

1.0 EXECUTIVE SUMMARY

1.1 Justification for Implementation of the Project

M/s SKS Cement Limited, (SKSCL) a subsidiary of SKS Ispat & Power Limited is proposing to setting up Integrated Cement Plant (ICP) with production capacity of 3.0 MTPA consisting clinkering unit capacity of 1.4 MTPA, coal washery of 0.96 MTPA capacity and a captive power plant (CPP) of 40 MW (2x20 MW) capacity at Pataidih village, Semradih panchayat, Masturi tehsil, district Bilaspur, Chhattisgarh state.

The total land required for the proposed ICP including cement plant, captive power plant, coal washery, infrastructure and township is 100.1 ha. There are no R&R issues involved. There is no forest land present in the plant site. The proposed project will provide direct employment to a large number of personnel. This project will also generate indirect employment to a considerable number of families, who will render their services for the project.

Thus, in view of considerable benefits from the project without any major adverse environmental impact, the proposed project is most advantageous to the region as well as to the nation.

1.2 Salient Features of the Project

SKSCL has signed an MOU with Govt. of Chhattisgarh to establish 3.0 MTPA of Integrated Cement Plant (ICP), 2x20 MW captive power plant with 0.96 MTPA coal washery on 01.07.2008. To meet the power requirement of this proposed ICP, 40 MW (2 X 20 MW) captive power plant is also proposed. The total cost of the proposed ICP is about Rs. 700 Crores and for the environment protection measures cost is about Rs. 70 Crores. The salient features of the project are given in **Table-1**.

TABLE-1
SALIENT FEATURES OF PROPOSED INTEGRATED CEMENT PLANT (ICP)

Sr. No.	Title	Details	
1	Plant Capacity		
	Cement Plant Production	3.0 MTPA	
	Clinkerization Unit Production	1.4 MTPA	
	Coal Washery	0.96 MTPA	
	Captive Power Plant (CPP)	2 X 20 MW	
	Total Land (Proposed Cement Plant Complex)	100.1 ha	
2	Process adopted	Dry Process with Five Stage Preheater with Pre-Calciners	
3	Raw materials	Requirement* (MTPA)	Sources
	Limestone	2.25	SKS Mines at Chilhati
	Clinker	2.10	SKS Clinker Plant and outside purchase
	Iron ore	0.03	Purchase
	Coal for Clinkerization	0.06	SECL
	Coal for CPP	0.30	SECL
	For Coal of washery (Unwashed coal)	0.96	SECL



Sr. No.	Title	Details	
	Fly ash (PPC)	0.74	Captive CPP and 1200 MW of IPP at Raigarh
	Slag	1.00	
	Gypsum	0.15	Purchase
4	Finished Product	Cement - 3.0 MTPA	
5	Water		
	Source	Sheonath river	
	Water transmission	Pipeline transportation	
	In-plant storage	Full-fledged raw water pretreatment system	
	Cooling water system	Re-circulating cooling water system. Cooling tower will be provided.	
	Water Quantity Requirement (m ³ /day)		
	Cement Plant	1500	
	Captive Power Plant	600	
	Coal Washery	230	
	Domestic (Plant & colony)	450	
	Limestone Mine	150	
	Total	2930	
	Wastewater Generation		
	Process wastewater		
	Wastewater treatment / Disposal	Domestic wastewater subjected to STP and it will be used for green belt development / horticulture & for dust suppression and hence there will be no wastewater discharge outside the premises.	
	Mine water	This water will be utilized for haul road dust suppression, plantation and other agriculture purpose	
6	Emission sources and their control		
	Raw Mill/ Kiln	Bag House (BH) with emission <50 mg/Nm ³	
	Clinker Cooler	ESP (99.9% efficiency)	
	Coal Mill	Bag House (BH)	
	Cement Mill	Bag house/ESP (99.9% efficiency)	
	Packer units	Bag filter	
	CPP	ESP (99.9% efficiency)	
7	Man Power	513 nos.	

