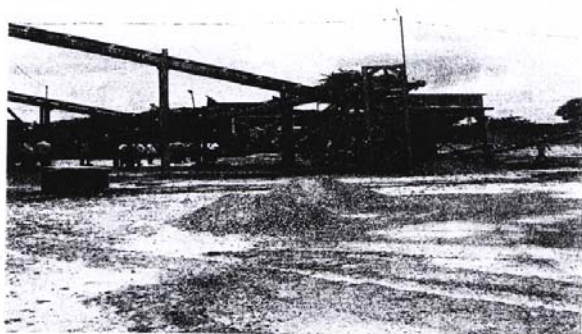


Report of the Expert Committee  
on the environmental problems due to stone crushers and  
related activities in Sonebhadra district



**Central Pollution Control Board**  
(Ministry of Environment & Forests, Govt. of India)  
Parivesh Bhawan, CBD-cum-Office Complex,  
East Arjun Nagar, Delhi-110 032



स. प्र. गौतम  
अध्यक्ष  
S.P. Gautam  
Chairman

केन्द्रीय प्रदूषण नियंत्रण बोर्ड

(भारत सरकार का संगठन)

पर्यावरण एवं वन मंत्रालय

Central Pollution Control Board

(A Govt. of India Organisation)

Ministry of Environment & Forests

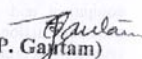
Phone : 22304948 / 22307233

### FOREWORD

Member, National Commission for Protection of Child Rights (NCPCR) made a visit to Sonbhadra district during January 2011 and observed that a large number of stone crushers are working in the Dala area leading to large-scale stone mining and queries due to which the entire environment was getting polluted, and also posing severe health hazards to the workers engaged and the people living nearby. Following the visit, Member, NCPCR strongly recommended to Central Pollution Control Board (CPCB) to constitute a Committee to look into the matter and suggest measures to prevent the pollution affecting the human health.

CPCB constituted an Expert Committee to study the environmental problems due to stone crushers and related activities in Sonbhadra district / Singrauli region and suggest preventive and mitigative measures. This Expert Committee visited the Dalla stone crusher and mining area during 13<sup>th</sup> and 14<sup>th</sup> July 2011 and based on the field observations and discussions held with the stakeholders during the field visit arrived at some recommendations for the area. This Report represents the findings and recommendations of the Expert Committee

January 10, 2012

  
(S. P. Gautam)  
Chairman

'Parivesh Bhawan' C.B.D.-cum-Office Complex, East Arjun Nagar, Delhi-110 032  
Fax : 22304948 / 22307078 e-mail : ccb.cpcb@nic.in  
Website : cpcb.nic.in

B-4002/PCI (SSI)/2011

January 19, 2012

To,

**Dr. Yogesh Dube, Member**  
**National Commission for Protection of Child Rights (NCPCR)**  
5<sup>th</sup> Floor, Chanderlok Building  
36, Janpath, New Delhi

**Sub:** Environmental problems due to stone crushers and related activities in Sonebhadra district

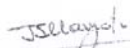
Sir,

This has reference to your letter No. 16/1/2011/U.P./NCPCR/CL/16404, dated 10<sup>th</sup> February 2011 and subsequent letter dated 25<sup>th</sup> May 2011 addressed to Secretary, Environment & Forests, Govt. of India, on the above subject.

In view of the concerns expressed in these letters, Central Board constituted an Expert Committee vide office order dated May 16, 2011 to study the environmental problems in Sonebhadra district due to operation of stone crushers and related activities. The Expert Committee submitted its report (copy enclosed) prepared on the basis of field observations and discussions with the stakeholders.

Based on the findings / recommendations of the Expert Committee, Central Board has issued directions under Section 18 (1) (b) of the Air (Prevention and Control of pollution) Act, 1981 to U.P. State Pollution Control Board on January 10, 2012 for ensuring installation of pollution control equipment and implementation of pollution abatement measures in stone crushers besides taking necessary action to ensure implementation of environment protection measures in clusters of stone crushers and mining areas.

