Gomardih Dolomite Quarry
TATA STEEL LIMITED

Ref: EC No. J-11015/5/92-IA-II(M), Dated 18th May 1994

Condition (i): This clearance is valid only for mining operation limited to 146.66 ha. (112.13 ha. of Gomardih Block and 34.53 ha. of Khotkuribahal Block), which includes the area under application for mining rights.

Compliance: The Government of Odisha, vide letter no. III (B) SM4 /94-10757/SM, Bhubaneswar , dated 28.11.1997 had granted second renewal of mining lease in respect of the area over 372.796 ha at Gomardih in the villages of Tunmura and Jharbeda of Sundargarh district for a period of 20 years from 06.03.1993 to 05.03.2013. The application for 3rd RML was filed on 27.02.2012 over the entire area of 372.796 ha under Rule 24A(1) of MCR 1960.

The Govt. of Odisha has been pleased to extend the validity period of the mining lease from 06.03.2013 to 31st Mar 2020 under section 8A of the MMDR Act 1957 as amended by the MMDR Amendment Act 2015. The extension order in this regard has been received from the Additional Secretary, Govt. of Odisha vide letter No. III (LD) SM-45/2013/3231/SM, Bhubaneswar, dated-17.04.2015. The execution and registration of the supplementary lease deed has been done on the 12th May 2015 vide document no. 11761500385.

The Mining Lease area of 372.796 ha includes 112.13 ha of Gomardih Block as mentioned in the condition (i) of EC No. J-11015/5/92-IA-II (M), Dated 18th May 1994. The mine is now operating within 62.96 ha of surface right area.

The Khotkuribahal Blocks (ii & iv) which include the area of 34.53 ha as mentioned in the EC No. J-11015/5/92-IA-II (M), dated 18th May 1994 was surrendered to the Govt. of Odisha in the year 2000.

The surface plan showing the Mining Lease area and surface right area is furnished as **Annexure-I.**

Condition (ii): The levels of SPM concentration should not exceed 500 μg/m^3 at any station within the mine leasehold. Emission of SO2, NO2 and CO should be maintained below the levels prescribed by competent authority. The measures suggested in the EMP in this regard should be strictly implemented.

Compliance: As per the MoEF notification, vide no. G.S.R-826(E) dated 16th November 2009; we are monitoring $PM_{2.5}$ and PM_{10} instead of SPM. The levels of $PM_{2.5,}$ PM_{10}, SO2, NO2, and CO concentration are maintained well below the prescribed limits.

All Environmental protection measures suggested in the EMP are being followed and are enumerated below

- Two nos. of water sprinklers are engaged in all shifts for dust suppression in road and mine
- Grass covering of Dump slope and periodic wetting of OB Dump
- Wet Drilling Process
- Plantation has been done at the dump slope for stabilization
- Toe wall has been made along the foot of the OB dump and at the ore stack yard
- Garland drains and settling pits have been made to channelize the surface run-off

- Hazardous waste management has been carried out as per the guidelines of Odisha State Pollution Control Board
- Dry fog system installed in the crusher plant and all transfer points
- Green belt created along the northern and southern lease boundary
- Control blasting technique adopted for noise and dust control
- Periodic maintenance of all HEMM and other vehicle to control the vehicular emission
- Avoiding overloading of Tippers
- Part of the permanent haul road near crusher plant has been covered under permanent sprinkling system.

The six monthly Ambient Air Quality Monitoring data for the period Oct'16 to March'17 are furnished in **Annexure II.**

All Environmental protection measures suggested in the EMP are being followed and are enumerated below.

- Two nos. of water sprinklers are engaged in all working shifts for dust suppression
- Control blasting technique adopted for noise and dust control
- Dry fog system installed in the crusher plant
- Part of the permanent haul road near crusher plant has been covered under permanent sprinkling system.
- Green belt created along the northern and southern lease boundary.
- Plantation has been done at the dump slope for stabilization.
- Toe wall has been made along the foot of the OB dump and at the ore stack yard.
- Garland drains and settling pits have been made to channelize the surface run-off.
- Hazardous waste management has been carried out as per the guidelines of Odisha State Pollution Control Board.
- Schedule maintenance of all mining machinery is done to control the vehicular emission.

Condition (iii): The quality of effluent finally discharged into the main water course should conform to the standards prescribed under CSR 422 (E) dated 19.5.1993.

Compliance:

- The ROM of Gomardih is processed in a dry crusher plant. Only crushing and screening is done here and it involves no process of beneficiation
- So, no effluent is discharged in the process. The sludge generated in the process of crushing and screening is stacked separately as mineral rejects.
- Mine discharge (accumulated rain and seepage water) is allowed to settle in the settling pits before it is allowed to go outside.
- Oil & Grease separation pit has been provided to treat the effluent generated during HEMM washing.
- Toe wall, Garland drains and settling pits have been made along the foot of the OB dump and at the ore stack yard to channelize the surface run-off.

The six monthly average of mine discharge Water Quality Monitoring data for the period Oct'16 to March'17 is given in **Annexure-III, IV,V & VI**.

Condition (iv): Regular monitoring of air and water quality should be made in and around the core zone. The sampling points and frequency should be decided in consultation with State Pollution Control Board. The quarterly data should be furnished to Ministry regularly.

Compliance:

- Ambient Air Quality is being monitored taking samples from 5(five) different locations as given below:
  - Near Sub-station
  - Near First Gate of Mines
  - Near Crusher Plant
  - Near V.T. Centre
  - Near Hospital

- Water Quality is monitored taking samples from 4 (four) different locations as given below:-

  - Intake surface water: Intake point at Nakti nala
  - Drinking water: Tab water at Guest House
  - Mine Effluent: Mine discharge water
  - Domestic Effluent: Canteen effluent
- The sampling points and the frequency of taking samples have been decided as per the guidelines of the SPCB, Odisha. Presently Air Quality sampling is done twice a week and Water quality once in a month.

- The six monthly average report of the Ambient Air, Ambient Noise and Water Quality monitoring data are furnished to Odisha State Pollution Control Board & MoEF Regional Office on regular basis.

The six monthly average report of the Ambient Air, Ambient Noise and Water Quality monitoring data for the period Oct'16 to March'17 are furnished as annexure as follows:-

- **Annexure-II** : Ambient Air Quality monitoring report
- **Annexure-III** : Intake Water Quality monitoring report
- **Annexure-IV** : Drinking Water Quality monitoring report
- **Annexure-V** : Mine discharge (effluent) Water Quality monitoring report
- **Annexure-VI** : Canteen effluent Quality monitoring report

Condition (v): The authorities should implement adequate noise control measure as proposed in the EMP to keep the noise level within the prescribed limits.

Compliances: Adequate noise control measures have been implemented at Gomardih. Different measures taken either to curb noise at the source or to subdue it are enumerated below.

- Schedule maintenance of all mining machinery is being done to control the noise.
- Green belt created along the northern and southern lease boundary.
- Control blasting technique adopted for noise and dust control.
- Rubber liners provided at each transfer points like hopper and screens inside the crusher plant.
- All employees working at the HEMM and plant have been provided with ear-muffs as a contingency measure.

The six monthly average of the ambient noise monitoring data for the period Oct'16 to March'17 is furnished as **Annexure-VII**.

Condition (vi): No change in method of working (including Calendar Plan excavation), be made without prior consent of this Ministry.

