

Annexure 2

**JAYPEE HIMACHAL CEMENT PLANT (LIMESTONE MINE)- BAGA - BHALAG (ARKI) SOLAN HP
(A UNIT OF JAIPRAKASH ASSOCIATES LTD.)**

AMBIENT AIR QUALITY MONITORING AT PLANT / MINE SITE & AT CORE ZONE

HALF YEARLY STATISTICAL REPORT (December'2011 - March' 2012)

Location 1 :- Hanumanji Mandir Site

PARTICULARS	PM 2.5	PM 10	SO ₂	NO _x	CO
Maximum	51.61	68.44	25.11	15.02	1.68
Minimum	7.71	15.53	3.94	3.34	0.00
Average	5.22	6.78	4.61	1.38	0.69
Standard Deviation	9.81	4.68	1.16	2.78	0.35
Coeffecient of Variation	1.88	0.69	0.25	2.02	0.51

All values are in µg/m³ except CO which is in mg/m³

Location 2 :- 1370 MSL (Near Main Plant Area; at Panali)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	24.78	74.34	15	16	130
Minimum	16.75	50.24	7	6	114
Average	20.17	60.51	10.86	10.5	122.19
Standard Deviation	2.41	7.22	2.17	2.36	4.08
Coeffecient of Variation	0.12	0.12	0.2	0.22	0.03

All values are in µg/m³

Location 3 :- 1260 MSL (Near Cement Mill Area, at Baga)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	29.4	88.21	15	15	132
Minimum	15.05	45.16	7	6	110
Average	20	59.99	11	10.53	121.67
Standard Deviation	3.4	10.19	2.4	2.58	5.25
Coeffecient of Variation	0.17	0.17	0.22	0.25	0.04

All values are in µg/m³

Location 4 :- Challan (Near Bhalag Crusher at Mine area)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	28.43	85.29	15	15	132
Minimum	15.74	47.21	6	7	114
Average	20.29	60.86	10.67	10.92	121.75
Standard Deviation	3.3	9.89	2.34	2.49	4.29
Coeffecient of Variation	0.16	0.16	0.22	0.23	0.04

All values are in µg/m³

Location 5 :- Baga (Near worker Mesh, Basant Kunj)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	33.08	99.24	15	15	136
Minimum	15.53	47.12	6	7	108
Average	21.22	63.9	10.39	10.78	120.33
Standard Deviation	4.93	14.92	2.56	2.37	6.63
Coeffecient of Variation	0.23	0.23	0.25	0.22	0.06

All values are in µg/m³

Location 6 :- Malothi (Near Fabrication Yard)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	33.82	101.46	15	15	134
Minimum	16.05	48.16	6	7	108
Average	21.28	63.84	10.81	10.89	120.5
Standard Deviation	5.2	15.59	2.46	2.41	5.97
Coeffecient of Variation	0.24	0.24	0.23	0.22	0.05

All values are in µg/m³**Location 7 :- Nerri- Jajjar (Near Township at Dhartatoh)**

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	33.1	99.31	15	15	136
Minimum	16.09	48.26	6	6	105
Average	21.27	62.16	10.42	10.47	120.14
Standard Deviation	5.07	15.53	2.36	2.51	7.54
Coeffecient of Variation	0.24	0.25	0.23	0.24	0.06

All values are in µg/m³**Location 8 :- Kandhar (Near Prposed ITI)**

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	32.83	98.49	15	15	132
Minimum	15.08	45.25	7	6	108
Average	21.04	63.12	10.61	10.47	120.33
Standard Deviation	5.11	15.33	2.37	2.21	5.79
Coeffecient of Variation	0.24	0.24	0.22	0.21	0.05

All values are in µg/m³**MONTHLY REPORT (March' 2012)****Location 1 :- Hanuman ji Mandir Site**

PARTICULARS	PM 2.5	PM 10	SO ₂	NO _x	CO
Maximum	39.41	68.44	25.11	7.29	1.68
Minimum	20.55	16.68	10.25	3.34	1.01
Average	30.36	51.33	14.45	4.56	1.38
Standard Deviation	6.01	13.51	3.95	1.19	0.19
Coefficient of Variation	0.2	0.26	0.027	0.26	0.14

All values are in µg/m³ except CO which is in mg/m³**Location 2 :- 1370 MSL (Near Main Plant Area; at Panali)**

