

BASELINE DATA STUDY OF THE LALITPUR POWER  
GENERATION CORPORATION LIMITED (3x 660 MW) DURING  
THE CONSTRUCTION STAGE

A Dissertation  
Submitted in the partial fulfillment for the award of the degree of

Master of Technology  
In  
ENVIRONMENT SCIENCE AND TECHNOLOGY

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## Declaration

I, the undersigned, hereby declare that the research work presented in the M.Tech project entitled “Baseline data study of the Lalitpur power generation corporation limited (3x 660 MW) during the construction stage” has been carried out by me under the supervision and guidance of Mr. K.S. Babu , Assistant Professor, School of energy and environment, Thapar University, Patiala. and Mr. Rajeev Tyagi (D.G.M, EHS, LPGCL). Further, I declare that no part of this Dissertation has been submitted for a degree or any other qualification of any other university or examining body in India/elsewhere.

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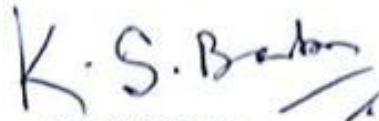
## CERTIFICATE

This to certify that the dissertation entitled "**Baseline data study of the Lalitpur Power Generation Company Limited (3X660 MW) during the construction stage**", carried out by **Ms. Akanksha Palak** in partial fulfillment of the requirements for the award of **Master of Technology in Environmental Science and Technology** at Thapar University, Patiala is an authentic piece of work carried out by her in our guidance and supervision.

To the best of our knowledge, the matter embodied in this thesis has not been submitted to any other university/institute for award of any degree/diploma.

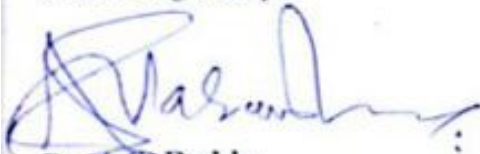


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## ABSTRACT

M/s Lalitpur Power Generation Company Ltd. (LPGCL), intends to set up coal based 3x660 MW thermal power plant near Mirchwara and Buraugaon villages in Lalitpur district of Uttar Pradesh. The baseline data study of the project site has been carried out during the construction stage. The monitoring of ambient air quality, noise level and wastewater was carried out during the construction phase.

The parameters considered while the ambient air quality monitoring were SO<sub>x</sub>, NO<sub>x</sub>, PM<sub>10</sub>, PM<sub>2.5</sub> and carbon monoxide. From the results obtained it was concluded that the parameters were under the permissible limit. Mitigation measures were taken to take care of the air quality.

The noise level monitoring was carried out on a daily basis by the sound level meter. The construction activities were carried out mostly in the day time to avoid any noise pollution during night. The noise pollution created from the construction activities was not causing much of the disturbance as the appropriate instruments were used. Various mitigation measures were also taken to take care of the noise level.

The parameters considered while the monitoring of the wastewater quality were BOD, COD, pH, total suspended solids and oil & grease. The samples were collected from various sites and examined for their quality. Various mitigation measures were taken and hence the water quality was maintained.

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## INTRODUCTION

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M/s Lalitpur Power Generation Company Ltd. (LPGCL), intends to set up coal based 3x660 MW thermal power plant near Mirchwara and Buraugaon villages in Lalitpur district of Uttar Pradesh. The baseline data study of the project site has been carried out during the construction stage.

### 1.1 IDENTIFICATION OF THE PROJECT AND PROJECT PROPONENT

#### 1.1.1 ABOUT THE PROJECT

The proposed project (3x660 MW coal based power plant) will be located near Mirchwara and Buraugaon villages in Lalitpur district of Uttar Pradesh. This project is in-line with central government's massive power capacity addition plan, which sets a target of adding 78,700 MW of power generation capacity in the country in the 11<sup>th</sup> plan (2007-2012) out of which more than 15000 MW are expected to be met by the private sector. This proposed project at Lalitpur district by M/s Lalitpur Power Generation Company Ltd. would assist in meeting the increased demand of power. It is envisaged to use coal for the power plant would be obtained from subsidiary of Coal India.

#### 1.1.2 PROJECT COMPONENT

M/s Lalitpur Power Generation Company Ltd. (LPGCL), intends to set up a coal based 3x660 MW thermal power plant near Mirchwara and Buraugaon villages in district Lalitpur in Uttar Pradesh.

### 1.2 BRIEF DESCRIPTION OF THE PROJECT

The proposed project would require 1282.2 acre of land including the ash pond and green belt area. In the proposed power plant 3 boilers with super critical technology will be installed which will be fired on coal. The total coal requirement for the project at 85% Plant Load Factor (PLF) 8.51 MTPA which comprises of indigenous coal from Dudhichua, open coal mine of NCL and imported coal from Indonesia. The water requirement will be about 5556 m<sup>3</sup>/hr, which will be

drawn from Rajghat dam (betwa canal system). One twin flue stack and one single flue stack of 275m with ESP of more than 99.9% efficiency will be provided to control particulate matter below 50 mg/Nm<sup>3</sup>.

### 1.2.1 COST OF THE PROJECT

The cost of the project is about Rs.12295.8 crores, which includes Rs.1230 crores for environmental protection measures. This project will be commissioned in 56 months.

### 1.2.2 DESCRIPTION OF THE SITE

This land identified for the proposed project is about 1282.2 acre. The land in the plant site is plain land with a general elevation of about 330m MSL. The mean maximum and the mean minimum ambient temperature in the area as per IMD-Tikamgarh for the period of 10 years from 1991 to 2000 are recorded to be 41.8<sup>0</sup>C (may) and 13.6<sup>0</sup>C (march).

The relative humidity varies from 35% to 55% at 0830 hours and from 22% to 31% at 1730

### 1.2.3 GEOGRAPHICAL PROFILE OF THE SITE

Lalitpur is of the districts of Uttar Pradesh state of India. It is a part of Jhansi division and was carved out as a district in the year 1974. It is connected to Jhansi district of Uttar Pradesh by a narrow corridor to the northeast otherwise it is almost surrounded by Madhya Pradesh.

Figure 1.1- geographical location of the lalitpur



### 1.3 BENEFITS OF THE PROJECT

Some of the benefits that accrue from the proposed coal based thermal plant include the following:

- The proposed project would enable to meet part of the growing power demands in Uttar Pradesh due to rapid industrialization and also due to large scale use of electricity for irrigation, domestic and commercial purposes.
- The proposed project would result in improvement of infrastructure, economic development, as well as improvement in social- economic condition in the area and provide direct and indirect employment to a large number of people there.
- Employment Opportunities: The major benefit due to the proposed project will be in the sphere of generating temporary employment for substantial number of people. During construction phase of power plant, there would be requirement for semi-skilled and unskilled workers. These construction workers shall be taken from the affected villages and area to the extent possible. During the operational phase of the plant, there would also be need for gardeners, drivers, security guards etc. This will provide job opportunity for local people.
- Economic Development: With the upcoming Project, there will be requirement for commercial establishments in and around project area to meet the demands of the local people and project people. The local population will be benefited by these developments.
- Community Services: LPGCL shall develop necessary infrastructure like roads, accommodation, water supply, sewerage, medical facility etc for catering to the needs of project staff, their families and PAF. LPGCL as part of periphery development activities and part of its Corporate Social Responsibility will develop local community infrastructure and up-grade the existing facilities. Through skill improvements and training programmes the locals will be provided opportunity and assisted in improving their skill sets specially focussing on self-employment.
- Transportation: LPGCL will be laying approach roads to project area. Development of

power plant in this area will boost infrastructural facilities material transportation, mechanical workshops etc. these will create more employment opportunities for the local people.