Compliances:

- The Production of Dolomite ore has been restricted to the 0.816 MTPA (ROM) approved in the previous EC approved by the Ministry.
- The mechanized opencast working is carried out as per the approved Mining Plan and subsequent schemes of mining. The present working of the mine is being carried out as per the Mining Plan approved vide letter No.2 MXV (b)-10/12-2257, dt.28.02.2013.

Condition (vii): The reclamation plan and land use plan as envisaged in the EMP should be strictly implemented. Also green belt should be developed in other areas like mine colony interface. OBR area etc. to attenuate noise level and also to arrest fugitive dust.

Compliances: The reclamation plan and land use plan as envisaged in the EMP is being followed.

- During the year, we have planted 550 numbers of saplings covering an area of 0.0.175 ha at the slope of the OB dump by terracing and pitting.

- Besides the above, the saplings planted at different locations of the mine like OB dump, northern lease boundary and around the mineral storage area are being maintained by watering and guarding. Similarly, the saplings planted along both side of the roads leading from Mine to Sonakhan railway siding and that connecting SH-10 and mine are being maintained. A team of gardeners have been engaged to take care of the plantation, park and garden inside the colony throughout the year to maintain greenery.

In order to comply with the EMP following measures are being followed.

- Water sprinkling is done along the haul road and dump area in all the shifts. Dry fog system is used in the crusher plant area. Wet drilling along with prescribed speed is followed. Fixed type water sprinkling arrangements made along one of the permanent haul road.
- Overloading of transport equipment is not allowed.
- It has been proposed in the approved Mining Plan to construct 180 meters of retaining/parapet wall at the toe of the OB dump in the year 2014-16; which has been already completed.. Another 100mtrs of retaining wall has been also done .
- Similarly it has been proposed in the approved Mining Plan to make 190 meters of garland drain during the year 2014-15; About 700mts of garland drain was made around the periphery of the dumps and mine during the financial year FY 2015-16. They are being maintained regularly.
- The silt of all the garland drains and settling pits had been cleaned before and after monsoon..

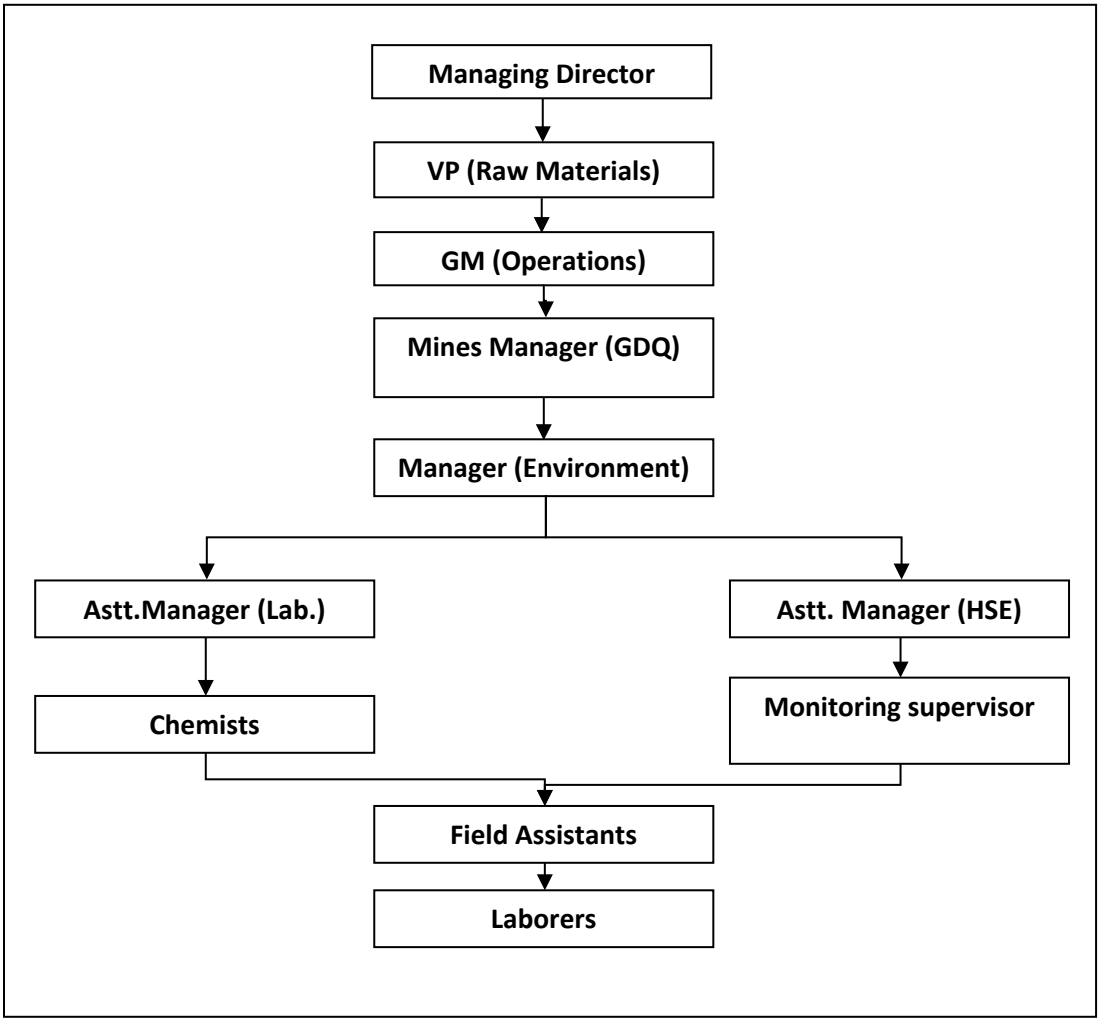
Condition (viii): Details of chemicals used for dust suppression with regard to their toxicity and the techniques employed for same should be furnished to the Ministry for observing the performance and non-toxicity of such methods.

Compliances: No chemical is used for dust suppression.

Condition (ix): Environmental Management cell has to be established to carry out functions relating to environmental management action plans. The head of the Cell should directly report to the Chief Executive.

Compliances: Gomardih Dolomite Quarry has a separate and dedicated team for carrying out environmental management action plan. Team consists of two labours, one field assistant and one monitoring supervisor who report to Assistant Manager (HSE). Team has also two chemists who report to Assistant Manger Lab. Manager (Environment) is overall in charge of this Environmental Management Cell who report to Manger GDQ. Complete structure of this Environmental Management Cell is given below.

Organization Structure of Environmental Management Cell



Condition (x): Adequate fund provision (capital and recurring expenditure) should be made for implementation of all safeguard measures and the funds should not be diverted for other purpose.

Compliances: Adequate fund have been provided for implementation of environmental safeguard measures. Around Rs. 0.47crores rupees have been spent for the construction of a new ETP in the colony area. The planned environmental expenditure for FY2016-17 and the actual up to March'17 is depicted in the following tables.