Yours faithfully

  
(J. S. Kamyotra)  
Member Secretary

## EXPERT COMMITTEE

Mr. U. N. Singh, AD & I/c PCI (SSI), CPCB	: Member
Mr. M. Q. Ansari, AD & I/c CPCB ZO-North, CPCB	: Member
Mr. M. J. Parvez, Director/Gr.Head (Env. Man), NPC	: Member
Mr. M. A. Patil, Director, Resource Conservation & Management, FICCI	: Member
Mr. Kalika Singh, I/c UPPCB, Sonbhadra Regional Office	: Member
Mr. Nazim uddin, SEE /Sc. D, CPCB	: Convener

**Report of the Expert Committee  
on the environmental problems due to stone crushers and related activities in  
Sonebhadra district**

**Background**

Member, National Commission for Protection of Child Rights (NCPCR) made a visit to Sonebhadra district, Uttar Pradesh during January 2011 and observed that large number of stone crusher plants have been working in the Dala area, leading to large-scale stone mining and queries and due to running of stone crusher plants and use of machines the entire environment was getting polluted, affecting the human health, especially the children and affecting the air, natural water sources, farm land and habitations of the area and also posing severe health hazards to the workers engaged and the people living nearby. The Member, NCPCR was also informed that the stone crushing activities are not only polluting the available water source but also the water level is going down and as a result the source of potable water is vanishing in the area and in remote areas people have been walking long distance to access water from natural source, which often gets dry up during summer. On the basis of his personal observations and feedback from the local stakeholders, the Member, NCPCR strongly recommended to Central Pollution Control Board (CPCB) to constitute a Committee to look into the matter and suggest measures to prevent the water and air pollution affecting the children and others.

Considering, the concerns shown by National Commission for Protection of Child Rights (NCPCR) regarding the problem of air and water pollution and water resource depletion due to stone crushing and related activities in Sonebhadra District, U.P., CPCB on 16<sup>th</sup> May 2011 constituted an Expert Committee to study the environmental problems due to stone crushers and related activities in Sonebhadra District, U.P. and to suggest preventive and mitigative measures. Copy of Office Order regarding constitution of the Expert Committee is attached at **Annexure I**.

**Terms of Reference of the Expert Committee**

Terms of Reference of the Committee are as below:

- To study the problem of air and water pollution and water resource depletion due to stone crushing operation and related activities in Sonebhadra district / Singrauli region.
- To suggest measures to prevent and control air and water pollution and depletion of water sources due to stone crushing and related activities in Sonebhadra District / Singrauli region to minimize impact on humans, especially children, animals and agriculture including better / cleaner production / air pollution control technologies.

### Meetings and Field visits of the Expert Committee of the Expert Committee

The Expert Committee held first meeting in CPCB Head Office on 30<sup>th</sup> May 2011 and decided to make a 2 day visit to the stone crusher area in Sonbhadra district, U.P. The 2 day field visit to the Dalla stone crushers cum mining area was conducted by the Expert Committee conducted on 13<sup>th</sup> & 14<sup>th</sup> July 2011. The Expert Committee held second meeting in CPCB Head Office on 12<sup>th</sup> September 2011 to finalize its findings and recommendations.

### General information about the problem / the area visited

As per the information provided by UPPCB, 264 stone crushers are located across various areas of Sonbhadra District, namely Dalla, Billi, Obra, Chopan Bardia, Sundariya Road. The stone is mined from open cast stone mines above and below ground level on lease basis. The stone is of a good quality black Vindhyan lime stone. The Expert Committee visited Dalla stone crusher cum mining area in which more than 70 % of the total stone crushers of Sonbhadra District are located. The Dalla stone crusher cum mining area is spread in about 652 acre and stone from the stone mines of the area are supplied for the stone crushing. The Stone crusher units of the area rely either on ground water wherever possible for operating the (wet) dust suppression system or on the water arranged through tankers which is obtained from near-by sources.

### General features of the area

Features	Name / Description	Geographical Location/Distance from Stone crusher cum mining area boundary
Rivers	River Sone	East, 3 km
	River Rihand	West, 8 km
Roads/ Highways	State Highway No. 5/ Varanasi – Shakti Nagar Highway road	East, Along the boundary of stone crusher cum mining area
	Billi-Obra road	Bisecting the Stone crusher cum mining area
Village/ Settlements	Obra	North West, 5 to 6 km
	Around 50 – 60 Settlements on Billi-Obra road	On the either side of the road, Around 0.3 – 0.5 km
	Around 10-15 Settlements of villagers employed in stone crusher units	Scattered between the agricultural fields
Others	Agricultural and empty fields covering reasonable piece of land/ area	At the edge of stone crusher cum mining area.