### 1.3 LAND REQUIREMENT

**Table 1.1- land requirement for the project**

S. No.	Description	Area (Acre)
1	Main Plant -Includes raw-water reservoir, coal handling plant, auxiliary structures, stores and miscellaneous buildings.	476.0
2	Ash Pond	145
3	Colony	70
4	Green Belt	297
5	Rail and Water Corridor	50
Total		1038

### 1.4 ENVIRONMENTAL SETTING OF THE SITE

**Table 1.2- environmental setting of the site**

S.NO.	PARTICULARS	DETAILS		
1	Plant Location	Mirchwara and Buraugaon villages of Lalitpur district, Uttar Pradesh		
2	Plant site coordinates	Coordinates		
		Corner	Latitude	Longitude
		<b>Point</b>		
		A	24048'26" N	78038'01" E
		B	24048'07" N	78039'33" E
		C	24047'06" N	78039'38" E
	D	24047'05" N	78038'58" E	

		E	24047'27" N	78038'05" E
3	Ash pond coordinates	Coordinates		
		Corner Point	Latitude	Longitude
		1	24047'05" N	78038'58" E
		2	24046'46" N	78038'59" E
		3	24046'54" N	78039'15" E
		4	24047'06" N	78039'38" E
4.	Climatic Conditions (IMD, Tikamgarh)			
a)	Temperature Mean maximum Mean minimum	41.8 0C (May)		
b)	Mean Annual Rainfall	1057.1 mm		
c)	Relative Humidity	22 % - 87%		
d)	Predominant wind directions	W, N followed by SW		
6	Plant site Elevation above MSL	330 -m above MSL		
7	Plant site top sheet	54 L/9		
8	Present land use at the site	Mixed barren land with shrubs		
9	Nearest highway	NH-26 (16-km, W)		
10	Nearest railway station	Lalitpur (20-km, SW)		
11	Nearest Airstrip	Lalitpur (20-km, SW)		
12	Nearest major water bodies	-Sajnam nadi (1.6-km, W)- Uttai nadi (0.5-km, E)		
13	Water source for the project	Upstream of Betwa canal system		

14	Nearest town/City	Lalitpur, (20-km, SW)
15	Nearest village	Mirchwara (1.0-km, SW)
16	Hills/valleys	--
17	Archaeologically important	Nil in 15-km radius
18	Protected areas as per Wildlife Protection Act,1972 (Tiger reserve, Elephant reserve,	Nil in 15-km radius
19	Reserved / Protected Forests	17 forests exists around study area - Tori RF (6.8-km, NW) - Bar No.1 RF (8.5-km, NW) - Maughat PF (12.0-km, E) - Banhaur Kharait RF (10.1-km, NNW)]- Nayakhara PF (11.9-km, E)
20	Seismicity	Seismic Zone-II as per IS 1893 (Part I):2002
21	Defense Installations	None in 15-km radius area
22	Major industries in 15-km radius	No major industries are present in 15-km radius
23	State Boundary	Madhya Pradesh State boundary, 9.9-km, NE

Figure 3 : picture showing construction process on the site.



## LITERATURE REVIEW

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### 2.1 SIGNIFICANCE OF MONITORING DATA FOR VARIOUS PURPOSES

Many hundreds of toxic compounds are released into the atmosphere as a result of human activities. Any monitoring programmed design will be dependent upon the monitoring specific objectives specified in the selected area of interest.

### 2.2 OBJECTIVE OF AIR MONITORING

- facilitate the background concentration(s) measurements and monitor current levels as a baseline for assessment.
- check the air quality relative to standards and detect the importance of individual sources.
- enable comparison of the air quality data from different areas
- collect data for the air quality management traffic and land-use planning purposes,
- observe trends (related to emissions) and develop abatement strategies.
- determine the exposure and assess the effects of air pollution on health, vegetation or building materials and inform the public about the air quality.
- develop warning systems for the prevention of undesired air pollution and facilitate the source apportionment and identification.
- supply data for research investigations and develop management tools.
- develop and test analytical instruments and support legislation in relation to the air quality limit values and guidelines.

In 2001 Amy D. Kyle et al. evaluated the health significance of hazardous air pollutants using monitoring data. In this paper six air pollutants – ozone, sulphur dioxide, nitrogen dioxide, particulate matter, carbon dioxide and lead were monitored and assessed for health significance.

The goal of the study was to analyze the availability of information needed to characterize the health significance of hazardous air pollutants, focusing on urban areas of California.

In 2008 Bjarne Sivertsen et al. described the monitoring of air quality, its objectives and designs. The specification of monitoring objectives, data quality objectives together with proper site selection, data quality assurance and well-defined data presentation and assessment are important elements in this process.

In 2000 science advisory committee described the concept of air toxics monitoring. There are currently 188 hazardous air pollutants (HAPs), or air toxics, regulated under the Clean Air Act (CAA) that have been associated with a wide variety of adverse ecosystem and health effects, including cancer, neurological effects, reproductive effects and developmental effects. These air toxics are emitted from multiple sources, including major stationary, area, and mobile sources, resulting in population exposure to these air toxics.

In 1999 Jon bover et al. described the significance of ambient air quality monitoring for health impact assessment. According to the paper, health impact assessment combines estimates of population exposure with information on toxicity or the relationship between exposure and response. Human exposure to air pollution may result in a variety of health effects, depending on the types of pollutants, the magnitude, duration and frequency of exposure and the associated toxicity of the pollutants of concern.

### **2.3 OBJECTIVES OF NOISE LEVEL MONITORING**

- Check the noise level relative to standards and detect the importance of individual sources.
- Enable comparison of noise level data from different areas.
- Ensure that mitigation associated with all phases (i.e., Construction, Operation, and Decommissioning) of the proposed project meets the noise level standards.

In 2002, D Smeatham et al. published their work on noise levels and noise exposure of workers in pubs and clubs. The information provided by the literature is used to determine whether there is a noise problem, practical measures that can be adopted to control the level of noise exposure,

methods adopted by Local Authorities to enforce control, and what needs to be done to ensure employees in pubs and clubs are provided with a safe work environment.