EXPENDITURE PLANNED & INCURRED FOR DIFFERENT ENVIRONMENTAL ACTIVITIES DURING 2016-17 UP TO MARCH'2017

Items	Expenditure :2016-17 (Planned) in Rupees	Expenditure: 2016-17 (Actual) up to March' 2017 in Rupees.
Afforestation	900,000.00	380,000.00
Dust Suppression	1,893,100.00	1,060,800.00
Environment & weather , exhaust monitoring	2,400,000.00	2,278,955.00
Horticulture development	472,320.00	543,168.00
Drinking water Supply	682,000.00	410,081.00
Sanitation	450,000.00	795,984.00
Malaria eradication	151,100.00	151,110.00
Garland drain & storm water drain	300,000.00	181,000.00
Environment awareness (EMS)	24,000.00	40,000.00
Hazardous waste management	20,000.00	20000.00
Total (in Rupees)	7,292,520.00	5,861,098.00

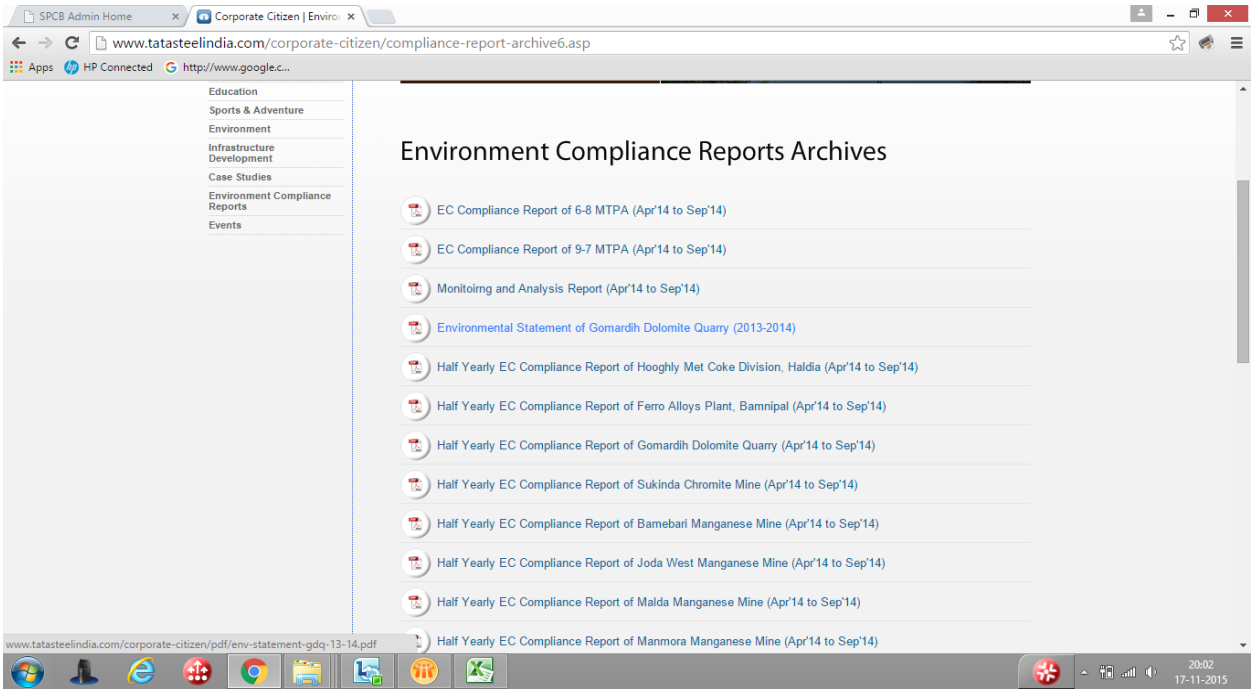
Condition (xi): The Ministry of any other concerned competent authority may stipulate any other conditions at any stage. The Ministry reserves the right to modify the conditions to revoke the approval. If necessary, either due to change in scope and consequent environmental scenario of feedback from field monitoring of the impacts.

Compliances: No such conditions have been imposed so far.

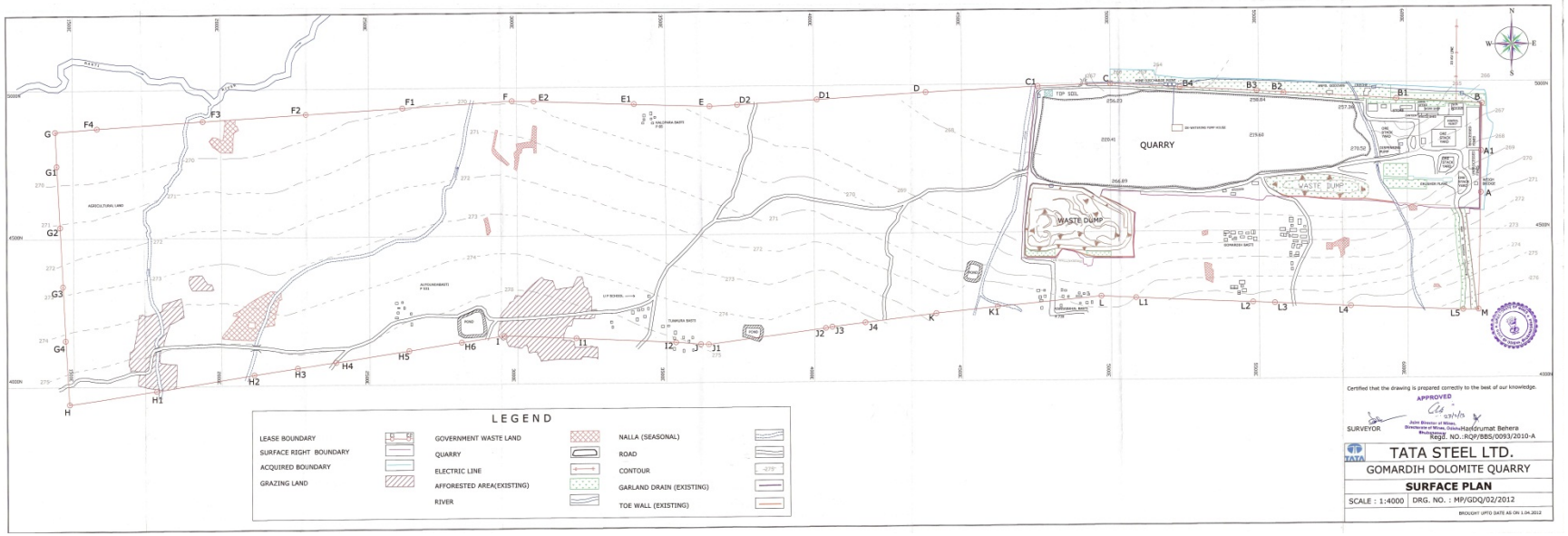
Condition (xii): Environmental compliance status report vis-à-vis progress should be submitted for the scrutiny of this Ministry once in six months regularly.

Compliances:

- Environmental Condition compliance status report is furnished to the Ministry in every six months as per the EIA Notification, 2006. The last six monthly report was submitted to the Ministry vide letter no GD/204/126A, dated.25.05.2014.
- Same has been uploaded in the Company website www.tatasteelindia.com.