1.2.1 Description of the Environment

1.2.1.1 Location and Description of the Site

The proposed ICP site is located at Pataidih village, Semradih panchayat, Masturi tehsil, district Bilaspur, Chhattisgarh. The ICP site is generally flat and comprises of private land. The general ground level is 258 m above MSL. The project area falls in the Mahanadi of the Sheonath River basin in the Bilaspur district of Chhattisgarh. The environmental setting of the proposed ICP site is given in **Table-2**. The study area covers 10 km radius from the proposed Integrated Cement Plant (ICP) site and it is presented in **Figure-1**.

**TABLE-2
ENVIRONMENTAL SETTING OF THE SITE**

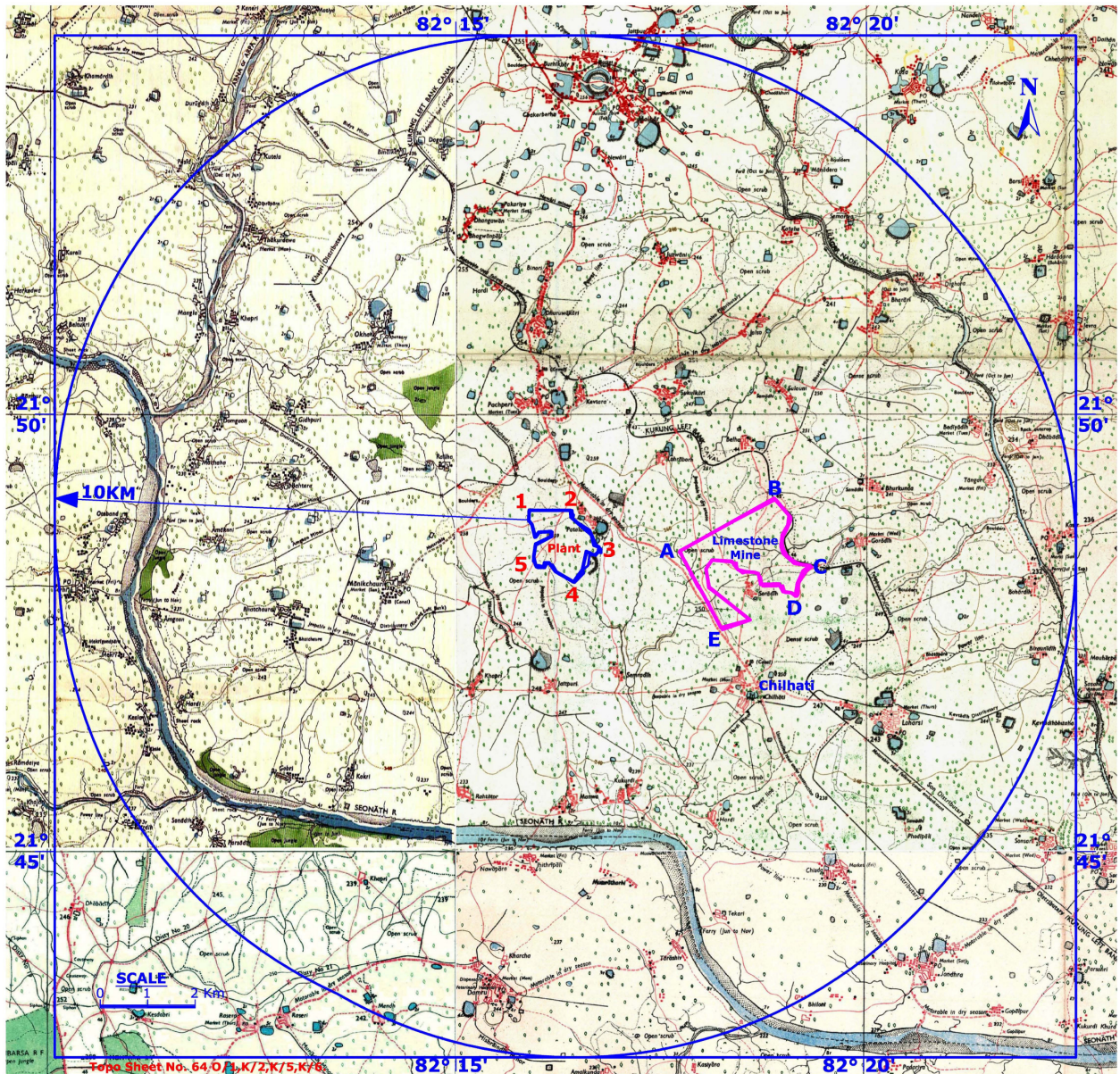
Sr. No.	Particulars	Integrated Cement Plant (ICP)
1	Location	Village Pataidih, Semradih panchayat, Masturi tehsil
2	District / State	Bilaspur district, Chhattisgarh state
3	Distance from Cement Plant to Mine,	1.6 km, E