In 2012, Vaishali Jain et al. worked on analysis of noise level reduction for plant machine monitoring. In this, noise levels are identified and monitored for several machines and comparison done with its actual acceptable limits. The unacceptable noise limits are smoothed by certain techniques like change in design on equipment, providing silencers, sealing the leakages, preventive maintenance schedule and again noise level is measured for the machines to get the result of acceptable noise.

In May 2013 Luis E. worked on application of noise level monitoring in urban area. The purpose was to encourage users to collect noise measurements with their personal smart phones so that other stakeholders can use these measurements in their analysis and decision making processes. This research presents a prototype to monitor environmental noise based on gamification techniques and outlines some possible analysis to obtain noise maps.

In 2010 Nicolas Maisonneuve et al. worked on participatory noise pollution monitoring using mobile phones. In this paper they present a novel approach to monitor noise pollution involving the general public. Using mobile phones as noise sensors, they provide a low cost solution for the citizens to measure their personal exposure to noise in their everyday environment and participate in the creation of collective noise maps by sharing their geo-localized and annotated measurements with the community.

In 2009 Shahid Naseem et al. worked on computerized monitoring of noise and dust levels at different road crossings of Lahore. This study concludes that the noise level gauged at different areas of Lahore at different times of the day was higher than the permissible level.

In 2011 S. B. Kankal et al. conducted studies on noise level monitoring at Shirdi (Maharashtra). The result of this study shows that the levels of noise pollution in Shirdi city far exceed the acceptable limit during peak days ( Saturday, Sunday, Thursday and National Holidays ) and Festival Days (Ramanavmi and Gudhipadwa etc.). Even the residential area and vulnerable institutions like school and hospitals face noise which has much higher noise level than acceptable limit.

## 2.4 OBJECTIVES OF WASTEWATER MONITORING

In 2012 O. Korostynska et al. published their work on monitoring of nitrates and phosphates in wastewater. This paper critically analyses both commercially available and state-of-the-art research methods and devices suitable for real-time wastewater quality monitoring and suggests further developments in this area. In particular, the focus is made on the monitoring of nitrates and phosphates in wastewater and a novel microwave based method for instantaneous water quality assessment is suggested.

In 2004 Langergraber G. et al published their work on monitoring of a paper mill wastewater treatment plant using UV/VIS spectroscopy. The UV/VIS range (200-750 nm) for simultaneous measurement of COD, filtered COD, TSS and nitrate with just a single instrument. The instrument measures in-situ, directly in the process. Paper mill wastewater shows typical and reproducible spectra at various process measuring points.

In 2005 Matthew Wade published his work on real-time control and process monitoring of wastewater treatment plants. This paper reports on the design, implementation and real-time operation of advanced process monitoring techniques for wastewater treatment plants. It presents the development of a software platform and its implementation in a full-scale wastewater treatment plant.

In 2008 Ettore Zuccato et al. presented work on estimating community drug abuse by wastewater analysis. They tested a sewage epidemiology approach, using levels of excreted drug residues in wastewater, to monitor collective use of the major drugs of abuse in near real time.

In 1987 J.C. Loftis et al presented their work on statistical analysis of industrial wastewater monitoring data. This study involved review of monitoring goals and objectives, evaluation of background data statistical characteristics, specification of the monitoring network physical configuration, specification of routine data analysis procedures and computerization of data storage, retrieval and analysis.

In 2006 Olivier Thomas conducted studies on wastewater quality monitoring and treatment. In this paper it was presented that wastewater monitoring courses are of short duration, as components of a larger whole. There is no occupation dedicated to wastewater monitoring, or to other types of water

(drinking water, natural waters). There is clearly a pressing need for this work to be duly recognized, combining a traditional approach (specimen sampling, laboratory measurements) with alternative methods.

In 2011 Rakesh kanda et al. worked on mass spectrometry technique for environmental and wastewater monitoring. According to the study, advanced MS techniques combined with innovative sample preparation methods enable analytical chemists to have the ability to analyze and report substances at much lower concentrations than ever done previously in sample of high matrix complexity.

In 2005 Bruce W. Kilgour et al. worked on biological criteria for municipal wastewater effluent monitoring programs. The proposed environmental objectives framework incorporating biological monitoring and assessment can be used to assess the receiving environmental quality and the need for management action. Assessment of biological tools requires the consideration of the magnitude and nature of effects worth preventing or otherwise managing.

### EXPERIMENTAL PROCEDURE AND MATERIALS

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#### 3.1 AIR MONITORING

##### 3.1.1 Activities causing air pollution during construction stage

Construction activities that contribute to air pollution include:

- land clearing
- operation of diesel engines
- demolition
- burning
- Working with toxic materials.

All construction sites generate high levels of dust (typically from concrete, cement, wood, stone, silica) and this can carry for large distances over a long period of time. Construction dust is classified as PM<sub>10</sub> - particulate matter less than 10 microns in diameter, invisible to the naked eye. Research has shown that PM<sub>10</sub> penetrate deeply into the lungs and cause a wide range of health problems including respiratory illness, asthma, bronchitis and even cancer. Another major source of PM<sub>10</sub> on construction sites comes from the diesel engine exhausts of vehicles and heavy equipment. This is known as diesel particulate matter (DPM) and consists of soot, sulphates and silicates, all of which readily combine with other toxins in the atmosphere, increasing the health risks of particle inhalation.

Diesel is also responsible for emissions of carbon monoxide, hydrocarbons, nitrogen oxides and carbon dioxide. Noxious vapours from oils, glues, thinners, paints, treated woods, plastics, cleaners and other hazardous chemicals that are widely used on construction sites, also contribute to air pollution. The potential effects of the particulates is influenced by site and weather conditions (rain and wind direction) and by preventative measures implemented during construction to minimize

emission. Emissions of particulates that exceed air quality guidelines may result in problems on the construction site and under special circumstances (such as strong wind) in off site areas as well. The generation of particulates at construction sites depends on the silt content of the soil being disturbed, the proportion of dry days, operator habits, construction vehicle type and speeds, vehicle weights, and the number of vehicles. Studies indicate that dust from similar construction activities, including excavation and grading settles out very quickly and a level of 150 micron gram/ m<sup>3</sup> will be exceeded at a distance of 50 m, only 2 to 3% of the time (Canadian National Highway Research Program).

**3.1.2 The parameters considered during the monitoring of the ambient air quality are :**

- Sulphur dioxide
- Nitrogen dioxide
- PM<sub>10</sub>
- PM<sub>2.5</sub>

**3.1.3 Methodology used for the calculation of these parameters:**

**Table 3.1- methods used for the calculation of ambient air quality parameters**

<b>S. No.</b>	<b>Parameters</b>	<b>Methods</b>
1	Sulphur dioxide	Modified West & Gaeke Method
2	Nitrogen dioxide	Modified Jacobs & Hochheiser Method
3	PM <sub>10</sub>	Gravimetric method
4	PM <sub>2.5</sub>	Gravimetric method

## **1. NOISE LEVEL MONITORING**

Construction activities are highly contribute to an increase in noise levels at the project site. For the most part of this is unavoidable but is relatively short lived for any individual receptor such as along the pipe line route.