### Specific observations regarding the two stone crusher units visited

#### M/s Raja Sewa Samiti, Dalla, Sonbhadra (Capacity: 3 ton per hour)

The unit was non-operational due to power cut but the operation was demonstrated with the help of DG set. The plant has installed two jaw crushers (primary and secondary) and a vibrating screen. Dust containment system in the form of metal sheet enclosures are provided at three sides of vibratory screen but one side was found permanently open. No dust

containment system was provided at primary and secondary crusher discharge area. (Wet) Dust suppression system is provided at some places. Wind breaking walls and green belt are present. Sprinkler arrangement all around the premises to spray water from a height of 5 to 7 meters for regular wetting the ground is provided. The road inside the premises are not metalled.

**M/s Vijay Express Way Engineering Ltd., Dalla, Sonbhadra (Cap.: 100 tons per hour)**

The unit was setup to provide products for the roads being constructed by NHAI and is non-operational since last three months as there was no requirement of stone products. The plant has installed three crushers (primary jaw crusher and secondary and tertiary cone crushers) and two vibrating screens (primary and secondary). The first screen is fed by the secondary crusher and the second screen is fed by either the tertiary crusher or by the first screen. The plant is based on a German design however only the design of stone crusher has been adopted but the dry air pollution control system based on bag filters has not been installed (Fig. 4). The crusher and screens design are almost covered. Spray nozzles for (wet) dust suppression system was provided for all equipments at appropriate places. Wind breaking walls and green belt have not been provided. Sprinkler arrangement to spray water for regular wetting of the ground is not provided. The road inside the premises are not metalled.

#### **Discussion with Stake holders**

During detailed interaction / discussion with the stakeholders, various facts were put forward before the Expert Committee by various stake holders - Stone Crusher Association), UPPCB, Mining officer, Forest officer and PWD, and these are as listed below:

1. During the operation of stone crusher units, cloud of dust covering the area can be seen.
2. UPPCB officers informed that production capacity of maximum number of stone crushers present in this region varies between 15 - 30 tonne per hour.
3. Most stone crushers have installed wet dust suppression system and provided bore wells within their premises with submersible pumps to run these systems. Dalla region being a hilly area is associated with scarcity of water and ground water required for the wet dust suppression system in the stone crusher units is not available during three peak summer months: April, May and June. Due to water scarcity during the summer season, most of the units do not operate the water sprinkling system.
4. The wet dust suppression system installed in most of stone crushers are not scientifically designed, rather, the size, type of the nozzle as well as rate of application of water is decided by stone crusher owners themselves.
5. Some stone crushers informed that due to water spraying in the wet dust suppression process the very fine dust becomes sticky and sometimes the products is rejected due to poor quality.

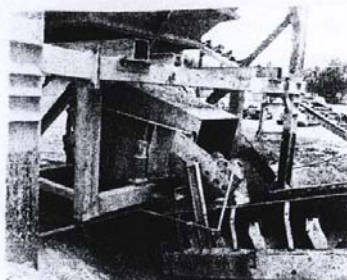
6. Stone Crusher Association expressed that the replacement of dust suppression system with techno-economically feasible dry scrubbing technology is the need of the hour.
7. Stone Crusher Association expressed that wind breaking walls gets damaged because of vibrations originated from blasting operations performed in mines in close vicinity, therefore, other options need to be explored to prevent suspension of dust.
8. UPPCB officers informed that following works are proposed in the area:
  - Supporting installation of one model air pollution control system in one stone crusher for which Rs 10 lakh has been sanctioned Shakti Nagar Area Development Authority (SADA)
  - Construction/development of link roads in the stone crushers cluster area under MNREGA
  - Development of green belt along main road and in stone crushers cluster area by Forest Department for which Rs 25 lakh has been sanctioned by SADA
9. Forest Officer expressed willingness to provide plants at government rate for green belt development and provide guidance regarding species which would be most suited considering the scarcity of water and maximum foliage for entrapment.
10. Because of a large number of bore wells in the stone crusher cluster, a substantial amount of ground water is extracted and as the natural recharging of the ground water from rain water is not sufficient enough to replenish the ground water levels due to typical terrain, stone crushers might be contributing in depletion of ground water in the area every year.
11. Some of the stone mines are very deep. The ground water from nearby areas might have seeped into the deeper mine pits in the past which might have led to drying of nearby shallow bore wells which were of lesser depth than the depth of mine pits.