Sr. No.	Particulars	Integrated Cement Plant (ICP)
	km	
4	Latitude	21° 48' 4.51" N - 21° 48' 50.83" N
5	Longitude	82° 16' 42.72" E - 82° 16' 4.38" E
6	Site elevation above Mean Sea Level (MSL)	258 m
7	Geographical location in toposheet	64 Q/1, 64 K/2, 64 K/5 and 64 K/6
8	Site Specific Meteorological Data	Study Period – 1st October – 31st December-2011 Predominant Wind Direction- NE (13.0 %), ENE (11.1 %) Predominant Wind Speed-1.0 – 11 kmph Minimum / Maximum Temperature-8.5 °C (December 2011) / 34.8°C (October 2011) Relative Humidity-23.4 – 97.0 %
9	Meteorological Data from Nearest IMD station at Raipur (at a distance of about 95 km)	IMD Raipur Data (Annual) Predominant Wind Direction- NE (15.7 %), NNE (14.7 %) Predominant Wind Speed- 1-19 kmph Minimum / Maximum Temperature - 12.7°C (December) / 41.9°C (May) Relative Humidity- 18.7 % - 86.7 %
10	Nearest Highways : State Highway	Bilaspur – Raigarh Highway (14.5 km, NNE)
11	Nearest Railway Station	Jayaram Nagar, 25 km, N Nipani, 22 km, W
12	Nearest Towns	Bilaspur, 32 km, NNW
13	Major Water Bodies	Sheonath River, 5.1 km, S Lilagarh River, 7.6 km, NE
14	Nearest airport	Raipur, 95 km, SW
15	Archaeologically Important Places	None in 15 km radius
16	Protected areas as per Wildlife Protection Act,1972 (Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries, community reserves and conservation reserves)	None in 15 km radius
17	Reserved / Protected Forests	Nil in 10 km radius
18	Seismicity	Seismic Zone-II as per IS 1893 (Part I): 2002
19	Defence Installations	None in 15 km radius
20	Major industries in 15 km radius	None in 15 km radius
21	Socio-economic factors	No R&R issues involved. There are no homestead displacement.

1.3 Baseline Studies

About 100.1 ha of land is required for the construction of the ICP and CPP including township and accessories. Sufficient flat land, free from major undulations for plant and colony is available. The land required for the cement plant is under acquisition process. The State Government has given in principle approval vide letter dated 26.07.2011 through department of Industries.



- Plant Area**
- Limestone Mine**
- PLANT SITE**
- 1 : 21° 48' 54.0" N, 82° 15' 54" E
 2 : 21° 48' 54.0" N, 82° 16' 25.4" E
 3 : 21° 48' 26.3" N, 82° 16' 46.5" E
 4 : 21° 48' 4.6" N, 82° 16' 27.1" E
 5 : 21° 48' 19.3" N, 82° 15' 56.8" E
- ML AREA**
- A : 21° 48' 25.7" N, 82° 17' 42.9" E
 B : 21° 49' 1.7" N, 82° 18' 54.2" E
 C : 21° 48' 15.6" N, 82° 19' 20.5" E
 D : 21° 47' 55.0" N, 82° 19' 8.7" E
 E : 21° 47' 32.1" N, 82° 18' 14.8" E