Annexure-I
Surface Plan for GDQ



Annexure II

Ambient Air Quality

Six Monthly Average (OCT-16 TO MAR-17**)**

Monitoring Location: Near Hospital

Parameters	Method of Measurement	Detection Limit	Time Weighted Average	Standards (unit)	Months (OCT-16 TO MAR-17)						Six monthly Avg.
					OCT	NOV	DEC	JAN	FEB	MAR	
P.M-10	Gravimetric method	.....	24 Hrly	100 (µg/m3)	34.62	43.25	50.8	50.52	50.0	44.0	**45.5**
P.M.-2.5	Gravimetric method	.....	24 Hrly.	60 (µg/m3)	16.10	20.04	24.7	24.82	24.8	20.6	**21.8**
SO2	Improved West Gaeke method.	4	24 Hrly.	80 (µg/m3)	<4.00	<4.12	<4.2	<4.15	<4.2	<4.0	**<4.1**
Nox	Jacob &Hochhelser modified (Na-Arsenite) method	9	24 Hrly	80 (µg/m3)	<9.21	<9.47	<9.7	9.85	9.9	<9.1	**<9.5**
O3	Chemical Method	4	8 Hrly.	100(µgm3)	<4.00	<4.00	<4.0	<4.0	<4.0	<4.0	**<4.0**
CO	NDIR Spectroscopy method	0.1	1 Hrly.	4(mg/m3)	0.11	0.13	0.2	0.15	0.15	0.12	**0.14**
NH3	Indophenol Blue Method	20	24 Hrly.	400(µg/m3)	<20.00	<20.0	<20.0	<20.0	<20.0	<20.0	**<20.0**
C6H6	AAS method after sampling	0.001	Annual	05(µg/m3)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
BaP	AAS method after sampling	0.002	Annual	01(ng/m3)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**
Ni	AAS method after sampling	0.01	Annual	20(ng/m3)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Pb	Absorption & Desorption followed by GC analysis	0.001	24 Hrly.	01(µg/m3)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
As	Solvent extraction followed by GC analysis.	0.001	Annual	6(ng/m3)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**

Ambient Air Quality

Six Monthly Average (OCT-16 TO MAR-17**)**

Monitoring Location: Near VT Centre

Parameter	Method of Measurement	Detection	Time	Standards	Months (OCT-16 TO MAR-17)	Six

s		Limit	Weighted Average	(unit)	OCT	NOV	DEC	JAN	FEB	MAR	monthly Avg.
P.M-10	Gravimetric method	.....	24 Hrly	100 (µg/m3)	**35.65**	**45.13**	**54.8**	**53.64**	**52.3**	**46.5**	48.0
P.M.-2.5	Gravimetric method	.....	24 Hrly.	60 (µg/m3)	**16.93**	**21.61**	**26.7**	**26.24**	**25.3**	**22.3**	23.2
SO2	Improved West Gaeke method.	4	24 Hrly.	80 (µg/m3)	**<4.07**	**<4.29**	**4.6**	**4.33**	**4.3**	**<4.0**	<4.3
Nox	Jacob &Hochhelser modified (Na-Arsenite) method	9	24 Hrly	80 (µg/m3)	**<9.33**	**<9.52**	**11.1**	**10.96**	**11.2**	**<9.4**	<10.3
O3	Chemical Method	4	8 Hrly.	100(µgm^3)	**<4.00**	**<4.00**	**<4.1**	**5.04**	**5.2**	**<4.0**	<4.4
CO	NDIR Spectroscopy method	0.1	1 Hrly.	4(mg/m^3)	**0.12**	**0.13**	**0.2**	**0.25**	**0.3**	**0.14**	0.19
NH3	Indophenol Blue Method	20	24 Hrly.	400(µg/m^3)	**<20.00**	**<20.00**	**<21.0**	**<21.28**	**21.1**	**<20.0**	<20.4
C6H6	AAS method after sampling	0.001	Annual	05(µg/m^3)	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**
BaP	AAS method after sampling	0.002	Annual	01(ng/m^3)	**<0.002**	**<0.002**	**<0.002**	**<0.002**	**<0.002**	**<0.002**	**<0.002**
Ni	AAS method after sampling	0.01	Annual	20(ng/m^3)	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**
Pb	Absorption & Desorption followed by GC analysis	0.001	24 Hrly.	01(µg/m^3)	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**
As	Solvent extraction followed by GC analysis.	0.001	Annual	6(ng/m^3)	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**

Six Monthly Average (OCT-16 TO MAR-17**)**

Monitoring Location: Near Gate No-1

Parameters	Method of Measurement	Detection Limit	Time Weighted Average	Standards (unit)	Months (OCT-16 TO MAR-17)						Six monthly Avg.
					OCT	NOV	DEC	JAN	FEB	MAR	
P.M-10	Gravimetric method	.....	24 Hrly	100 (µg/m3)	39.09	50.70	61.8	62.93	67.7	55.2	56.2
P.M.-2.5	Gravimetric method	.....	24 Hrly.	60 (µg/m3)	18.92	24.82	30.6	31.38	34.0	26.5	27.7
SO2	Improved West Gaeke method.	4	24 Hrly.	80 (µg/m3)	<4.30	4.64	5.1	5.2	5.0	4.2	<4.7
Nox	Jacob &Hochhelser modified (Na-Arsenite) method	9	24 Hrly	80 (µg/m3)	<9.82	11.32	12.6	13.54	14.6	11.7	<12.3
O3	Chemical Method	4	8 Hrly.	100(µgm^3)	<4.00	<4.00	5.4	6.78	7.4	4.8	<5.7
CO	NDIR Spectroscopy method	0.1	1 Hrly.	4(mg/m^3)	0.14	0.23	0.3	0.34	0.4	0.28	0.28
NH3	Indophenol Blue Method	20	24 Hrly.	400(µg/m^3)	<20.00	<20.00	<22.9	23.88	27.4	20.9	<22.5
C6H6	AAS method after sampling	0.001	Annual	05(µg/m^3)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BaP	AAS method after sampling	0.002	Annual	01(ng/m^3)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Ni	AAS method after sampling	0.01	Annual	20(ng/m^3)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pb	Absorption & Desorption followed by GC analysis	0.001	24 Hrly.	01(µg/m^3)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
As	Solvent extraction followed by GC analysis.	0.001	Annual	6(ng/m^3)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Six Monthly Average (OCT-16 TO MAR-17**)**

Monitoring Location: Near Substation

Parameters	Method of Measurement	Detection Limit	Time Weighted Average	Standards (unit)	Months (OCT-16 TO MAR-17)						Six monthly Avg.
					OCT	NOV	DEC	JAN	FEB	MAR	
P.M-10	Gravimetric method	.....	24 Hrly	100 (µg/m3)	39.88	52.25	62.7	64.34	68.6	58.5	57.7
P.M.-2.5	Gravimetric method	.....	24 Hrly.	60 (µg/m3)	19.40	25.79	31.1	31.97	34.2	28.5	28.5
SO2	Improved West Gaeke method.	4	24 Hrly.	80 (µg/m3)	<4.54	4.85	5.1	5.15	5.0	<4.3	<4.8
Nox	Jacob &Hochhelser modified (Na-Arsenite) method	9	24 Hrly	80 (µg/m3)	10.38	11.92	12.9	14.52	14.7	12.6	12.8
O3	Chemical Method	4	8 Hrly.	100(µgm^3)	<4.00	<4.00	6.2	7.83	7.7	<5.2	<5.8
CO	NDIR Spectroscopy method	0.1	1 Hrly.	4(mg/m^3)	0.17	0.25	0.3	0.35	0.36	0.30	0.29
NH3	Indophenol Blue Method	20	24 Hrly.	400(µg/m^3)	<20.00	<20.00	23.9	26.47	24.6	20.4	22.6
C6H6	AAS method after sampling	0.001	Annual	05(µg/m^3)	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
BaP	AAS method after sampling	0.002	Annual	01(ng/m^3)	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002
Ni	AAS method after sampling	0.01	Annual	20(ng/m^3)	<0.01	<0.01	0.010	<0.01	<0.01	<0.01	<0.01
Pb	Absorption & Desorption followed by GC analysis	0.001	24 Hrly.	01(µg/m^3)	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
As	Solvent extraction followed by GC analysis.	0.001	Annual	6(ng/m^3)	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001