#### **Emissions from stone crushers**

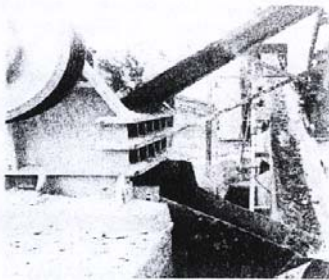
The emissions could be classified into two types, primary and secondary.

Primary Emissions are emissions of fine dust from crushing process. During operation of stone crushers, fine dust is generated from various points like unloading of raw material, jaw crushers, screens, transfer points wherever crushed stones fall from belt conveyor, and at the points of final discharges to stock piles.





Vibratory screen discharge point without enclosures



Crusher without enclosures

Secondary emissions are those where the fine dust settled on ground or on equipments or from stock piles get air borne due to wind or vehicle movement which remains in suspension for a long time.

Most of the stone crushers in the cluster store their crushed products of different sizes in open stock piles. The 'stone dust' product contains large percentage of fine dust particles. Some fine dust generated during crushing operation also gets along with the crushed stone. As the products are stored in open stock piles, whenever wind blows substantial fine dust gets air borne from these stock piles. Fine dust settled on the road also gets air borne due to movement of vehicles on the unpaved roads.

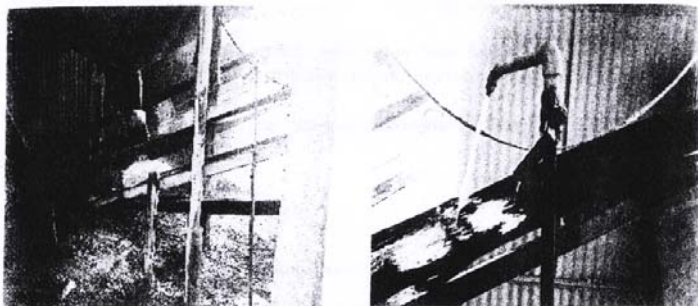


Uncovered stock piles of stone dust and fine dust and non-metalled road

#### **Salient observations regarding Stone crusher cum Mining area**

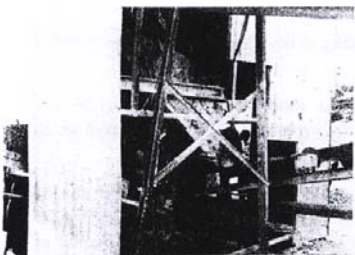
1. None of the stone crusher units were found operational during the visit due to power cut even then substantial dust emissions were observed in the stone crusher cluster area, due to movement of transport vehicles on the dusty roads even when crusher units were not operating.

2. Most stone crushers have installed some sort of water spraying arrangements for dust suppression. However, the water spraying arrangements are not properly designed in terms of type of nozzles deployed, quantity and pressure of water sprayed, locations of the sprays, absence of water meter / totalizer to keep record of quantity of water sprayed etc.

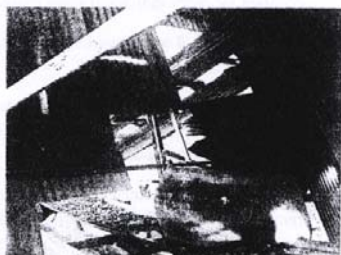


Improperly designed water spraying system

3. Most stone crushers have installed some sort of dust containment in the form of metal sheet enclosures. However, these containment enclosures are only partial in nature. Though metal sheet enclosures are provided for equipments like the vibratory screen, there are a number of large openings in the side walls, especially at the places where belt conveyor enters and leaves the enclosure. Such partial enclosures are ineffective and cannot contain the fine dust within the enclosure and the dust escapes through the openings.



Partial dust containment system / enclosure around vibratory screen



Gaps in the side walls of enclosure / dust containment system

4. Stone crusher units in the area have mostly not provided wind breaking walls or if provided it is of inadequate height.

5. Facilities for regular cleaning and wetting of the ground within the premises and green belt along the periphery of the stone crushers is absent in the stone crushers of the area. However, one unit located at the fringe of the area (M/s Raja Sewa Samiti) shown to the Expert Committee team has facility for sprinkling water all around the premises along with some green belt.
6. Neither the link/approach roads in the stone crushers area nor the roads within the premises of the stone crushers are properly metalled.
7. Blasting activities were not carried out during the visit.