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	20.42	61.25	15	14	126
Minimum	17.42	52.26	8	7	116
Average	19.02	57.06	11.11	10.44	121
Standard Deviation	1.062	3.185	2.571	2.297	3.202
Coefficient of Variation	0.056	0.056	0.231	0.22	0.026

All values are in µg/m³**Location 3 :- 1260 MSL (Near Cement Mill Area, at Baga)**

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Minimum	15.4	46.21	7	6	114
Average	18.73	56.2	10.89	9.89	121.33
Standard Deviation	2.186	6.559	2.667	2.667	4.387
Coefficient of Variation	0.117	0.117	0.245	0.27	0.036

All values are in $\mu\text{g}/\text{m}^3$

Location 4 :- Challan (Near Bhalag Crusher at Mine area)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	20.38	61.14	14	15	128
Minimum	15.74	47.21	6	8	116
Average	18.46	55.39	10.33	11.33	122.22
Standard Deviation	1.505	4.515	2.5	2.345	3.833
Coefficient of Variation	0.082	0.082	0.242	0.207	0.031

All values are in $\mu\text{g}/\text{m}^3$

Location 5 :- Baga (Near worker Mesh, Basant Kunj)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	20.74	62.21	14	15	126
Minimum	15.53	48.13	6	7	113
Average	18.34	55.19	9.44	10.67	120.22
Standard Deviation	1.675	4.717	2.555	2.646	4.842
Coefficient of Variation	0.091	0.085	0.271	0.248	0.04

All values are in $\mu\text{g}/\text{m}^3$

Location 6 :- Malothi (Near Fabrication Yard)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	20.4	61.19	14	15	126
Minimum	16.17	48.51	6	8	114
Average	17.88	53.65	10.33	11.44	120.67
Standard Deviation	1.347	4.04	2.5	2.297	4.031
Coefficient of Variation	0.075	0.075	0.242	0.201	0.033

All values are in $\mu\text{g}/\text{m}^3$

Location 7 :- Nerri- Jajjar (Near Township at Dhartatoh)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	22.51	61.18	14	14	125
Minimum	16.74	50.22	6	7	113
Average	18.63	54.3	10.44	10.33	119.33
Standard Deviation	1.89	3.647	2.555	2.449	4.359
Coefficient of Variation	0.101	0.067	0.245	0.237	0.037

All values are in $\mu\text{g}/\text{m}^3$

Location 8 :- Kandhar (Near Prposed ITI)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	20.38	61.14	13	15	125
Minimum	15.81	47.42	8	7	114
Average	18.3	54.91	10.56	10.78	120.67
Standard Deviation	1.602	4.805	1.944	2.386	3.391
Coefficient of Variation	0.088	0.088	0.184	0.221	0.028

All values are in $\mu\text{g}/\text{m}^3$

MONTHLY REPORT (February' 2012)

Location 1 :- Hanuman ji Mandir Site

PARTICULARS	PM 2.5	PM 10	SO ₂	NO _x	CO
Maximum	33.47	68.28	15.57	15.02	1.37

Minimum	7.71	15.53	14.49	7.78	1.36
Average	19.27	37.77	14.67	9.85	1.37
Standard Deviation	6.21	5.21	0.21	4.21	1.21
Coefficient of Variation	0.322	0.138	0.014	0.428	0.885

All values are in $\mu\text{g}/\text{m}^3$ except CO which is in mg/m^3

Location 2 :- 1370 MSL (Near Main Plant Area; at Panali)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SOx	NOx	CO
Maximum	20.18	60.53	14	15	128
Minimum	17.05	51.14	7	6	116
Average	18.6	55.81	10.56	10.22	122.11
Standard Deviation	1.206	3.618	2.297	2.819	3.822
Coefficient of Variation	0.065	0.065	0.218	0.276	0.031

All values are in $\mu\text{g}/\text{m}^3$

Location 3 :- 1260 MSL (Near Cement Mill Area, at Baga)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SOx	NOx	CO
Maximum	22.72	68.15	14	15	127
Minimum	15.05	45.16	8	6	116
Average	18.5	55.49	11.56	10.33	122.67
Standard Deviation	2.318	6.954	2.186	3.162	3.742
Coefficient of Variation	0.125	0.125	0.189	0.306	0.031