Ambient Air Quality

Six Monthly Average (OCT-16 TO MAR-17**)**

Monitoring Location: Near Crusher Plant

Parameters	Method of Measurement	Detection Limit	Time Weighted Average	Standards (unit)	Months (OCT-16 TO MAR-17)						Six monthly Avg.
					OCT	NOV	DEC	JAN	FEB	MAR	
P.M-10	Gravimetric method	.....	24 Hrly	100 (µg/m3)	43.56	54.06	66.9	67.72	72.0	61.7	61.0
P.M.-2.5	Gravimetric method	.....	24 Hrly.	60 (µg/m3)	21.32	27.07	34.2	34.25	36.7	30.4	30.7
SO2	Improved West Gaeke method.	4	24 Hrly.	80 (µg/m3)	<4.75	5.20	5.5	5.55	5.3	<4.6	<5.2
Nox	Jacob &Hochhelser modified (Na-Arsenite) method	9	24 Hrly	80 (µg/m3)	10.75	12.73	14.1	15.05	15.7	13.3	13.6
O3	Chemical Method	4	8 Hrly.	100(µgm^3)	<4.00	<5.50	7.9	8.48	9.3	<5.9	<6.8
CO	NDIR Spectroscopy method	0.1	1 Hrly.	4(mg/m^3)	0.19	0.28	0.4	0.39	0.4	0.32	0.33
NH3	Indophenol Blue Method	20	24 Hrly.	400(µg/m^3)	<20.00	<22.48	27.0	28.43	26.6	<21.7	<24.4
C6H6	AAS method after sampling	0.001	Annual	05(µg/m^3)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BaP	AAS method after sampling	0.002	Annual	01(ng/m^3)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Ni	AAS method after sampling	0.01	Annual	20(ng/m^3)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pb	Absorption & Desorption followed by GC analysis	0.001	24 Hrly.	01(µg/m^3)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
As	Solvent extraction followed by GC analysis.	0.001	Annual	6(ng/m^3)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Ambient Air Quality

Six Monthly Average (OCT-16 TO MAR-17**)**

Monitoring Location: Buffer Zone

Parameters	**Method of Measurement**	**Detection Limit**	**NAAQ STANDARDS**	**BZ 1**	**BZ 2**	**BZ 3**	**BZ 4**	**BZ 5**	**BZ 6**	**BZ 7**	**BZ 8**	**BZ 9**	**BZ 10**
P.M-10	Gravimetric method	.....	100 (µg/m^3)	49.4	51	46.4	43.1	43.3	36.5	37.3	34.9	34.5	38.9

P.M.-2.5	Gravimetric method	.....	60 (µg/m^3)	23.5	24	21.3	19.9	19.5	15.9	16.5	15.3	14.9	17.6
SO2	Improved West Gaeke method.	4	80 (µg/m^3)	4.9	4.4	<4.2	<4.06	<4.1	<4.0	<4.0	<4.0	<4.0	<4.0
Nox	Jacob &Hochhelser modified (Na-Arsenite) method	9	80 (µg/m^3)	13.9	13	10.4	<9.93	<10.2	<9.1	<9.3	<9.13	<9.0	<9.2
O3	Chemical Method	4	100(µgm^3)	<4.8	<5	<4.5	<4.4	<4.6	<4.0	<4.0	<4.0	<4.0	<4.0
CO	NDIR Spectroscopy method	0.1	4(mg/m^3)	0.2	0.2	0.18	0.16	0.17	0.13	<0.13	0.12	<0.11	<0.13
NH3	Indophenol Blue Method	20	400(µg/m^3)	<23.5	<23	<22.3	<21.7	<21.2	<20.0	<20.0	<20.0	<20.0	<20.0
C6H6	AAS method after sampling	0.01	20(ng/m^3)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BaP	AAS method after sampling	0.001	01(µg/m^3)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Ni	AAS method after sampling	0.001	6(ng/m^3)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pb	Absorption & Desorption followed by GC analysis	0.001	05(µg/m^3)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
As	Solvent extraction followed by GC analysis.	0.002	01(ng/m^3)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Annexure-III

Water Quality

Six Monthly Average (OCT-16 TO MAR-17)

Sampling Location- DW-1: Drinking water From Guest House

-	-	-	-	-	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Six

Sl. No	Parameter	Unit	Standards as per IS: 10500, 1991		Analysis Results	Analysis Results	Analysis Results	Analysis Results	Analysis Results	Analysis Results	Month Avg
Essential Characteristics			**Desirable Limit**	**Permissible Limit**							
1	Colour	Hazen	**5**	**25**	CL	CL	CL	CL	CL	CL	CL
2	Odour	--	**U/O**	**--**	U/O	U/O	U/O	U/O	U/O	U/O	U/O
3	Taste	--	**Agreeable**	**--**	AL	AL	AL	AL	AL	AL	AL
4	Turbidity	NTU	**5**	**10**	<2	<2	<2	< 2	< 2	< 2	< 2
5	pH Value	--	**6.5-8.5**	**No Relaxation**	6.9	7.1	7.2	7.14	6.98	7.08	7.1
6	Total Hardness (as $CaCO_3$)	mg/l	**300**	**600**	26	30	28	30	26	28	28.0
7	Iron (as Fe)	mg/l	**0.3**	**1**	0.11	0.14	0.12	0.11	0.12	0.13	0.12
8	Chloride (as Cl)	mg/l	**250**	**1000**	12	15	13	14	12	14	13.3
9	Residual, free Chlorine	mg/l	**0.2**	**---**	ND	ND	ND	ND	ND	ND	ND
Desirable Characteristics											
10	Dissolved Solids	mg/l	**500**	**2000**	53	61	53	57	49	55	54.7
11	Calcium (as Ca)	mg/l	**75**	**200**	8	8.8	8	8.4	7.6	8	8.1
12	Magnesium (as Mg)	mg/l	**30**	**100**	1.5	1.9	1.9	2.2	1.7	1.9	1.9
13	Copper (as Cu)	mg/l	**0.05**	**1.5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Manganese (as Mn)	mg/l	**0.1**	**0.3**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
15	Sulphate (as SO_4)	mg/l	**200**	**400**	0.24	0.32	0.28	0.34	0.28	0.34	0.30
16	Nitrate (as NO_3)	mg/l	**45**	**100**	0.1	0.12	0.08	0.09	0.07	0.08	0.09
17	Fluoride (as F)	mg/l	**1**	**1.5**	0.02	0.016	0.013	0.012	0.011	0.009	0.014
18	Phenolic Compounds (as C_6H_5OH)	mg/l	**0.001**	**0.002**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
19	Mercury (as Hg)	mg/l	**0.001**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
20	Cadmium (as Cd)	mg/l	**0.01**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
21	Selenium (as Se)	mg/l	**0.01**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
22	Arsenic (as As)	mg/l	**0.05**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
23	Cyanide (as CN)	mg/l	**0.05**	**No Relaxation**	ND	ND	ND	ND	ND	ND	ND
24	Lead (as Pb)	mg/l	**0.05**	**No Relaxation**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Zinc (as Zn)	mg/l	**5**	**15**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
26	Anionic Detergents (as MBAS)	mg/l	**0.2**	**1**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
27	Chromium (as	mg/l	**0.05**	**No**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

	Cr^{+6})			**Relaxation**							
28	Mineral Oil	mg/l	**0.01**	**0.03**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
29	Alkalinity	mg/l	**200**	**600**	28	31	27	28	25	27	**27.7**
30	Aluminium as(Al)	mg/l	**0.03**	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
31	Boron (as B)	mg/l	**1**	**5**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Poly Aromatic Hydrocarbon as PAH	µg/l	**--**	**--**	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
33	Pesticide	mg/l	**Absent**	**0.001**	Absent	Absent	Absent	Absent	Absent	Absent	Absent
34	Total Coliform Organism	MPN/100ml	**Not more than 10MPN/100 ml**	**--**	<2	<2	<2	<2	<2	<2	<2
35	Faecal Coliforms	MPN/100ml	**Not more than 10MPN/100 ml**	**--**	Absent	Absent	Absent	Absent	Absent	Absent	Absent
36	E. Coli	MPN/100ml	**Absent**	**--**	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Water Quality