Roads, metalled: according to importance: distance stone	
unmetalled, do.	
Cart-track, Pack-track and pass. Foot-path with bridge	
Bridges: with piers: without. Causeway. Ford or Ferry	
Streams: with track in bed: undefined. Canal.	
Dams: masonry or rock-filled: earthwork. Weir.	
River banks: shelving: steep. 3 to 6 metres: over 6 metres.	
dry with water channel: with island & rocks: Tidal river.	
Submerged rocks. Shoal. Swamp. Reeds.	
Wells: lined: unlined. Tube-well. Spring. Tanks: perennial: dry.	
Embankments: road or rail: tank. Broken ground.	
Railways: broad gauge: double: single with station: under constr.	
other gauge: do. do. with distance stone.	
Mineral line or tramway. Telegraph line. Cutting with tunnel.	
Captures with sub features. Rocky slopes. Cliffs.	
Sand features: dunes: dunes: dunes: shifting dunes.	

Towns or Villages: inhabited: deserted. Fort.	
Huts: permanent: temporary. Tower. Antiquities.	
Temple. Chhatrai. Church. Mosque. Idgah. Tomb. Graves.	
Lighthouse. Lightship. Buoy: lighted: unlighted. Anchorage.	
Mine. Vine on trellis. Grass. Scrub.	
Palms: palmyra: other. Plantain. Conifer. Bamboo. Other trees.	
Boundary, international.	
state: demarcated. undemarcated.	
district: subdivn: tahsil or taluk: forest.	
Boundary pillars: surveyed: unlocated. Village trijunction.	
Heights: triangulated: station, point: approximate.	
Bench-mark: geodetic: tertiary: canal.	
Post office. Telegraph office. Combined office. Police station.	
Bungalows: dak or traveller: inspection. Rest-house.	
Circuit house. Camping ground. Forest: reserved: protected.	
Spaced names: administrative: locality or tribal.	

FIGURE-1
STUDY AREA MAP OF 10 KM RADIUS



Secondary meteorological data was collected from the nearest IMD station - Raipur, located at about 95 km from the proposed site in the South-west direction.

The baseline environmental studies for the various environmental attributes were carried out during October 2011 to 31st December 2011 representing post-monsoon and partly winter seasons.

1.3.1 Climate

The temperature recorded on site when compared vis-à-vis the IMD data, slight variations were found. The maximum and minimum temperatures recorded at site during study period were 32.8°C and 13.5°C, whereas the maximum and minimum values recorded at IMD-Raipur during the same period are 31.7°C and 12.7°C respectively. The relative humidity was observed to range from 42.8 – 76.1% during the study period at the site, whereas according to IMD-Raipur the relative humidity was observed to be in the range of 37.1–73.9% during the same season.

1.3.2 Ambient Air Quality

To establish the baseline status of the ambient air quality in the study area, the air quality was monitored at ten locations. The PM₁₀, PM_{2.5}, SO₂, NO_x and CO concentrations are found to be well within the prescribed standards.

1.3.3 Water Environment

The baseline water quality status in the region has been established by analyzing samples at thirteen locations consisting of ten ground water samples and three surface water samples. The ground water and surface water samples were analysed as per drinking water standards of IS: 10500. The surface and ground water quality in the study area does not indicate any industrial contamination.

1.3.4 Noise Environment

The noise monitoring has been conducted at ten locations. The day & night time noise levels at all the locations are observed to be within the prescribed limit of 55 dB (A) and 45 dB (A) respectively.

1.3.5 Soil Environment

The soil samples were collected from ten locations covering various land uses and compared with the standard soil classification. The observation indicates that the soils are fertile and support the vegetation life in the region. The soil quality does not indicate any industrial contamination.