#### Recommendations

##### *Stone crusher units:*

1. All stone crushers should provide the following dust containment equipment/ system:
  - a) Closed metal sheet enclosures at dust emitting points i.e. the crushers including their discharge points, screens, and the transfer points of belt conveyers, with arrangements of a door with opening and closing facility for cleaning and maintenance and flexible covers at entrance and exit of the belt conveyors. All opening provided for ventilation in the enclosures should be covered by canvas bag-filter to arrest the escaping dust.
  - b) Covering of all belt conveyers.
  - c) Silos with telescopic discharge chute for collecting, storing and delivering/truck-loading the product, 'stone dust' and the reject, 'fine dust'.

The above 'equipment specifications' should be primarily and compulsorily enforced on all stone crushers. SPM standard as described in E (P) Act, 1986 must be complied by every individual stone crusher.

2. A minimum 12 ft high metal sheet barricading or boundary wall should be provided by all stone crushers.
3. Dust suppression by scientifically designed water sprinkling system on raw material/products at the equipments and transfer points should be adopted as an auxiliary air pollution control measure.
4. The roads inside the stone crusher premises should be metalled and the stone crusher premises should be cleaned regularly to avoid re-entrainment of settled dust. Regular wetting of the ground within the premises be adopted as an auxiliary air pollution abatement measure.
5. Green belt along the boundary wall needs to be developed by all stone crushers.

6. The dust extraction system installed by the stone crushers at dust containment enclosures to extract the accumulated dust should be equipped with adequate dust control system such as cyclone and bag filter followed by a stack.
7. The loading, unloading, handling and storage of raw material / products, waste or by-products should be carried out in such a way so as to minimize the generation of dust emissions. Covering should be provided while transportation and storage of final product / material.

**Stone crusher area:**

1. The stretches of the main highways passing in the vicinity of the stone crushers area needs to be metalled to control re-suspension of settled dust and minimise seasonal damages.
2. The approach and link roads in the stone crushers area should be metalled.
3. Green belt should be developed along the main highways and link roads in the stone crushers area

**Mining area:**

1. Suitable water conservation measures to preserve ground water resources should be implemented in and around the mining area in consultation with Central Ground Water Board. Maximum permissible depth of mining should be specified and enforced by the Mining Department. The mining activity be restricted well above the static water table so as to ensure that the ground water is not impacted.
2. Measures to augment ground water resources should be implemented in and around the mining area in consultation with Central Ground Water Board. Water recharge structures should be constructed for the closed mines' pits.

Central Pollution Control Board  
Parivesh Bhawan, East Arjun Nagar, Delhi-32

B-4002/PCI (SSI)/2011

16.05.2011

**OFFICE ORDER**

**Constitution of the Expert Committee to study the problem of air and water pollution and water resource depletion due to stone crushing and related activities in Singrauli region**

An Expert Committee comprising of following officers is constituted to study the environmental problems due to stone crushers and related activities in Sonbhadra district and Singrauli region and suggest preventive and mitigative measures:

- |   |            |
|---|------------|
| 1. Mr. U. N. Singh, AD & I/c PCI (SSI), CPCB                            | -Member    |
| 2. Mr. M. Q. Ansari, AD & I/c CPCB ZO-North, CPCB                       | -Member    |
| 3. Mr. M. J. Parvez, Director/Gr.Head (Env. Man), NPC                   | -Member    |
| 4. Mr. M. A. Patil, Director, Resource Conservation & Management, FICCI | -Member    |
| 5. Representative of UPPCB  | -Member    |
| 6. Mr. Nazim uddin, SEE /Sc. D, CPCB                                    | - Convener |

The Committee will submit a detailed report based on site visits. CPCB North Zonal Office and concerned office of UPPCB will provide necessary assistance to the Committee.

**Terms of reference:**

- to study the problem of air and water pollution and water resource depletion due to stone crushing operation and related activities in Sonbhadra district and Singrauli region
- to suggest measures to prevent and control air and water pollution and prevent depletion of water sources due to stone crushing and related activities in Sonbhadra district and Singrauli region to minimize impact on humans, especially children, animals and agriculture including better / cleaner production / air pollution control technologies .

**Term of the Experts Committee:** Four months

TA and honorarium of Rs. 3000/- per day for participating in the visits/meetings will be paid to the representatives from NPC and FICCI.

-sd-  
(J. S. Kamyotra)  
Member Secretary

To: - All members

Copy to:

P.S. to C.C.B.  
P.S. to M.S.