CENTRAL POLLUTION CONTROL BOARD,

Zonal Office – South, Bangalore

REPORT ON TRIAL RUN STUDY OF CO-PROCESSING OF ETP SLUDGE IN CEMENT KILN AT M/s ULTRATECH CEMENTS LTD., ARIYALUR, TN

1. Background

The Hazardous Wastes (Management and Handling & Transboundary Movement) Rules, 2008, provided for a specific Section i.e. Rule 11 dedicated to utilization of Hazardous Wastes as a supplementary resource or energy recovery or after processing. In view of this CPCB has taken-up trial run for co-processing of few categories of wastes and granted regular permission for the same. The unit which is going for co-processing of wastes has to follow the guidelines on Co- processing in Cement / Power / Steel Industry.

M/s Ultratech Cements Ltd., (Reddipalayam Cements Works), Ariyalur District – 621 704, having 124 acres of land in Reddipalayam at about 12 kms from Ariyalur in Tamilnadu, is one of the most modern cement plants of Aditya Birla Group. It has a cement production capacity of 4650 TPD (Ordinary Portland Cement & Portland Puzzolona Cement) as per TNPCB consent and started its production during year 2000. The unit has permission from CPCB to utilise wastes viz. tyre chips, paint sludge, ETP sludge (from BASF India Ltd.,) Refinery Sludge and Plastic Wastes vide letter no. B-33014/12-13/2009/PCI-II/3402 dated August 13, 2010. Also, to utilise 4000 MT of CETP/ IETP sludge in cement manufacturing vide letter no. B-33014/7//2006/PCI-II/ dated 28.12.1012.

In view of above, the Tamil Nadu State Pollution Control Board (TNPCB) has grant permission to conduct trail with IETP sludge (4000 MT) from textile industries. In continuation, on request of the unit, the Board has permitted them to increase the quantity of ETP sludge from 4000 MT to 7800 MT for taking full scale trial as per co processing protocol vide letter no. T10/TNPCB/F-16306/HWM/TRY/2013, dated 14.3.2013.

Accordingly, M/s Ultratech Cements Ltd., initiated trail run for co-processing IETP sludge from textile processing mills/ dying units during **May 27 - 31, 2013 for 5 days.** The following officials from CPCB & TNPCB have been present for assessment and monitoring:

1. Mrs. H.D.Varalaxmi, EE, CPCB
2. Mr. G.Thirumurthy, EE, CPCB.
3. Mrs. Lakshmi ,DEE, Trichy Regional Office, TNPCB

The unit has engaged M/s Vimta Labs Ltd, Hyderabad for emission monitoring during monitoring programme (normal operation, trail run at fixed % of H.W and normal operation) for 5 days. CPCB inspection team witnessed the trail run during co-processing of ETP sludge (textile).

2. Hazardous Wastes & Handling

Generation: The TNPCB accord permission / authorisation to the units (16 units) located in the area of Tirupur, Karur and Erode to transport the ETP sludge generated from the textile waste water treatment to M/s Ultratech Cements to conduct the trail run. The list of industries transported ETP sludge is as follows:

S. No.	*Name of the Unit*	*Approved by TNPCB (MT)*	*Quantity Received (MT)*
1.	M/s Shri Santhosh Meenakshi Textile Pvt Ltd., Karipudur village, Palladam Tk, Tirupur Dist.	240	254.14
2.	M/s Maruthi Dyeing , Andipalayam Village, Tirupur Tk & Dist.	600	579.32
3.	M/s Àmaravathi Dyers, Somoor, Karur	259	253
4.	M/s Trinity Colour India Private Ltd., SIPCOT, Perundurai , Erode	1000	678.42
5.	M/s Indian Stitches Private Limited, Industrial Growth Centre, Perundurai, Erode.	1115	890
6.	M/s Karpaga Ganapathi Textile Process Pvt Ltd , SIPCOT, Perunduari ,Erode	1500	929.17
7.	M/s Pioneer Processing India Ltd ,R.N.Pudue, Erode	500	502.45
8.	M/s Rajalakshmi Textile Processsors Pvt Ltd., BP Agraharam Road, R.N.Pudur Post, Erode.	500	459.69
9.	M/s S. P.Textile Processors Pvt Ltd, Kumillamparappu, Perumalmalai Koil Road, Chithode, Erode.	175	166.38
10.	M/s A.V. Textiles, Nallagoundenpalayam, Chithode post, Erode.	36	32.93
11.	M/s Ero Dyeing, R.N.Pudur, Erode.	90	90.00
12.	M/s Emperor Textiles (P) Ltd, Veerapandi village, Tirupur	160	160
13.	M/s Indu Processor, Chinnakarai Village, Tirupur.	165	145.00
14.	M/s Decent Colours, Vanijipalayam, Tirupur	220	150
15.	M/s Vaibhav Processing Mills Pvt Ltd., Mayapuram, R.N. Pudur, Erode.	60	60.00
16.	M/s Jay Jay Textiles,	1500	210.00
	Total	5560.5	8120

Transportation: The hazardous waste for co-processing need to be handled in an environmentally safe manner avoiding the possibilities of contaminating the nearby environment and eliminate the chances of accidents. It was informed that the ETP

sludge from the ETPs was transported by truck about 230 kms from Tirupur, Perundurai and Karur during May 2013. The sludge transported for co-processing with required Form - 13, Hazardous Waste Manifest. The unit informed that the unit cost of transport per tone per kilometre is Rs. 1.10.

Storage: The total quantities of sludge brought from ETPs are stored in open place along with lime stone separately nearer to stone crusher. The blended and crushed sludge along with lime stone is staked separately with help of stacker and reclaimer in a shed.