1.3.6 Landuse Studies

The study area falls in Pataidih village (Semradih panchayat), Masturi tehsil, Bilaspur district in Chhattisgarh state within 10 km zone around project area. The forestland under the study area consists of 1657 ha (4.25 %) of the total



geographic area. The irrigated land under the study area consists of 17707 ha (45.36 %) of the total geographic area. Un-irrigated land is about 21.76 % of the total land in the study area. The study area comprises about 20.4 % cultivable wastelands. The land not available for cultivation is 8.23 % of the total study area.

1.3.7 Ecological Environment

Detailed ecological studies were conducted during post-monsoon and a part of winter season 2011 to identify the floristic composition in and around proposed project site and surrounding villages, forest blocks in 10 km radius from proposed project site. 170 species belongs to Phanerophytes, 151 species belongs to therophytes, 52 species belongs to Hemicryptophytes, 7 species of hydrophytes and 10 species of geophytes and 1 species of Epiphyte were in the study area. 391 plant species were identified from the study area. It can be observed that some of the faunal species reported in the project area belongs to Schedule-II, III, IV & V category. There are no schedule-I species allocated in core and buffer zone. There is no forest land in the plant and mine lease area.

1.3.8 Socio-Economic Environment

As per 2011 census, the study area consists of 127809 persons of the study area. In the study area, as per 2011 census, 26.05 % of the population belongs to Scheduled Castes (SC) and 12.10 % to Scheduled Tribes (ST). The literacy rate is 52.19%. The sex ratio in the study area has 1008 females per 1000 males as per 2011 census.

1.4 **Summary of Anticipated Environmental Impacts and Mitigation Measures**

The summary of anticipated adverse environmental impacts due to the proposed project during operation and mitigation measures is given below:

1.4.1 Air Environment

The impact on air quality is assessed based on emissions from the plant will be Particulate Matter (PM), Sulphur dioxide (SO₂) and NO_x are major pollutants from the proposed project. Prediction of impacts on air environment due to proposed facilities are carried out using Industrial Source Complex (ISC3) dispersion model, which was developed by United State Environmental Protection Agency [USEPA] has been used for simulations from point sources.

The maximum incremental short term 24 hourly ground level concentrations for Particulate matter (PM), SO₂ and NO_x likely to be encountered during post monsoon and partly winter seasons are 3.80 µg/m³, 3.1 µg/m³ and 2.1 µg/m³ respectively and will be occurring at a distance of about 1.4 km in the SW direction.

Further, due to the additional traffic load, the incremental peak hourly concentration of CO and NO_x would be about 7.2 µg/m³ and 12.8 µg/m³ respectively, likely to occur at 20 m from the center of the road and will gradually reduce and become negligible at about 100 m from the carriage way.



The resultant concentrations for particulate matter and other gaseous emissions such as SO₂ and Oxides of Nitrogen will be within the National Ambient Air Quality standards. The air pollution control measures envisaged are:

- Particulate matter shall be controlled below 50 mg/Nm³ by providing efficient Electrostatic Precipitators (ESPs- 99.9 % efficiency);
- Further, two stacks of 90 m height with each one flue for kiln, two stacks of 90 m height with each one flue for raw mill, two stacks of 60 m height with each one flue for coal mill, two stacks of 30 m height and one stack of 40 m height with each one flue for cement mill and one stack of 90 m height with bi-flue for CPP will be provided for adequate dispersion of sulphur dioxide;
- Emission of NO_x will be controlled by designing low NO_x burners;
- Adequate dust suppression system like dry fog type and water spray system shall be installed in the material handling system/transfer points;
- Green belt shall be provided around the plant area. Plantation along the internal roads in the plant premises will also be undertaken;
- All the internal roads shall be concreted / asphalted to reduce the fugitive dust due to vehicular movement; and
- Water spraying will be practiced frequently at coal stockyard.

1.4.2 Water Environment

The water requirement for proposed ICP will be met from Sheonath river, which is located at about 5 km from site. The total water requirement will be 2930 m³/day, which includes 150 m³/day of the limestone mine water requirement. Rain water collected in the rain water harvesting structures will also be used.

Wastewater – Cement Plant

As the cement plant is operated on the dry process, water is mainly used at certain stages in the process for cooling. As the system involved is a close circuit, there is no scope for process wastewater generation. Thus, there will not be any wastewater generation from the cement manufacturing process.