All values are in $\mu\text{g}/\text{m}^3$

Location 4 :- Challan (Near Bhalag Crusher at Mine area)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SOx	NOx	CO
Maximum	20.05	60.14	15	14	126
Minimum	16.41	49.23	8	7	116
Average	18.13	54.39	10.78	10.44	122.11
Standard Deviation	1.286	3.858	2.333	2.297	3.296
Coefficient of Variation	0.071	0.071	0.216	0.22	0.027

All values are in $\mu\text{g}/\text{m}^3$

Location 5 :- Baga (Near worker Mesh, Basant Kunj)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SOx	NOx	CO
Maximum	20.08	60.25	15	14	124
Minimum	15.71	47.12	7	7	112
Average	18.37	55.29	11	10.44	117.67
Standard Deviation	1.658	4.697	2.739	2.297	4.062
Coefficient of Variation	0.09	0.085	0.249	0.22	0.035

All values are in $\mu\text{g}/\text{m}^3$

Location 6 :- Malothi (Near Fabrication Yard)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SOx	NOx	CO
Maximum	20.05	60.14	15	14	124
Minimum	16.05	48.16	7	7	112
Average	17.88	53.65	10.89	10.78	118.44
Standard Deviation	1.463	4.388	2.667	2.438	3.877
Coefficient of Variation	0.082	0.082	0.245	0.226	0.033

All values are in $\mu\text{g}/\text{m}^3$

Location 7 :- Nerri- Jajjar (Near Township at Dhartatoh)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	22.51	60.19	13	15	126
Minimum	16.09	48.26	7	6	111
Average	18.44	53.84	10	10.11	118.44
Standard Deviation	2.116	4.401	1.936	2.934	5.457
Coefficient of Variation	0.115	0.082	0.194	0.29	0.046

All values are in µg/m³**Location 8 :- Kandhar (Near Prposed ITI)**

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	20.04	60.12	15	14	128
Minimum	15.08	45.25	7	6	112
Average	17.67	53.02	10.33	10.33	120.89
Standard Deviation	1.686	5.059	2.646	2.5	4.91
Coefficient of Variation	0.095	0.095	0.256	0.242	0.041

All values are in µg/m³**MONTHLY REPORT (January' 2012)****Location 1 :- Hanuman ji Mandir Site**

PARTICULARS	PM 2.5	PM 10	SO ₂	NO _x	CO
Maximum	51.61	-	6.16	11.73	0
Minimum	19.34	-	3.94	4.89	0
Average	35.29	-	4.97	7.27	0
Standard Deviation	14.394	-	0.267	2.973	0
Coefficient of Variation	0.673	-	0.066	0.511	0

All values are in µg/m³ except CO which is in mg/m³**Location 2 :- 1370 MSL (Near Main Plant Area; at Panali)**

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	23.08	69.23	15	14	126
Minimum	16.75	50.24	8	8	116
Average	20.74	62.23	10.89	10.56	121.56
Standard Deviation	2.302	6.907	2.205	2.068	3.358
Coefficient of Variation	0.111	0.111	0.202	0.196	0.028

All values are in µg/m³**Location 3 :- 1260 MSL (Near Cement Mill Area, at Baga)**

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	23.08	69.23	15	14	128
Minimum	16.38	49.15	7	8	114
Average	20.16	60.49	11	10.67	121.11
Standard Deviation	2.578	7.734	2.739	2.121	4.676
Coefficient of Variation	0.128	0.128	0.249	0.199	0.039

All values are in µg/m³**Location 4 :- Challan (Near Bhalag Crusher at Mine area)**

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	23.47	70.41	14	15	126
Minimum	17.07	51.2	7	7	114

Average	20.59	61.78	10.67	10.89	120.11
Standard Deviation	2.259	6.778	2.345	2.892	4.014
Coefficient of Variation	0.11	0.11	0.22	0.266	0.033

All values are in $\mu\text{g}/\text{m}^3$

Location 5 :- Baga (Near worker Mesh, Basant Kunj)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	24.84	74.51	14	15	128
Minimum	17.14	51.41	7	8	108
Average	21.59	65.04	10.44	11.67	119.44
Standard Deviation	2.973	9.129	2.297	2.345	6.044
Coefficient of Variation	0.138	0.14	0.22	0.201	0.051

All values are in $\mu\text{g}/\text{m}^3$

Location 6 :- Malothi (Near Fabrication Yard)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	25.08	75.23	14	13	126
Minimum	17.74	53.21	7	7	110
Average	21.99	65.97	11	10.22	119.44
Standard Deviation	2.456	7.369	2.291	2.224	5.003
Coefficient of Variation	0.112	0.112	0.208	0.218	0.042