Six Monthly Average (OCT-16 TO MAR-17)

Sampling Location- SW-1: Intake of Nakti Nallah

Sl. No	Parameter	Unit	Standard as per IS:2296:1992 , Class'C'	Analysis Results	Analysis Results	Analysis Results	Analysis Results	Analysis Results	Analysis Results	Six Month Avg
				Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	
1	Dissolved Oxygen (minimum)	mg/l	**4**	5.5	5.1	5.3	5.1	5.3	5.5	5.3
2	BOD (3) days at 27^{0}C (max)	mg/l	**3**	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	<1.8
3	Total Coli form	MPN/100 ml	**5000**	370	170	220	120	150	220	208.3
4	pH Value	--	**6.0-9.0**	7.3	7.2	7.1	7.2	7.28	7.22	7.2
5	Colour (max)		**300**	4	1	1	1	CL	CL	1.8
6	Total Dissolved Solids	mg/l	**1500**	150	145	142	148	154	150	148.2
7	Copper as Cu (max)	mg/l	**1.5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8	Iron as Fe (max)	mg/l	**0.5**	0.5	0.46	0.42	0.45	0.48	0.44	0.46
9	Chloride (max)	mg/l	**600**	20	22	20	24	28	26	23.3
10	Sulphates (SO_4) (max)	mg/l	**400**	2.8	2.4	2.9	3.1	3.6	3.8	3.1
11	Nitrate as NO_3(max)	mg/l	**50**	1.2	0.9	1.1	1.2	1.6	1.4	1.2
12	Fluoride as F (max)	mg/l	**1.5**	0.14	0.13	0.12	0.14	0.16	0.015	0.12
13	Phenolic Compounds as C_6H_5OH (max)	mg/l	**0.005**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
14	Cadmium as Cd (max)	mg/l	**0.01**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
15	Selenium as Se (max)	mg/l	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
16	Arsenic as As	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Cyanide as CN (max)	mg/l	**0.05**	ND	ND	ND	ND	ND	ND	ND
18	Lead as Pb(max)	mg/l	**0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
19	Zinc as Zn(max)	mg/l	**15**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Hexa Chromium as Cr^{+6}	mg/l	**0.05**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Anionic Detergents (max)	mg/l	**1**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Water Quality

Six Monthly Average (OCT-16 TO MAR-17)

Sampling Location- EW-1 Guest House Discharge Water

	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Six Month

Sl. No	Parameter	Unit	Standards (In land Surface water)	Analysis Results	Analysis Results	Analysis Results	Analysis Results	Analysis Results	Analysis Results	Avg
1	Colour & Odour	Hazen	**Colourless/Odourless as far as practicable**	10 & pungent smell	07 & pungent smell	08 & pungent smell	06 & pungent smell	07 & pungent smell	05 & pungent smell	7.2 & pungent smell
2	Suspended Solids	mg/l	**100**	98	98	97	79	78	95	90.8
3	Particulate size of SS		**Shall pass 850 micron IS Sieve**	<850	<850	<850	<850	<850	<850	<850
4	pH Value	--	**5.5-9.0**	5.4	5.7	5.5	5.8	5.44	5.68	5.6
5	Temperature	^{o}C	**Shall not exceed 5^{o}C above the receiving water temperature**	23	20	20	20	21	21	21
6	Oil & Grease(max)	mg/l	**10**	ND	ND	ND	ND	ND	ND	ND
7	Total Residual Chlorine	mg/l	**1**	ND	ND	ND	ND	ND	ND	ND
8	Ammonical Nitrogen (as N)	mg/l	**50**	6.8	4.8	5.6	4.8	4.4	4.6	5.2
9	Total Kjeldahl nitrogen (as NH_3)	mg/l	**100**	18.2	15.6	17.4	15.6	12.5	13.6	15.5
10	Free ammonia (as NH_3)	mg/l	**5**	ND	ND	ND	ND	ND	ND	ND
11	BOD(3 days at 27^{o}C (max)	mg/l	**30**	27	28	36	24	28	30	28.8
12	Chemical Oxygen Demand as COD	mg/l	**250**	246	180	200	160	184	160	188.3
13	Arsenic as As	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
14	Mercury (Hg)	mg/l	**0.01**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
15	Lead as Pb(max)	mg/l	**0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
16	Cadmium as Cd (max)	mg/l	**2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Hexavalent Chromium as Cr^{+6}	mg/l	**0.1**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
18	Total Chromium (Cr)	mg/l	**2**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
19	Copper as Cu (max)	mg/l	**3**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Zinc as Zn(max)	mg/l	**5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Selenium (Se) (max)	mg/l	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
22	Nickel (Ni)	mg/l	**3**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
23	Cyanide as CN (max)	mg/l	**0.2**	ND	ND	ND	ND	ND	ND	ND
24	Fluoride as F (max)	mg/l	**2**	0.26	0.21	0.24	0.25	0.28	0.32	0.26
25	Dissolved Phosphates (P)	mg/l	**5**	0.82	0.72	0.8	0.72	0.84	0.8	0.78
26	Sulphide (S)	mg/l	**2**	2.2	1.8	1.6	1.2	1.3	1.2	1.55
27	Phenolic Compounds as C_6H_5OH (max)	mg/l	**1**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	#DIV/0!
28	Bio-assay test		**90% survival of fish after 96 hours in**	86% survival of fishes	89% survival of fishes	86% survival of fishes	89% survival of fishes	87% survival of fishes	90% survival of fishes	88% survival of fishes

			100% effluent							
29	Manganese (Mn)	mg/l	**2**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
30	Iron as Fe (max)	mg/l	**3**	0.52	0.47	0.44	0.46	0.52	0.48	0.48
31	Vanadium (V)	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
32	Nitrate Nitrogen	mg/l	**10**	4.8	4.20	4.9	4.6	5.2	4.8	4.75

Water Quality

Six Monthly Average (OCT-16 TO MAR-17)