Wastewater – Captive Power Plant

In CPP, the effluents from the respective neutralization pits and boiler blow down in the CPP will be routed to an Effluent Treatment Plant (ETP) and will be reused for road sprinkling, dust suppression and greenbelt development. The proposed ETP will meet the effluent generated from the proposed CPP.

The Effluent Treatment Plant (ETP) will be established to treat the effluents generated from the proposed project facilities. The treated water will be reused for make-up, dust suppression and for development of greenbelt.



Wastewater – Coal Washery

In coal washery around 230 m³/day of water will be used. The entire wastewater will be recycled back after the treatment to the process/greenbelt development/dust suppression, hence zero discharge condition will be maintained.

Wastewater – Sanitary

The treated water will be re-cycled back to the water reservoir for use in the cement plant, CPP make-up, dust suppression system and green belt development.

As all the effluent including sewage water is re-used after sufficient treatment and as the plant will be operated on zero discharge basis, no impacts of wastewater are envisaged. There is no wastewater discharge from the proposed cement plant complex. Hence, there will not be any contamination of surface water bodies due to effluent discharges. Water conservation measures are given below:


- The treated wastewater will be used for dust suppression in coal yards and for greenbelt development;
- Part of the treated effluent from the guard pond will be used for greenbelt development, dust suppression and ash quenching within the plant;
- Quantity of effluents will be minimized through reuse to the maximum extent feasible;
- The treatment schemes proposed would be finalized before the commissioning of the plant; and
- Sludge would be removed regularly and sufficient time would be given for proper settling of solids.

1.4.3 Solid Waste Management

No hazardous waste is generated either in the process or in pollution control facilities. Dust collected from air pollution control equipment is 100% recycled in process and there will be no solid waste generation in cement plant.

Bottom ash and fly ash will be generated from the proposed coal based captive power plant. The coal consumption is estimated at 0.30 MTPA at 100% installed capacity. The maximum ash content of the coal is estimated to be in 41.0%. Based on the above ash content, the bottom ash (20%) and fly ash (80%) generation is estimated to be 0.02 MTPA and 0.1 MTPA respectively. The fly ash will be generated from the 40 MW CPP is (100%) utilized in cement plant for manufacturing the Portland Pozzolona Cement (PPC) and fly ash brick manufacturing. The bottom ash generated will be utilized for the filling of used mines/low line area backfilling.

Solid waste in the form of sludge is generated from the Sewage Treatment Plant (STP). The waste will be used for maintaining the MLSS in the activated sludge process of STP and the balance waste is used as manure for greenbelt development.

	<p>Environmental Impact Assessment for the Proposed Cement Plant (3.0 MTPA), Clinker Plant (1.4 MTPA), Coal Washery (0.96 MTPA) along with Captive Power Plant (2x20 MW) at Pataidih Village, Semradih Panchayat, Masturi Tehsil, District Bilaspur, Chhattisgarh</p> <p style="text-align: right;">Executive Summary</p>
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1.4.4 Noise Environment

The noise impact on the surrounding population during the construction phase will be within the acceptable limits. High noise generating equipment, if used, shall not be operated during the night to eliminate any possible discomfort to the nearby residents. Community noise levels are not likely to be affected because of the vegetation and likely attenuation due to the physical barriers. The noise levels at the sources for these units will be in the range of 80-90 dB(A).

The predicted noise levels at a distance of 0.5 km and above from plant site, would be less than <45.0 dB(A). Most of the human settlements are at a distance greater than 0.5 km from the plant site. Hence, impact on general population would be insignificant. Further, greenbelt will be developed to attenuate the community noise impact.