Preparation: The sludge was shifted by tipper (bucket) lifter and directly dumped (through hopper) to lime stone crusher along with lime stone. Each load of bucket tipper weighs about 3.5 tone of ETP sludge, about 50 tone of lime stone (2 tipper truck) is dumped along with sludge to maintain ratio of about 7%.

Characteristic of sludge: The characteristic of ETP sludge and the blended with lime stone (stacked for raw mill feed) ranges are given below:

Characteristics	**Sludge (Ranges between)**	**Blended (limestone & sludge)**
Total Moisture %	26.9 to 40.2 %	-
Gross Calorific Value Kcal/Kg	Nil to 1020	-
LOI %	68.90 to 15.9 %	-
SiO_2	1.95 to 36.2	13.87 (Ave.)
Al_2O_3	0.33 to 11.2	3.23 (Ave.)
Fe_2O_3	0.29 to 44.9	2.69 (Ave.)
CaO	1.91 to 41.7	43.11 (Ave.)

The individual waste analysis results of the ETP sludge has shown a wide variation in its characteristics.

3. Trail Process

The hazardous waste sludge blended with lime stone stacked after crushing in a shed is transferred to feed, which is subjected to crushing and stocked in silos for feeding to raw meal preparation. Relevant photos are given at **Annexure 1.**

4. Raw material & Cost Saving

As like other wastes, the textile processing ETP waste is not having required calorific value to consider as energy substitute in the co-processing. The ETP sludge contains average CaO of 30%, which is consider to be good substitute for limestone to about

7%. The substituting with sludge the unit has saved 7% of the limestone by weight. The available calorific value of the sludge is at a maximum of 1020 kcal/kg.

Quantity of hazardous waste utilization : 7.1 % i.e 335 TPD
Direct saving of Lime stone : 335 TPD
Cost of Lime stone per tone : Rs. 315/tone
Total cost saving : 315 * 335 = Rs. 1,05,525 per day*

Note: * - *excluding the packaging, transportation, preparation and handling costs.*

In addition to Raw material lime stone replacement ETP sludge, the unit has used AFR like paint sludge, tyre chips and plastic, which has high caloric value, as energy alternative. The Raw material consumption and clinker production are as follows:

S.No.	Raw material	Pre trial	Trial (Ave)	Post-trial
1.	Lime Stone (TPD)	4783	4445	4834
2.	White Clay (TPD)	305	288	254
3.	AFR (TPD)			
	- Paint Sludge	40	32	35
	- Tyre chips	8	15	10
	- Plastic	5	-	-
4.	Coal consumption (TPD)	92.6	89.84	86.4
5.	ETP sludge (TPD)	-	335	-
6.	Clinker Production (TPD)	3331	3233	3235

5. Emission Control & Monitoring

The unit has provided ESP to control the particulate matter followed with a stack. The stack height is 82 M and 3.2 Meter dia. The CPCB team witnessed the co-processing of sludge in the kiln. The unit has engaged M/s Vimta Labs Ltd, Hyderabad carried out as per Guideline for normal operation; trail run at fixed % of H.W and normal operation for 5 days. **The summary of the emissions monitoring results as per protocol of monitoring for source and ambient will be submitted by M/s Vimta Labs Ltd**.

6. Conclusion

- M/s Ultratech Cements Ltd., has conducted trail run for utilisation of ETP sludge as a supplementary resource during May 27 to 31, 2013 in the cement kiln of 3200 TPD clinker production. In addition to ETP sludge, the unit is practicing AFR like Paint sludge, Tyre chips and plastic as energy alternative to Coal.

- The unit has maintained the Waste (ETP Sludge) feed at an average of 7% by weight in Kiln along with lime stone and white clay.

- The unit could able to save 335 TPD of lime stone by ETP sludge. The cost of saving of lime stone @ Rs. 315 /T is around Rs. 1.5 lac per day, which is excluding the cost of handling etc.

- As per the analysis report of IETP/CETP sludge, presence of traces of heavy metals was found, hence monitoring of heavy metals in source emissions and ambient air quality is required to assess the adequacy of control measures provided to kiln.

- The unit has handled/dumped the materials with a help of JCB dumper directly in to lime stone crusher along with lime stone. Crushed and blended lime store is stacked and reclaimed for raw meal preparation with a help of automatic stacker & reclaimer.

- The unit shall develop and maintain the sprinkler system to arrest fugitive emission at lime stone & ETP sludge loading area to arrest fugitive emission. Also to construct wind barrier around material handling area to arrest the carryover dusts.

- The unit handles shorted municipal wastes, tyres, Paint sludge, and plastic as alternative fuel. The shed provided for handling of Municipal wastes are not enough, the shed shall be extended and leachate collection pit is to be constructed inside the shed.

(G. Thirumurthy)
EE

(H.D.Varalaxmi)
EE

Annexure 1

Trail Run Photographs

Fig.1: ETP sludge Storages for feeding

Fig.2: Tipper (bucket) lifter is used for charging the material

Fig.3:ETP sludge charging along with lime stone to the crusher

Fig.4: Alternate fuel charging arrangement (manually)

Fig.5: Alternate fuels stored in a shed (MSW, rice husk etc)

Fig.6: Alternate fuels stored in a shed

Fig.7: Stack monitoring witnessed by PCBs

Fig.8: Shed with stacker & reclaimer for lime stone

Fig.9: Sheds provided for AFR

Fig.10: Sludge stored along with lime stone, charging area to the crusher

Fig.11: Ambient Air Quality Monitoring

Fig.12: Ambient Air Quality Monitoring