### **3.2.1 ACTIVITIES CONTRIBUTING TO NOISE POLLUTION**

The major construction activities is being done at the day time hours so it not affecting the night – time noise level.

The instrument used for the monitoring of noise level was sound level meter. Monitoring was done only during day time because the construction activities are carried out in daytime only. The major sources of the noise pollution at Lalitpur Thermal Power Plant construction Site are:

- the excavation equipment
- movements of trucks
- construction equipments
- Blasting operations.

## **3.3 WASTEWATER QUALITY MONITORING**

### **3.3.1 Activities contributing to wastewater generation**

During construction at Lalitpur Thermal Power Plant site, the runoff from the construction site is a source of water pollution. Such pollution may persist entirely during initial phase of construction when site grading and excavation for foundation and back filling would be in progress. During this stage the rain water runoff would be carry more soil slit than normal and this would cause silting problem in the receiving water bodies. The other source of water pollution is from the sanitary waste coming from the temporary accommodation of the construction workers. At Lalitpur site more than 1000 temporary contractor workers are working.

### 3.3.2 Parameters considered during the wastewater analysis

- pH
- total suspended solids
- BOD
- COD
- Oil and grease

### 3.3.3 Methodology used for the calculation of these parameters

Table 3.2- methods used for calculation of parameters of wastewater

S. no.	Parameters	Method
1	pH	Electrometric method
2	Total suspended solids	Total solids dried at 103°-105 °C
3	BOD	3 day BOD test
4	COD	Open reflux method
5	Oil and grease	Partition-gravimetric method

## CHAPTER 4

### RESULTS AND DISCUSSION

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#### 4.1 Ambient air quality data during construction period at LPGCL

##### 1. Ambient air monitoring at thermal power plant at Mirchwara, Lalitpur

- Analysis Date : 15/01/2013
- Place of Monitoring : Near Main Gate

Table 4.1 – monitoring after first day of sampling

S. no.	Parameters	Unit	Results
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	70.5
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg /m <sup>3</sup>	11.2
3	Sulphur Dioxide	µg /m <sup>3</sup>	1.5
4	Nitrogen Dioxide	µg/m <sup>3</sup>	3.2
5	Carbon Monoxide	µg/m <sup>3</sup>	0.1

##### 2. Ambient air monitoring at Mirchwara village site:

- Analysis Date : 19/01/2013
- Place of Monitoring : Near Mirchwara Village

**Table 4.2 – monitoring after second day of sampling**

S. no.	Parameters	Unit	Results
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	55.2
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	8.0
3	Sulphur Dioxide	µg/m <sup>3</sup>	1.2
4	Nitrogen Dioxide	µg/m <sup>3</sup>	2.1
5	Carbon Monoxide	µg/m <sup>3</sup>	0.12

**3. Ambient Air Monitoring near Company Hotel Site:**

- Analysis Date : 23/01/2013
- Place of Monitoring : Company Field Hostel Site

**Table 4.3 – Monitoring after third day of sampling**

S. no.	Parameters	Unit	Results
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	52.5
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	8.1
	Sulphur Dioxide	µg/m <sup>3</sup>	1.1
	Nitrogen Dioxide	µg/m <sup>3</sup>	2.0
	Carbon Monoxide	µg/m <sup>3</sup>	0.10

**4. Ambient air monitoring at near Vishnu temple site:**

- Analysis Date : 27/01/2013

- Place of Monitoring : Near Vishnu Temple

**Table 4.4 – monitoring after fourth day of sampling**

S. no.	Parameters	Unit	Results
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	48.0
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	6.5
3	Sulphur Dioxide	µg/m <sup>3</sup>	1.3
4	Nitrogen Dioxide	µg/m <sup>3</sup>	2.1
5	Carbon Monoxide	µg/m <sup>3</sup>	0.11

#### 5. Ambient air monitoring at near company godown site:

- Analysis Date : 31/01/2013
- Place of Monitoring : Near company godown

**Table 4.5 – monitoring after fifth day of sampling**

S. no.	Parameters	Unit	Results
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	42.0
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	6.2
3	Sulphur Dioxide	µg/m <sup>3</sup>	1.1
4	Nitrogen Dioxide	µg/m <sup>3</sup>	2.5
5	Carbon Monoxide	µg/m <sup>3</sup>	0.10

## 6. Ambient air monitoring at near batching plant site:

- Analysis Date : 04/02/2013
- Place of Monitoring : Batching Plant

Table 4.6 – monitoring after sixth day of sampling

S. no.	Parameters	Unit	Results
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	75.0
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	78.5
3	Sulphur Dioxide	µg/m <sup>3</sup>	2.3
4	Nitrogen Dioxide	µg/m <sup>3</sup>	2.0
5	Carbon Monoxide	µg/m <sup>3</sup>	0.11

## 7. Ambient air monitoring at near Mirchwara village road site:

- Analysis Date : 08/02/2013
- Place of Monitoring : Near Mirchwara village road

Table 4.7 – monitoring after seventh day of sampling

S. no.	Parameters	Unit	Results
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	45.0
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	6.1
3	Sulphur Dioxide	µg/m <sup>3</sup>	1.2
4	Nitrogen Dioxide	µg/m <sup>3</sup>	2.0
5	Carbon Monoxide	µg/m <sup>3</sup>	0.01

## 8. Ambient air monitoring at near chimney construction Site:

- Analysis Date : 12/02/2013
- Place of Monitoring : Near chimney Construction Area

**Table 4.8 – monitoring after eighth day of sampling**

S. no.	Parameters	Unit	Results
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	69.0
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	22.0
3	Sulphur Dioxide	µg/m <sup>3</sup>	1.6
4	Nitrogen Dioxide	µg/m <sup>3</sup>	2.11
5	Carbon Monoxide	µg/m <sup>3</sup>	0.10

## 9. Ambient air monitoring at near boiler unit-1 Site:

- Analysis Date : 16/02/2013
- Place of Monitoring : Boiler unit -1 Area

**Table 4.9 – monitoring after ninth day of sampling**

S. no.	Parameters	Unit	Results
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	55.0
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	24.5
3	Sulphur Dioxide	µg/m <sup>3</sup>	2.5
4	Nitrogen Dioxide	µg/m <sup>3</sup>	2.2
5	Carbon Monoxide	µg/m <sup>3</sup>	0.01

## 10. Ambient air monitoring at near raw water reservoir site:

- Analysis Date : 20/02/2013
- Place of Monitoring : Near Water Reservoir

**Table 4.10 – monitoring after tenth day of sampling**

S. no.	Parameters	Unit	Results
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	65.0
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	22.5
3	Sulphur Dioxide	µg/m <sup>3</sup>	2.3
4	Nitrogen Dioxide	µg/m <sup>3</sup>	1.12
5	Carbon Monoxide	µg/m <sup>3</sup>	0.10