Sampling Location: EW-2:Mines Canteen Effluent

				Oct-16	**Nov-16**	**Dec-16**	**Jan-17**	**Feb-17**	**Mar-17**	

Sl. No	Parameter	Unit	Standards (In land Surface water)	Analysis Results	Analysis Results	Analysis Results	Analysis Results	Analysis Results	Analysis Results	Six month Avg
1	Colour & Odour	Hazen	**Colourless/Odourless as far as practicable**	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O
2	Suspended Solids	mg/l	**100**	48	38	28	34	42	48	39.7
3	Particulate size of SS		**Shall pass 850 micron IS Sieve**	<850	<850	<850	<850	<850	<850	<850
4	pH Value	--	**5.5-9.0**	6.8	6.9	6.8	6.7	6.82	6.73	6.8
5	Temperature	^{o}C	**Shall not exceed 5^{o}C above the receiving water temperature**	23	20	20	20	21	21	20.8
6	Oil & Grease(max)	mg/l	**10**	ND	ND	ND	ND	ND	ND	ND
7	Total Residual Chlorine	mg/l	**1**	ND	ND	ND	ND	ND	ND	ND
8	Ammonical Nitrogen (as N)	mg/l	**50**	1.8	1.6	2.2	1.9	2.1	2.4	2.0
9	Total Kjeldahl nitrogen (as NH_3)	mg/l	**100**	3.2	3.4	5.6	4.8	5.2	5.8	4.7
10	Free ammonia (as NH_3)	mg/l	**5**	ND	ND	ND	ND	ND	ND	ND
11	BOD(3 days at 27^{o}C (max)	mg/l	**30**	12	14	12	10	8	6	10.3
12	Chemical Oxygen Demand as COD	mg/l	**250**	38	48	48	42	40	36	42
13	Arsenic as As	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
14	Mercury (Hg)	mg/l	**0.01**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
15	Lead as Pb(max)	mg/l	**0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
16	Cadmium as Cd (max)	mg/l	**2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Hexavalent Chromium as Cr^{+6}	mg/l	**0.1**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
18	Total Chromium (Cr)	mg/l	**2**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
19	Copper as Cu (max)	mg/l	**3**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Zinc as Zn(max)	mg/l	**5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Selenium (Se) (max)	mg/l	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
22	Nickel (Ni)	mg/l	**3**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
23	Cyanide as CN (max)	mg/l	**0.2**	ND	ND	ND	ND	ND	ND	ND
24	Fluoride as F (max)	mg/l	**2**	0.16	0.17	0.14	0.12	0.14	0.16	0.15
25	Dissolved Phosphates (P)	mg/l	**5**	0.16	0.16	0.18	0.16	0.12	0.1	0.15
26	Sulphide (S)	mg/l	**2**	ND	ND	ND	ND	ND	ND	ND
27	Phenolic Compounds as	mg/l	**1**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

	C_6H_5OH (max)									
28	Bio-assay test		**90% survival of fish after 96 hours in 100% effluent**	93% survival of fishes	92% survival of fishes	93% survival of fishes	94% survival of fishes	92% survival of fishes	93% survival of fishes	93% survival of fishes
29	Manganese (Mn)	mg/l	**2**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
30	Iron as Fe (max)	mg/l	**3**	0.54	0.6	0.56	0.5	0.44	0.4	0.51
31	Vanadium (V)	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
32	Nitrate Nitrogen	mg/l	**10**	1.8	1.9	1.8	1.6	1.7	1.5	1.7

Water Quality

Six Monthly Average (OCT-16 TO MAR-17)

Sampling Location: GW-1:Tube well near Guest House

-	-	-	-	-	**Oct-16**	**Nov-16**	**Dec-16**	**Jan-17**	**Feb-17**	**Mar-17**	
Sl. No	**Parameter**	**Unit**	**Standards as per IS: 10500, 1991**		**Analysis Results**	**Analysis Results**	**Analysis Results**	**Analysis Results**	**Analysis Results**	**Analysis Results**	**Six Month Avg**
Essential Characteristic			**Desirable Limit**	**Permissible Limit**							

s											
1	Colour	Hazen	**5**	**25**	CL	CL	CL	CL	CL	CL	CL
2	Odour	--	**U/O**	**--**	U/O	U/O	U/O	U/O	U/O	U/O	U/O
3	Taste	--	**Agreeable**	**--**	AL	AL	AL	AL	AL	AL	AL
4	Turbidity	NTU	**5**	**10**	< 2	< 2	< 2	< 2	< 2	< 2	< 2
5	pH Value	--	**6.5-8.5**	**No Relaxation**	6.8	6.9	7.0	7.05	7.14	7.12	7.0
6	Total Hardness (as $CaCO_3$)	mg/l	**300**	**600**	116	112	118	124	129	130	121.5
7	Iron (as Fe)	mg/l	**0.3**	**1**	0.28	0.28	0.3	0.26	0.36	0.26	0.3
8	Chloride (as Cl)	mg/l	**250**	**1000**	28	26	30	32	35	34	30.8
9	Residual, free Chlorine	mg/l	**0.2**	**---**	ND	ND	ND	ND	ND	ND	ND
Desirable Characteristics											
10	Dissolved Solids	mg/l	**500**	**2000**	167	170	182	191	202	201	185.5
11	Calcium (as Ca)	mg/l	**75**	**200**	33.3	32.1	33.7	35.3	36.1	36.5	34.5
12	Magnesium (as Mg)	mg/l	**30**	**100**	8	7.8	8.3	8.7	9.5	9.5	8.6
13	Copper (as Cu)	mg/l	**0.05**	**1.5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Manganese (as Mn)	mg/l	**0.1**	**0.3**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
15	Sulphate (as SO_4)	mg/l	**200**	**400**	4.5	4.7	5.1	5.6	5.9	5.6	5.2
16	Nitrate (as NO_3)	mg/l	**45**	**100**	1.5	1.7	1.9	1.8	2.2	2.3	1.9
17	Fluoride (as F)	mg/l	**1**	**1.5**	0.02	0.024	0.022	0.024	0.028	0.024	0.024
18	Phenolic Compounds (as C_6H_5OH)	mg/l	**0.001**	**0.002**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
19	Mercury (as Hg)	mg/l	**0.001**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
20	Cadmium (as Cd)	mg/l	**0.01**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
21	Selenium (as Se)	mg/l	**0.01**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
22	Arsenic (as As)	mg/l	**0.05**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
23	Cyanide (as CN)	mg/l	**0.05**	**No Relaxation**	ND	ND	ND	ND	ND	ND	ND
24	Lead (as Pb)	mg/l	**0.05**	**No Relaxation**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Zinc (as Zn)	mg/l	**5**	**15**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
26	Anionic Detergents (as MBAS)	mg/l	**0.2**	**1**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
27	Chromium (as Cr^{+6})	mg/l	**0.05**	**No Relaxation**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Mineral Oil	mg/l	**0.01**	**0.03**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
29	Alkalinity	mg/l	**200**	**600**	102	100	106	110	115	118	108.5
30	Aluminium as(Al)	mg/l	**0.03**	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
31	Boron (as B)	mg/l	**1**	**5**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Poly Aromatic Hydrocarbon as PAH	µg/l	**--**	**--**	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
33	Pesticide	mg/l	**Absent**	**0.001**	Absent	Absent	Absent	Absent	Absent	Absent	Absent

34	Total Coliform Organism	MPN/100 ml	**Not more than 10MPN/100 ml**	--	<2	<2	<2	<2	<2	<2	<2
35	Faecal Coliforms	MPN/100 ml	**Not more than 10MPN/100 ml**	--	Absent	Absent	Absent	Absent	Absent	Absent	Absent
36	E. Coli	MPN/100 ml	**Absent**	--	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Water Quality

Six Monthly Average (OCT-16 TO MAR-17)

Sampling Location: GW-2:Tube well (Gomardih Village)