All values are in $\mu\text{g}/\text{m}^3$

Location 7 :- Nerri- Jajjar (Near Township at Dhartatoh)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	24.46	73.38	15	14	128
Minimum	16.44	49.32	7	7	106
Average	20.82	60.78	11	10.33	118.56
Standard Deviation	2.465	7.804	2.739	2.398	7.401
Coefficient of Variation	0.118	0.128	0.249	0.232	0.062

All values are in $\mu\text{g}/\text{m}^3$

Location 8 :- Kandhar (Near Proposed ITI)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	24.55	73.65	14	13	126
Minimum	17.08	51.25	7	8	109
Average	21.39	64.18	10.56	10.22	118.44
Standard Deviation	2.921	8.764	2.455	1.716	5.94
Coefficient of Variation	0.137	0.137	0.233	0.168	0.05

All values are in $\mu\text{g}/\text{m}^3$

MONTHLY REPORT (December' 2011)

Location 1 :- Hanuman ji Mandir Site

PARTICULARS	PM 2.5	PM 10	SO ₂	NO _x	CO
Maximum	48.47	-	7.88	12.01	0
Minimum	18.46	-	4.83	5.27	0
Average	33.94	-	5.73	7.48	0
Standard Deviation	12.641	-	0.221	2.762	0
Coefficient of Variation	0.557	-	0.073	0.497	0

All values are in $\mu\text{g}/\text{m}^3$ except CO which is in mg/m^3

Location 2 :- 1370 MSL (Near Main Plant Area; at Panali)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	24.78	74.34	14	16	130
Minimum	17.08	51.23	8	8	114
Average	22.32	66.96	10.89	10.78	124.11
Standard Deviation	2.768	8.305	1.9	2.587	5.51
Coefficient of Variation	0.124	0.124	0.175	0.24	0.044

All values are in µg/m³**Location 3 :- 1260 MSL (Near Cement Mill Area, at Baga)**

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	29.4	88.21	14	15	132
Minimum	16.25	48.76	7	7	110
Average	22.59	67.77	10.56	11.22	121.56
Standard Deviation	4.663	13.988	2.297	2.539	7.986
Coefficient of Variation	0.206	0.206	0.218	0.226	0.066

All values are in µg/m³**Location 4 :- Challan (Near Bhalag Crusher at Mine area)**

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	28.43	85.29	14	15	132
Minimum	17.03	51.1	7	7	114
Average	23.96	71.89	10.89	11	122.56
Standard Deviation	3.776	11.327	2.571	2.739	5.876
Coefficient of Variation	0.158	0.158	0.236	0.249	0.048

All values are in µg/m³**Location 5 :- Baga (Near worker Mesh, Basant Kunj)**

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	33.08	99.24	15	14	136
Minimum	17.5	52.51	7	7	109
Average	26.58	80.1	10.67	10.33	124
Standard Deviation	6.388	19.501	2.784	2.345	9.579
Coefficient of Variation	0.24	0.243	0.261	0.227	0.077

All values are in µg/m³**Location 6 :- Malothi (Near Fabrication Yard)**

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	33.82	101.46	15	15	134
Minimum	18.07	54.22	7	7	108
Average	27.37	82.1	11	11.11	123.44
Standard Deviation	6.325	18.975	2.739	2.892	9.153
Coefficient of Variation	0.231	0.231	0.249	0.26	0.074

All values are in µg/m³**Location 7 :- Nerri- Jajjar (Near Township at Dhartatoh)**

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	33.1	99.31	14	15	136
Minimum	16.12	48.36	7	8	105
Average	27.17	79.73	10.22	11.11	124.22

Standard Deviation	6.498	21.568	2.438	2.571	10.94
Coefficient of Variation	0.239	0.271	0.239	0.231	0.088

All values are in $\mu\text{g}/\text{m}^3$

Location 8 :- Kandhar (Near Prposed ITI)

PARTICULARS	RSPM (PM ₁₀)	TSPM	SO _x	NO _x	CO
Maximum	32.83	98.49	15	15	132
Minimum	17.75	53.26	7	7	108
Average	26.79	80.37	11	10.56	121.33
Standard Deviation	6.462	19.385	2.739	2.506	8.367
Coefficient of Variation	0.241	0.241	0.249	0.237	0.069

All values are in $\mu\text{g}/\text{m}^3$