## 11. Ambient air monitoring at near switch yard site:

- Analysis Date : 24/02/2013
- Place of Monitoring : Near Switch Yard

**Table 4.11 – monitoring after eleventh day of monitoring**

S. no.	Parameters	Unit	Results
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	71.0
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	35.5
3	Sulphur Dioxide	µg/m <sup>3</sup>	2.3
4	Nitrogen Dioxide	µg/m <sup>3</sup>	2.5
5	Carbon Monoxide	µg/m <sup>3</sup>	0.10

## 12. Ambient air monitoring at near coal handling plant construction area:

- Analysis Date : 28/02/2013
- Place of Monitoring : Near coal handling plant construction area

**Table 4.12- monitoring after twelfth day of sampling**

S. no.	Parameters	Unit	Results
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	68.0
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	12.5
3	Sulphur Dioxide	µg/m <sup>3</sup>	1.3
4	Nitrogen Dioxide	µg/m <sup>3</sup>	2.0
5	Carbon Monoxide	µg/m <sup>3</sup>	0.11

## 13. Ambient air monitoring at near cooling tower construction area:

- Analysis Date : 04/03/2013
- Place of Monitoring : Near cooling tower construction area

**Table 4.13 – monitoring after thirteenth day of sampling**

S. no.	Parameters	Unit	Results
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	75.0
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	20.5
3	Sulphur Dioxide	µg/m <sup>3</sup>	2.5
4	Nitrogen Dioxide	µg/m <sup>3</sup>	1.5
5	Carbon Monoxide	µg/m <sup>3</sup>	0.01

Any Construction activity has significant impact on the environment. Direct impacts include use of land, materials and energy; this use in turn leads to greenhouse gas emissions and the production of other wastes. Indirect impacts depend on a range of factors including location (whether the development is in an ecologically sensitive area). The potential effects on air quality and the related Project interactions during construction are overburden disturbance and construction equipment operation.

At Lalitpur Thermal Power Plant construction site the primary air quality concern during construction is the impact of particulate matter on the surrounding environment. Particulate emissions during the Project construction are associated with land clearing, blasting, excavation, and backfilling operations. The potential effects of particulates is influenced by site and weather conditions (rain and wind direction) and by preventative measures implemented during construction to minimize emissions.

#### 4.1.1 The comparison of ambient air quality data before construction & during construction period at Lalitpur thermal power plant site –

- The average “ambient air quality data before construction” at Mirchwara

Table 4.14- ambient air quality before construction

S. no.	Parameters	Unit	Results	Standards
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	20.0	100
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	2.5	60
3	Sulphur Dioxide	µg/m <sup>3</sup>	ND	80
4	Nitrogen Dioxide	µg/m <sup>3</sup>	ND	80
5	Carbon Monoxide	µg/m <sup>3</sup>	ND	02

- The average ambient air quality data during construction phase

Table 4.15 – average ambient air quality during construction phase

S. no.	Parameters	Unit	Results	Standards
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	60.86	100
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	14.58	60
3	Sulphur Dioxide	µg/m <sup>3</sup>	1.71	80
4	Nitrogen Dioxide	µg/m <sup>3</sup>	2.1	80
5	Carbon Monoxide	µg/m <sup>3</sup>	0.08	02

- Percentage change in ambient air quality during construction phase

Table 4.16- percentage change in ambient air quality during construction phase

S. no.	Parameters	Unit	Results		Percentage in Change ambient air quality	Standards
			Before Construct ion	During Construc tion		
1	Particulate Matter's (size less than 10 micron) or PM <sub>10</sub>	µg/m <sup>3</sup>	20.0	60.86	32.68 %	100
2	Particulate Matter's (size less than 2.5 micron) PM <sub>2.5</sub>	µg/m <sup>3</sup>	2.5	14.58	17.00 %	60
3	Sulphur Dioxide	µg/m <sup>3</sup>	ND	1.71	-	80
4	Nitrogen Dioxide	µg/m <sup>3</sup>	ND	2.1	-	80
5	Carbon Monoxide	µg/m <sup>3</sup>	ND	0.08	-	02

#### **4.1.2. Effect of construction activities on ambient air quality at Lalitpur thermal power plant site:**

The effects on air quality during construction phase of Lalitpur thermal power plant are minor, as they all are localized, of small magnitude and short duration. The Parameters like PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>x</sub> & NO<sub>x</sub> are within the permissible limits. The particulate matter (PM<sub>10</sub>) is increased by 32.68% & particulate matters (PM<sub>2.5</sub>) is increased by only 17.00%.

As per the above presentation of the results it can be concluded that there is no any harmful effect on ambient air quality by the construction activities of Lalitpur Thermal Power Plant.

#### **4.1.3 Mitigation Measures:**

Lalitpur Thermal Power Generation Company adopted following measures mitigating the air pollution at construction site:

- Application of dust suppressants such as water, calcium chloride, or tree lignin based dust suppressant the work site is being done on regular basis.
- All rock drills are equipped with dust collectors in good working order.
- There will be adequate controls of dust at work sites are in proximity to nearby environmental effects are likely occur.
- At Lalitpur Power Generation Company Ltd. construction site, all construction equipments operate with the standard emission controls that each part of equipment was originally equipped with. All vehicles were maintained in a proper fashion in order to minimize vehicle emissions to extent possible.

**Figure :** Figure showing Dust Suppressant



## **4.2 Noise level monitoring at Lalitpur thermal power plant construction site**

### **1. Noise Level Monitoring at ESP Construction Site:**

- Analysis date : 11/03/2013
- Analysis time : 10.00 AM
- Place of monitoring : ESP construction site
- Equipment used : Sound level Meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	87.6	85.4	86.7	85.3	86.7	88.9	84.9	86.7	85.6	87.9

## Test Results

Table 4.17 – monitoring on 1st day

S. no.	Description Noise level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	86.6	
2	Maximum	88.9	
3	Minimum	84.9	75

## 2. Noise Level Monitoring at ESP Construction Site:

- Analysis date : 12/03/2013
- Analysis time : 2.00 PM
- Place of monitoring : ESP construction site
- Equipment used : Sound level Meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	86.5	86.0	86.5	85.5	85.3	88.5	85.0	85.5	85.0	86.3

## Test Results

Table 4.18 – monitoring on 2nd day

S. no.	Description Noise Level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	86.01	75
2	Maximum	88.5	75
3	Minimum	85.3	75

### 3. Noise Level Monitoring at ESP Construction Site:

- Analysis date : 13/03/2013
- Analysis time : 04.00 PM
- Place of monitoring : ESP construction site
- Equipment used : Sound level Meter

Observation No.	1	2	3	4	5	6	7	8	9	10
Day Time Reading dB (A)	85.0	84.5	83.3	82.5	82.7	80.5	81.5	80.5	79.5	82.5