-	-	-	-	-	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	
Sl. No	**Parameter**	**Unit**	**Standards as per IS: 10500, 1991**		**Analysis Results**	**Analysis Results**	**Analysis Results**	**Analysis Results**	**Analysis Results**	**Analysis Results**	**Six Month Avg**
Essential Characteristics			**Desirable Limit**	**Permissible Limit**							
1	Colour	Hazen	**5**	**25**	CL	CL	CL	CL	CL	CL	CL
2	Odour	--	**U/O**	**--**	U/O	U/O	U/O	U/O	U/O	U/O	U/O
3	Taste	--	**Agreeable**	**--**	AL	AL	AL	AL	AL	AL	AL
4	Turbidity	NTU	**5**	**10**	< 2	< 2	< 2	< 2	< 2	< 2	< 2
5	pH Value	--	**6.5-8.5**	**No Relaxation**	7.5	7.4	7.6	7.44	7.36	7.42	7.5
6	Total Hardness (as $CaCO_3$)	mg/l	**300**	**600**	176	172	184	192	198	196	186.3
7	Iron (as Fe)	mg/l	**0.3**	**1**	0.18	0.2	0.24	0.22	0.3	0.24	0.23
8	Chloride (as Cl)	mg/l	**250**	**1000**	32	28	32	36	39	37	34.0
9	Residual, free Chlorine	mg/l	**0.2**	**---**	ND	ND	ND	ND	ND	ND	ND
Desirable Characteristics											
10	Dissolved Solids	mg/l	**500**	**2000**	240	235	253	270	281	275	259
11	Calcium (as Ca)	mg/l	**75**	**200**	49.7	48.9	51.7	53.7	54.1	54.5	52.1
12	Magnesium (as Mg)	mg/l	**30**	**100**	12.6	12.2	13.4	14.1	15.3	14.6	13.7
13	Copper (as Cu)	mg/l	**0.05**	**1.5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14	Manganese (as Mn)	mg/l	**0.1**	**0.3**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
15	Sulphate (as SO_4)	mg/l	**200**	**400**	6.8	6.6	7.3	7.8	8.1	7.7	7.4
16	Nitrate (as NO_3)	mg/l	**45**	**100**	1.9	2.4	2.8	3.1	3.6	3.3	2.9
17	Fluoride (as F)	mg/l	**1**	**1.5**	0.032	0.04	0.036	0.032	0.038	0.034	0.035
18	Phenolic Compounds (as C_6H_5OH)	mg/l	**0.001**	**0.002**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
19	Mercury (as Hg)	mg/l	**0.001**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
20	Cadmium (as Cd)	mg/l	**0.01**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
21	Selenium (as Se)	mg/l	**0.01**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
22	Arsenic (as As)	mg/l	**0.05**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
23	Cyanide (as CN)	mg/l	**0.05**	**No Relaxation**	ND	ND	ND	ND	ND	ND	ND
24	Lead (as Pb)	mg/l	**0.05**	**No Relaxation**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Zinc (as Zn)	mg/l	**5**	**15**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

26	Anionic Detergents (as MBAS)	mg/l	**0.2**	**1**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
27	Chromium (as Cr^{+6})	mg/l	**0.05**	**No Relaxation**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Mineral Oil	mg/l	**0.01**	**0.03**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
29	Alkalinity	mg/l	**200**	**600**	164	160	168	176	182	178	171.3
30	Aluminium as(Al)	mg/l	**0.03**	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
31	Boron (as B)	mg/l	**1**	**5**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Poly Aromatic Hydrocarbon as PAH	µg/l	**--**	**--**	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
33	Pesticide	mg/l	**Absent**	**0.001**	Absent	Absent	Absent	Absent	Absent	Absent	Absent
34	Total Coliform Organism	MPN/100ml	**Not more than 10MPN/100 ml**	**--**	<2	<2	<2	<2	<2	<2	<2
35	Faecal Coliforms	MPN/100ml	**Not more than 10MPN/100 ml**	**--**	Absent	Absent	Absent	Absent	Absent	Absent	Absent
36	E. Coli	MPN/100ml	**Absent**	**--**	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Water Quality

Six Monthly Average (OCT-16 TO MAR-17)

Sampling Location: EW-3:Mines Discharge Water

				Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Six Monthly Avg
Sl. No	**Parameter**	**Unit**	**Standards (In land Surface water)**	**Analysis Results**	**Analysis Results**	**Analysis Results**	**Analysis Results**	**Analysis Results**	**Analysis Results**	
1	Colour & Odour	Hazen	**Colourless/Odourless as far as practicable**	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O
2	Suspended Solids	mg/l	**100**	10	16.0	12	10	16	20	14
3	Particulate size of SS		**Shall pass 850 micron IS Sieve**	<850	<850	<850	<850	<850	<850	<850
4	pH Value	--	**5.5-9.0**	7.5	7.4	7.5	7.4	7.38	7.3	7.41
5	Temperature	°C	**Shall not exceed 5°C above the receiving water temperature**	23	20.0	20	20	21	21	20.8
6	Oil & Grease(max)	mg/l	**10**	ND	ND	ND	ND	ND	ND	ND
7	Total Residual Chlorine	mg/l	**1**	ND	ND	ND	ND	ND	ND	ND
8	Ammonical Nitrogen (as N)	mg/l	**50**	ND	ND	ND	ND	ND	ND	ND
9	Total Kjeldahl nitrogen (as NH_3)	mg/l	**100**	ND	ND	ND	ND	ND	ND	ND
10	Free ammonia (as NH_3)	mg/l	**5**	ND	ND	ND	ND	ND	ND	ND
11	BOD(3 days at 27°C (max)	mg/l	**30**	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
12	Chemical Oxygen Demand as COD	mg/l	**250**	< 3	< 3	< 3	< 3	< 3	< 3	<3
13	Arsenic as As	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
14	Mercury (Hg)	mg/l	**0.01**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
15	Lead as Pb(max)	mg/l	**0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
16	Cadmium as Cd (max)	mg/l	**2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Hexavalent Chromium as Cr^{+6}	mg/l	**0.1**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
18	Total Chromium (Cr)	mg/l	**2**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
19	Copper as Cu (max)	mg/l	**3**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Zinc as Zn(max)	mg/l	**5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Selenium (Se) (max)	mg/l	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
22	Nickel (Ni)	mg/l	**3**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
23	Cyanide as CN (max)	mg/l	**0.2**	ND	ND	ND	ND	ND	ND	ND
24	Fluoride as F (max)	mg/l	**2**	0.15	0.13	0.1	0.11	0.12	0.14	0.13
25	Dissolved Phosphates (P)	mg/l	**5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

26	Sulphide (S)	mg/l	**2**	ND	ND	ND	ND	ND	ND	ND
27	Phenolic Compounds as C_6H_5OH (max)	mg/l	**1**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28	Bio-assay test		**90% survival of fish after 96 hours in 100% effluent**	98% survival of fishes	98% survival of fishes	98% survival of fishes	98% survival of fishes	98% survival of fishes	98% survival of fishes	98% survival of fishes
29	Manganese (Mn)	mg/l	**2**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
30	Iron as Fe (max)	mg/l	**3**	0.56	0.64	0.52	0.48	0.36	0.32	0.48
31	Vanadium (V)	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
32	Nitrate Nitrogen	mg/l	**10**	0.9	0.8	0.9	0.8	0.84	0.72	0.83

Annexure-VII
Ambient Noise Quality
Six Monthly Average (OCT-16 TO MAR-17**)**

Sl. No	Category of Area/Zone	Sampling Location	Noise Level in dB(A) Leq six monthly avg. (OCT-16 TO MAR-17)			
			Day time Equivalent		Night time Equivalent	
			Standard as per CPCB	Actual	Standard as per CPCB	Actual
1		Crusher Plant		58.25		47.5

Note : Day Time : 6.00 AM -10.00 PM, Night Time: 10.00PM- 6.00AM

AMBIENT AIR QUALITY STANDARDS IN RESPECT OF NOISE

AS PER CPCB GUIDELINES

AREA CODE	CATEGORY OF AREA / ZONE	LIMITS IN dB (A)	
		DAY TIME	NIGHT TIME
A	INDUSTRIAL AREA	75	70
B	COMMERCIAL AREA	65	55
C	RESIDENTIAL AREA	55	45
D	SILENE ZONE	50	40