, the representative apprised the members that prior shredding of the contaminated waste in the treatment chamber increases the surface area of the waste which get direct contact with saturated pressurized steam at temperature 138^0 C and pressure 3.8 bar (55 psi) and ensures sterilization of 8 Log_{10} reduction of the infectious load is achieved by maintaining 138^0C/3.8 bar for 10 minutes in the system. This follows cooling and the steam is condensed to water and discharged with the cooling water to sanitary sewer system and thereafter unloading of sterilized and shredded treated waste is done by gravity. It was also informed that efficacy of the ECODAS system was evaluated by various organizations such as Pasteur Institute, WNWN, USA, using various organisms such as Bacillus Stearothermophilis, Bascillus Subtilis Spores and found to be acceptable. He aslo informed that ECODAS system are designed and manufactured in accordance with the norms of ASME (USA), CE (European Directives, MHLW (Japan), GOSSTANDART (Russia), MLSE (China), TSSE (Canada), norms of Mexico upon approval from respective Ministries/Department of concerned Countries.

Replying to the queries of the members, he informed that the ECODAS system can be used for treatment of all bio-medical waste categories as stipulated in BMW Rules, 1998 except category no. 05, 09 & 10. Some of the members raised the issue on recycling of plastic waste as resource material as the system will treat all the mixed waste which will also include plastic waste. Members also expressed their concern on the odour problem that may arise due to the treatment of categories 1 & 2 and cost of the system.

c) **Other issues:**

The letter received from 'The Principal Secretary, Forest & Environment Department, Government of Gujarat' regarding inclusion of waste category 07, in the provisional approval granted earlier to 'Plasma Pyrolysis Technology' for treatment of waste categories (1), (2), (5) & (6) was discussed by the members. The members were of the view that inclusion of category 07 for treatment by Plasma Pyrolysis will hamper the exsiting provisions w.r.to segregation at source of the bio-medical waste as stipulated under BMW Rules. The issue regarding reduction in height of Chimney of the Plasma Pyrolysis System was also discussed in the meeting.

6. **Discussion & Recommendation:**

Upon considering pros and cons of the proposals received with regard to the new technologies for treatment of bio-medical waste in light of the existing provisions of Bio-medical Waste (Management & Handling) Rules, 1998, recommendations of the Committee are as follows:

a) **Placenta Anaerobic Bio-Reactor:** As the representative of M/s Krishna Hospital, Cochin, could not provide satisfactory reply to the queries of the members related to design aspects & standardization of the technology, data pertaining to tertiary treatment were not presented before the committee, it was decided that CPCB shall ask specific queries from the members on the

PABR technology and thereafter same shall be communicated to the proponent for submitting appropriate reply and its consideration in the next meeting.

b) **'ECODAS system' proposed by M/s Surgikit :** The members were of the view that non-burn green technology needs to be promoted for treatment of bio-medical waste and the proposed system of ECODAS system should also be evaluated in the similar way as the technology for 'PIWS -3000' was considered earlier by the Expert Committee. The committee decided that the proponent will submit additional clarifications against the queries as raised in case of PIWS 3000.

c) ***Letter from 'Principal Secretary, Forest & Environment Department, Government of Gujarat& e-mail from FCIPT, Institute of Plasma Research, Gandhinagar:***

The committee in principle did not agree to the request made by the 'Principal Secretary, Forest & Environment Department, Government of Gujarat for granting approval for inclusion of category 07 for treatment by Plasma Pyrolysis Technology and also did not accept the proposal with regard to the reduction of height of stack of the Plasma Pyrolysis System from 30 m to 7 meters as 30 m height of stack is suggested under the E (P) Act, 1986 including for hazardous waste incinerators (plasma pyrolysis).

The meeting ended with vote of thanks to the chair.

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Annexure I

List of Members / Officials/ Participants

Sl. No.	Name of the Member / Participants/ special invitee
1.	Shri J.S.Kamyotra, Member Secretary, CPCB, Delhi
2.	Dr. T.K. Joshi, Chairman of the Committee & Director, Moulana Azad Medical College, Delhi.
3.	Dr. M.Subba Rao, Director, HSMD, MoEF, New Delhi.
4.	Dr. D.K.Sharma, Medical Superintendent, All India Institute of Medical Sciences, New Delhi- 110 029.
5.	Dr. Anita Arora, Deptt. of Microbiology, Escort Heart Institute & Research Centre, A Fortis Network Hospital, Okhla Road, New Delhi – 110 025.
6.	Dr. M.J.Parvez, Director (Environment), National Productivity Council, 5th & 6th Institutional Area, Lodhi Road, New Delhi – 110 003.
7.	Dr. K.S.Baghotia, State Programme Officer (Leprocy & BMW Mgmt. , Directorate of Health Services, Govt. of NCT Delhi, F-17, Karkardooma, Delhi – 110 032.
8.	Sh. Ravi Aggarwal, Member, Toxics Link, New Delhi.
9.	Prof. (Dr.) B.K.Das, Member & Professor, SCB Medical College & Hospital, Cuttack
10.	Dr. A.K.Sabhapathy of M/s Krishna Nursing Home (presently known as M/s Krishna Hospital), Cochin.
11.	Dr. Achari, Associate Professor, the School of Environment Studies, Cochin University of Science & Technology, Cochin, Kerla.
12.	Shri Arun Khullar, Chief Executive Officer, Surgikit, Chandigarh.
13.	Mr. David Squalli, Vice President, U.S. HQ ECODAS
14.	Representative of M/s. Surgikit, Chandigarh
15.	Shri B.Vinod Babu, SC.'D', & I/c HWMD, CPCB, Delhi
16.	Sh. J.Chandra Babu, Sc. 'C', CPCB, Delhi
17.	Sh. R. N. Pankaj, Sc. 'B', CPCB, Delhi
18.	Ms. Youthika, Sc. 'B', CPCB, Delhi