## Test Results

Table 4.19- monitoring on 3<sup>rd</sup> day

S. no.	Description Noise Level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	82.25	75
2	Maximum	85.0	75

#### 4. Noise Level Monitoring at Cooling Tower Construction Site:

- Analysis date : 14/03/2013
- Time : 10.30 AM
- Place of monitoring : Cooling tower construction site
- Equipment used : Sound level meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	90.7	86.9	84.7	85.8	89.7	86.2	91.3	79.8	90.7	85.7

#### Test Results

Table 4.20 – monitoring on 4<sup>th</sup> day

S. no.	Description Noise Level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	87.2	
2	Maximum	91.3	
3	Minimum	79.8	75

#### 5. Noise level monitoring at cooling tower construction site:

- Analysis Date : 15/03/2013
- Time : 3.30 PM
- Place of Monitoring : Cooling tower construction site
- Equipment Used : sound level meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	90.5	89.9	85.5	85.5	90.0	86.2	90.2	80.5	85.7	85.5

## Test Results

Table 4.21 – monitoring on 5<sup>th</sup> day

S. no.	Description Noise Level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	86.95	
2	Maximum	90.50	
3	Minimum	80.5	75

### 6. Noise level monitoring at CHP construction site:

- Analysis date : 18/03/2013
- Time : 9:30 AM
- Place of monitoring : CHP construction site
- Equipment used : sound level meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	72.1	68.5	69.7	70.2	67.3	68.4	72.3	68.3	67.5	69.4

## Test Results

Table 4.22- monitoring on 6<sup>th</sup> day

S. no.	Description Noise Level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	69.4	
2	Maximum	72.3	
3	Minimum	67.3	75

### 7. Noise level monitoring at CHP construction site:

- Analysis date : 19/03/2013
- Time : 3:30 PM
- Place of monitoring : CHP construction site
- Equipment used : sound level meter

Observation No.	1	2	3	4	5	6	7	8	9	10
Day Time Reading dB (A)	80.5	75.5	79.7	70.5	75.5	85.4	84.3	85.5	67.8	75.4

## Test Results

Table 4.23- monitoring on 7<sup>th</sup> day

S. no.	Description Noise Level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	78.01	
2	Maximum	85.5	
3	Minimum	67.8	75

## 8. Noise level monitoring at chimney construction site:

- Analysis date : 20/03/2013
- Time : 11.00 AM
- Place of monitoring : Chimney construction site
- Equipment used : Sound level meter

Observation No.	1	2	3	4	5	6	7	8	9	10
Day Time Reading dB (A)	70.1	72.5	68.5	59.2	65.0	62.2	55.2	65.2	66.2	71.2

## Test Results

Table 4.24 – monitoring on 8<sup>th</sup> day

S.no	Description noise level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	65.53	
2	Maximum	72.5	
3	Minimum	55.2	75

## 9. Noise level monitoring at chimney construction site:

- Analysis Date : 21/03/2013
- Time : 3.00PM
- Place of Monitoring : Chimney construction site
- Equipment Used : Sound level Meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	70.5	85.0	78.8	65.8	75.8	82.5	82.5	85.2	79.5	75.6

## Test Results

**Table 4.25- monitoring on 9<sup>th</sup> day**

S. no.	Description Noise Level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	78.12	
2	Maximum	85.2	
3	Minimum	65.80	75

### 10. Noise level monitoring at switch yard site:

- Analysis Date : 22/03/2013
- Time : 12.00 PM
- Place of Monitoring : Switch Yard
- Equipment Used : Sound level Meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	71.5	68.5	72.5	68.2	65.2	55.2	56.2	65.2	72.5	72.0

## Test Results

Table 4.26- monitoring on 10<sup>th</sup> day

S.no	Description Noise Level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	66.70	
2	Maximum	72.5	
3	Minimum	55.20	75

### 11. Noise level monitoring at switch yard site:

- Analysis date : 25/03/2013
- Time : 12.00 PM
- Place of monitoring : Switch Yard
- Equipment used : Sound level Meter

Observation No.	1	2	3	4	5	6	7	8	9	10
Day Time Reading dB (A)	75.5	78.5	80.5	81.5	79.5	85.5	84.5	85.5	81.5	79.5

## Test Results

Table 4.27- monitoring on 11<sup>th</sup> day

S. no.	Description Noise Level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	81.20	
2	Maximum	85.50	
3	Minimum	75.5	75

**12. Noise level monitoring at boiler unit -1 construction site:**

- Analysis date : 26/03/2013
- Time : 11.15 AM
- Place of monitoring : Boiler Unit -1 Site
- Equipment Used : Sound level Meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	70.5	78.5	88.5	79.2	70.2	65.2	66.2	75.2	82.5	75.5

**Test Results**

**Table 4.28- monitoring on 12<sup>th</sup> day**

S. no.	Description Noise Level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	75.15	
2	Maximum	88.5	
3	Minimum	65.2	75

**13. Noise level monitoring at boiler unit -2 construction Site:**

- Analysis date : 27/03/2013
- Time : 10:00 AM
- Place of monitoring : Boiler Unit -2 Site
- Equipment used : Sound level Meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	72.5	78.5	80.5	79.2	75.2	65.5	66.3	75.5	75.5	80.0

## Test Results

Table 4.29- monitoring on 13<sup>th</sup> day

S.No.	Description noise level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	74.87	
2	Maximum	80.5	
3	Minimum	65.5	75

### 14. Noise level monitoring at near company entrance gate site:

- Analysis date : 28/03/2013
- Time : 11.45 PM
- Place of monitoring : At entrance gate
- Equipment used : Sound level meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	70.2	72.5	82.5	78.5	78.2	69.5	69.5	78.0	85.5	81.5

## Test Results

Table 4.30 – monitoring on 14<sup>th</sup> day

S. no.	Description Noise level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	76.59	
2	Maximum	85.5	
3	Minimum	69.5	75

### 15. Noise level monitoring at water reservoir site:

- Analysis Date : 29/03/2013
- Time : 3.45 PM
- Place of Monitoring : Water reservoir construction site
- Equipment Used : Sound level Meter

Observation No.	1	2	3	4	5	6	7	8	9	10
Day Time Reading dB (A)	75.5	71.5	81.2	80.2	72.5	78.5	78.2	80.2	80.5	71.0

## Test Results

Table 4.31- monitoring on 15<sup>th</sup> day

S. no.	Description Noise level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	76.93	
2	Maximum	81.2	
3	Minimum	71.5	75

### 16. Noise level monitoring at company canteen site:

- Analysis date : 01/04/2013
- Time : 9.00 PM
- Place of monitoring : Company canteen
- Equipment used : Sound level meter

Observation No.	1	2	3	4	5	6	7	8	9	10
Day Time Reading dB (A)	52.5	48.5	55.5	58.5	45.5	44.2	55.0	52.5	41.5	48.5

### Test Results

Table 4.32 – monitoring on 16<sup>th</sup> day

S. no.	Description Noise level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	75.15	
2	Maximum	55.5	
3	Minimum	50.22	75