1.4.5 Biological Environment & Greenbelt Development

There are no wildlife sanctuaries and national parks within 10 km radius study area. A 50 m-100 m wide greenbelt, consisting of at least 3 tiers plantation around plant boundary will be developed as greenbelt and green cover as per CPCB/MoEF, New Delhi guidelines. The plant density of 2,500 trees per hectare with local native species will be implemented. In the greenbelt area, about 80,000 trees will be planted with a density of 2500 trees/ha. The expenditure on development and maintenance of green belt is of revenue nature and sufficient fund will be provided to meet the requirement. An annual budget of about Rs. 4.8 Crores under revenue cost will be spent in first five years for the green belt development.


1.4.6 Socio- Economics

The major economic impacts, which will accrue to the region, during the construction phase and operation of the proposed ICP, will be an increased availability of direct and indirect employment. Local people will be benefited after commissioning of the proposed project in terms of petty to major contractual jobs and associated business establishments.

1.5 Risk Assessment and Disaster Management Plan

The preliminary risk assessment has been completed for the proposed ICP facilities and the broad conclusions are as follows:

- There will be no significant community impacts or environmental damage consequences;
- The hazardous event scenarios and risks in general at this facility can be adequately managed to acceptable levels by performing the recommended safety studies as part of detailed design, applying recommended control strategies and implementing a Safety Management System; and
- The health of the workers shall be regularly monitored for assessment of any occupational impacts / diseases known to be caused from this type of industry. Necessary data and record management on OHC will be established.

	Environmental Impact Assessment for the Proposed Cement Plant (3.0 MTPA), Clinker Plant (1.4 MTPA), Coal Washery (0.96 MTPA) along with Captive Power Plant (2x20 MW) at Pataidih Village, Semradih Panchayat, Masturi Tehsil, District Bilaspur, Chhattisgarh
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On-site and off-site emergency plans have been prepared under Disaster Management Plan.

1.6 Post Project Monitoring

SKSCL proposes to have a systematic approach for post project monitoring for the implementation of environment management measures and various conditions likely to be imposed in the Environmental Clearance. SKSCL has environment, health and safety policy in place and will implement and monitor in the proposed project also. Detailed monitoring plan will be implemented in compliance with MoEF / CPCB / CECB requirements.

1.7 Budget Requirement for Environment Protection

SKSCL is proposing to spend about Rs.70 Crores towards air pollution control equipments and shall also implement environmental pollution measures during operation of ICP. The details of investment for procuring the equipments for efficient control and monitoring of pollution and recurring cost are given in **Table-3**. The total cost for the proposed coal washery is Rs. 31 Crores and the cost for environment protection measures cost is about Rs. 1.3 Crores.

TABLE-3
COST PROVISION FOR ENVIRONMENTAL MEASURES

Sr. No.	Particulars	Cost (Rs. Crores)	Recurring (Rs. Crores)
1	Pollution control in Cement Plant and CPP	57.70	1.50
2	Pollution monitoring	1.60	0.08
3	Greenbelt / plantation	7.90	0.40
4	Occupational health	1.50	0.08
5	Pollution control in Coal Washery	1.30	0.40
	Total	70.00	2.46

1.8 Project Benefits


The project is expected to bring in the following direct and indirect benefits to the population in the project study area due to the establishment of the project resulting in socio-economic development of the area:

- Employment generation: The project will create opportunities for direct and indirect employment;
- Increase in purchasing power and improved standard of living of the area;
- Further development of small and medium scale industries may be developed as consequence; and
- Increased revenue to the state by way of royalty, taxes and duties.

The total cost estimated under Community Social Responsibilities (CSR) activities is about Rs. 35 Crores. About Rs. 700 Lakhs per annum will be spent for first five years period.

1.9 Conclusions

The proposed ICP will have marginal impacts on the local environment. However, with the implementation of the proposed pollution control and environment management measures, even the minor impacts anticipated due to construction and operation of the proposed ICP will be mitigated. With proper and judicious implementation of the mitigation and environment management measures, the

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impacts can be minimized and can be maintained well within the permissible limits specified by the regulatory authorities.

However, development of this project has certain beneficial impact/effects in terms of bridging the cement and electrical power demand and supply gap and providing employment opportunities that will be created during the course of its setting up and as well as during the operational phase of the project.