### 16. Noise level monitoring at labour colony site:

- Analysis date : 02/04/2013
- Time : 02.00PM
- Place of monitoring : Labour colony site
- Equipment Used : Sound level meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	55.0	48.5	55.2	50.5	51.2	58.5	66.5	68.5	61.2	55.5

## Test Results

Table 4.33- monitoring on 17<sup>th</sup> day

S. no.	Description Noise Level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	57.06	
2	Maximum	68.5	
3	Minimum	48.5	75

### 18. Noise level monitoring at batching plant site:

- Analysis date : 03/04/2013
- Time : 3.00PM
- Place of monitoring : Batching Plant Site
- Equipment used : Sound level Meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	80.5	88.0	81.5	79.2	80.2	79.2	79.5	78.2	82.5	88.5

## Test Results

Table 4.34- monitoring on 18<sup>th</sup> day

S. no.	Description Noise level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	81.79	
2	Maximum	88.5	
3	Minimum	78.2	75

### 19. Noise level monitoring at TG-1 Construction site:

- Analysis date : 04/04/2013
- Time : 11.00 AM
- Place of Monitoring : TG-1 construction site
- Equipment Used : Sound level meter

Observation No.	1	2	3	4	5	6	7	8	9	10
Day Time Reading dB (A)	72.5	75.5	75.5	79.2	78.2	69.2	75.5	79.2	79.50	80.5

## Test Results

Table 4.35- monitoring on 19<sup>th</sup> day

S. no.	Description Noise Level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	76.48	
2	Maximum	80.5	
3	Minimum	96.2	75

## 20. Noise Level Monitoring at Switch Yard Site:

- Analysis date : 05/04/2013
- Time : 9.00 AM
- Place of monitoring : Switch yard
- Equipment used : Sound level meter

Observation No.	1	2	3	4	5	6	7	8	9	10
Day Time Reading dB (A)	71.0	68.2	65.8	79.5	65.2	55.2	80.3	72.5	72.5	79.2

## Test Results

Table 4.36 – monitoring on 20<sup>th</sup> day

S. no.	Description Noise level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	70.94	
2	Maximum	79.50	
3	Minimum	55.20	75

## 21. Noise level monitoring at batching plant site:

- Analysis date : 08/04/2013
- Time : 12.00PM
- Place of monitoring : Batching Plant Site
- Equipment used : Sound level Meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	85.5	82.2	75.5	78.2	65.8	60.5	72.5	78.2	80.5	79.5

## Test Results

Table 4.37- monitoring on 21<sup>st</sup> day

S. no.	Description Noise Level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	75.84	
2	Maximum	85.5	
3	Minimum	60.5	75

## 22. Noise level monitoring at company canteen site:

- Analysis date : 09/04/2013
- Time : 4.00 PM
- Place of monitoring : Company canteen
- Equipment used : Sound level meter

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	48.5	55.5	48.5	58.5	45.5	44.2	55.0	52.5	41.5	55.2

## Test Results

Table 4.38- monitoring on 22<sup>nd</sup> day

S. no.	Description noise level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	75.15	
2	Maximum	55.5	
3	Minimum	50.22	75

### 23. Noise Level Monitoring at TG-1 Construction Site :

- Analysis Date : 10/04/2013
- Time : 03.00PM
- Place of Monitoring : TG-1 Construction site
- Equipment Used : Sound level Meter

Observation No.	1	2	3	4	5	6	7	8	9	10
Day Time Reading dB (A)	70.2	75.5	79.5	79.2	78.2	69.2	66.2	79.2	82.5	78.5

## Test Results

Table 4.39- monitoring on 23<sup>rd</sup> day

S. no.	Description noise level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	75.62	
2	Maximum	82.5	
3	Minimum	66.2	75

### 4.2.1 Effect of Noise Pollution during Construction Phase

During construction phase the major noise pollution sources at Lalitpur Thermal Power Plant construction site are the excavation equipment, movements of trucks and other construction equipments and blasting operations.

- **The Average Noise Level Monitoring Data At Lalitpur Thermal Power Plant Construction Site:**

<b>Observation No.</b>	1	2	3	4	5	6	7	8	9	10
<b>Day Time Reading dB (A)</b>	70.2	75.5	79.5	79.2	78.2	69.2	66.2	79.2	82.5	78.5

### Test Report

**Table 4.40- average noise level monitoring during construction stage**

S. no.	Description Noise level dB (A)	Results Day Time	Ambient Noise Standards/ Specification (CPCB) dB(A)
1	Average	75.62	
2	Maximum	82.5	
3	Minimum	66.2	75

- **To prevent excessive noise levels, LPGCL is making following efforts.**

To reduce noise pollution LPGCL using modern, quiet power tools, equipment and generators; low impact technologies; and wall structures as sound shields.

### 4.3 Wastewater monitoring during construction stage

#### 1. Waste water Sample Analysis Report

- Date of sampling : 15/04/2013

- Sampling Location : Labour Colony Soack Pit-1

**Table 4.41 – monitoring on 1<sup>st</sup> day**

S. no.	Parameters	Unit	Results	Standard Limit
1	pH		7.65	6.5-8.0
2	Total Suspended Solid	mg/l	65.5	30
3	Bio Chemical Oxygen demand (BOD) (3 days at 27° C)	mg/l	55	30
4	Chemical Oxygen demand	mg/l	265	250
5	Oil & Grease	mg/l	12	10

## 2. Wastewater sample analysis report

- Date of Sampling : 22/04/2013
- Sampling Location : Plant Construction Site Sample-1

**Table 4.42- monitoring on 2<sup>nd</sup> day**

S. no.	Parameters	Unit	Results	Standard Limit
1	pH		7.85	6.5-8.0
2	Total Suspended Solid	mg/l	49	30
3	Bio Chemical Oxygen demand (BOD) (3 days at 27° C)	mg/l	28	30
4	Chemical Oxygen demand	mg/l	245	250
5	Oil & Grease	mg/l	09	10

### 3. Waste water Sample Analysis Report

- Date of Sampling : 29/04/2013
- Sampling Location : Plant Construction Site Sample-2

Table 4.43- monitoring on 3<sup>rd</sup> day

Sl.	Parameters	Unit	Results	Standard Limit
1	pH		7.25	6.5-8.0
2	Total Suspended Solid	mg/l	55	30
3	Bio Chemical Oxygen demand (BOD) (3 days at 27° C)	mg/l	35	30
4	Chemical Oxygen demand	mg/l	280	250
5	Oil & Grease	mg/l	012	10

### 4. Wastewater Sample Analysis Report

- Date of Sampling : 06/05/2013
- Sampling Location : Drain From Company Canteen-1

Table 4.44- monitoring on 4<sup>th</sup> day

S. no.	Parameters	Unit	Results	Standard Limit
1	pH		7.50	6.5-8.0
2	Total Suspended Solid	mg/l	240	30
3	Bio Chemical Oxygen demand (BOD) (3 days at 27° C)	mg/l	180	30
4	Chemical Oxygen demand	mg/l	350	250
5	Oil & Grease	mg/l	22	10

## 5. Wastewater Sample Analysis Report

- Date of Sampling : 13/05/2013
- Sampling Location: Drain From Company Field Hostel-1

**Table 4.45- monitoring on 5<sup>th</sup> day**

S. no.	Parameters	Unit	Results	Standard Limit
1	pH		7.02	6.5-8.0
2	Total Suspended Solid	mg/l	55	30
3	Bio Chemical Oxygen demand (BOD) (3 days at 27° C)	mg/l	220	30
4	Chemical Oxygen demand	mg/l	380	250
5	Oil & Grease	mg/l	24	10

## 6. Wastewater sample analysis report

Date of Sampling : 20/05/2013

Sampling Location : Water Collection Pit at Plant construction Site-3

**Table 4.46- monitoring on 6<sup>th</sup> day**

S. no.	Parameters	Unit	Results	Standard Limit
1	pH		7.00	6.5-8.0
2	Total Suspended Solid	mg/l	55.5	30
3	Bio Chemical Oxygen demand (BOD) (3 days at 27° C)	mg/l	29.5	30
4	Chemical Oxygen demand	mg/l	235	250
5	Oil & Grease	mg/l	05	10

## 7. Wastewater sample analysis report

- Date of Sampling : 27/05/2013
- Sampling Location : Labour Colony -2

**Table 4.47- monitoring on 7<sup>th</sup> day**

S. no.	Parameters	Unit	Results	Standard Limit
1	pH		6.50	6.5-8.0
2	Total Suspended Solid	mg/l	55	30
3	Bio Chemical Oxygen demand (BOD) (3 days at 27° C)	mg/l	90.0	30
4	Chemical Oxygen demand	mg/l	320	250
5	Oil & Grease	mg/l	18	10

## 8. Wastewater Sample Analysis Report

- Date of Sampling : 03/06/2013
- Sampling Location : Labour Colony Soack Pit-3

**Table 4.48- monitoring on 8<sup>th</sup> day**

S. no.	Parameters	Unit	Results	Standard Limit
1	pH		7.20	6.5-8.0
2	Total Suspended Solid	mg/l	60.5	30
3	Bio Chemical Oxygen demand (BOD) (3 days at 27° C)	mg/l	95.0	30
4	Chemical Oxygen demand	mg/l	380	250
5	Oil & Grease	mg/l	25	10

## 9. Wastewater analysis report

- Date of Sampling : 10/06/2013
- Sampling Location : Labour Colony Soack Pit-4

**Table 4.49- monitoring on 9<sup>th</sup> day**

S. no.	Parameters	Unit	Results	Standard Limit
1	pH		7.55	6.5-8.0
2	Total Suspended Solid	mg/l	80.5	30
3	Bio Chemical Oxygen demand (BOD) (3 days at 27° C)	mg/l	80.5	30
4	Chemical Oxygen demand	mg/l	320	250
5	Oil & Grease	mg/l	21.5	10

## 10. Waste water Sample Analysis Report

- Date of Sampling: 17/06/2013
- Sampling location: Drain From Company Canteen-2

**Table 4.50- monitoring on 10<sup>th</sup> day**

S. no.	Parameters	Unit	Results	Standard Limit
1	pH		7.25	6.5-8.0
2	Total Suspended Solid	mg/l	150	30
3	Bio Chemical Oxygen demand (BOD) (3 days at 27° C)	mg/l	170	30
4	Chemical Oxygen demand	mg/l	360	250
5	Oil & Grease	mg/l	28	10

## 11. Waste water Sample Analysis Report

- Date of Sampling : 24/06/2013
- Sampling Location : Drain From Company Field Hostel-2

**Table 4.51- monitoring on 11<sup>th</sup> day**

S. No.	Parameters	Unit	Results	Standard Limit
1	pH		7.50	6.5-8.0
2	Total Suspended Solid	mg/l	140	30
3	Bio Chemical Oxygen demand (BOD) (3 days at 27° C)	mg/l	285	30
4	Chemical Oxygen demand	mg/l	410	250
5	Oil & Grease	mg/l	25	10

### 4.3.1 Mitigation Measures:

LPGCL management doing following mitigation measures to prevent water pollution from the Lalitpur site.

- Cover piles of building materials like cement, sand and other powders, regularly inspect for spillages, and locate them where they will not be washed into waterways or drainage areas.
- Collect any wastewater generated from site activities in tanks and reuse it back for construction purpose.
- Segregate, tightly cover and monitor toxic substances to prevent spills and possible site contamination.
- Cover up and protect all drains on site.
- For construction workers and officials separate sanitation facilities provided by LPGCL to control water pollution.

- Construction of wastewater collection channels and settling chamber for the collection screening and reuse of 100% waste water for the construction purpose.

The Lalitpur Thermal Power Plant envisages to provide ETP and STP for treatment of industrial effluent and municipal effluent & also provide a system for recycling the treated effluent for various uses. This system of treatment and recycling will ensure that there will be no discharge of effluent from plant premises. 100% wastewater will be recycle & reuse for different puposes like ash condition , ash Quenching etc. & The sludge from sewage treatment plant will be dried, vermi-composted and used as manure for greenbelt maintenance. Canteen/sanitary waste will be composted and used as manure for greenbelt development. In addition, it is envisaged that surface run-off from plant area will be intercepted. Water will be diverted to a sedimentation pond for recharge of ground water. It may be seen from above that there is no possibility of pollution of surface water.

## **WATER POLLUTION CONTROL & CONSERVATION PLAN DURING OPERATIONAL PHASE-**

- **Effluent Treatment Plant:** - To treat the industrial effluents. Treated effluent to be recycled for industrial use.
- **Sewage Treatment Plant :**  
A Sewage treatment plant will be provided to treat sewage generated in township. Treated water will be used for greenbelt maintenance.
- **Surface Run- off from Plant:** It will be collected through open catch drain. Collected water to be diverted to sedimentation Pond. Overflow pond to be used for ground water recharge.

CONCLUSION

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The significance of effects on air & water quality during construction phase of Lalitpur thermal power plant is mainly due to overburden disturbance and are minor as they all are localized, of small magnitude and short duration. No significant adverse environmental effects are likely to occur. During operational phase of Lalitpur Thermal Power Plant, the environmental effects will be very minimal as per plan environmental management Plan. 100% wastewater will be recycle & reuse for different purposes like ash condition , ash Quenching etc. & The sludge from sewage treatment plant will be dried, vermi-composted and used as manure for greenbelt maintenance. Canteen/sanitary waste will be composted and used as manure for greenbelt development. The fly ash will be given for supply to potential users like cement plants in dry form for cement manufacturing & remaining ash will be disposed into HDPE lined ash pond. The HDPE liner prevents any kind of percolation into the ground.

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