ENVIRONMENTAL IMPACT ASSESSMENT

ON

THE PROPOSED EXPANSION OF INTEGRATED IRON & STEEL PLANT TO 1.5 MTPA IN BILASPUR DISTRICT, CHHATTISGARH

TO

NOVA IRON & STEEL LIMITED

EXECUTIVE SUMMARY

NOVEMBER 2015

M. N. DASTUR & COMPANY (P) LTD
CONSULTING ENGINEERS

SUMMARY

In accordance with the approved Terms of Reference (ToR) of Ministry of Environment, Forests & Climate Change (MoEFCC), Government of India for Environmental Impact Assessment (EIA) of the proposed expansion project of Nova Iron and Steel Ltd (NISL) in Bilaspur district of Chhattisgarh to 1.5 million tons per annum (MTPA) integrated iron and steel plant, this Summary presents a brief outline of the EIA findings and the proposed mitigation measures.

Glimpse of the Project

Capacity after Expansion	..	1.5 MTPA crude steel
Product mix	..	0.5 MTPA – Wire Rods 0.55 MTPA – Medium Section Products 0.39 MTPA – Light Section Products
Process route	..	Production of hot metal through blast furnace & direct reduced iron (DRI) through direct reduction plant (DR plant) followed by & electric arc furnace (EAF)/ Induction furnace (IF) for conversion of both hot metal and HDRI to liquid steel in (BF+DR-EAF+IF)
Site	..	Located in Dagori village of Bilaspur district, Chhattisgarh, about 40 km south of Bilaspur town
Iron Ore Source	..	Through e-auction
Water Source	..	Sheonath River
Electric Power	..	Captive Power Plant
Estimated Investment	..	Rs 10,834 crore
Completion Period	..	36 months from Go-Ahead date

Summary (Cont'd)

1. Chhattisgarh has emerged as the state with the highest economic growth since its inception in 2000. It provides the ideal choice for investment opportunities with its industrial infrastructure, innate capabilities and its enterprising citizens. It has well developed social, physical and industrial infrastructure; good roads, rail and air connectivity. The steel industry is one of the biggest heavy industries of Chhattisgarh. More than 100 steel rolling mills, 90 sponge iron plants and ferro-alloy units are presently operating in Chhattisgarh. Along with Bhilai, Raipur, Bilaspur, Korba and Raigarh have become major steel hubs of Chhattisgarh. The state capital Raipur has become the biggest market for steel in India today.

2. In view of this evolving state of steel production in the country and the conducive environment available in the state combined with the initiatives by the State Government, Nova Iron & Steel Limited (NISL) is planning to set up a 1.5 MTPA integrated steel plant for production of carbon and alloy steel in the existing complex at Dagori village, Dist. Bilaspur. NISL presently owns a 500 TPD sponge iron plant at Dagori Village in Bilaspur district of Chhatisgarh. The proposition of this project is particularly encouraged by the growing demand of structural steel for infrastructure development in the country.

3. NISL already possesses water withdrawal permission of 3 MGD and has applied for permission for the additional requirement.

4. The proposed project would be set up in the existing plant premises of NISL.

Summary (Cont'd)

PROJECT DESCRIPTION

5. The site is located in Bilaspur district of Chhattisgarh. The site lies between latitudes 21°52'40" - 21°54'25" N and longitudes 82°02'10" - 82°04'55" E and 250 m above mean sea level (MSL). It is located about 34 km south west of Bilaspur city and 70 km north east of Raipur city of Chhattisgarh.

6. The site is located about 9 km away from NH – 200 and lies on the eastern side of it. The site is connected with NH-200 by a bypass road which runs from NH-200 to village Belha at the northern side of proposed plant. The nearest railway station, Dagori is situated about 6 km away on the north-east side of the plant. Captive railway siding is envisaged for wagons coming to the plant in loaded/unloaded condition. The site is about 25 km by rail from Bilaspur. The nearest airport is at Raipur which is about 70 km from the plant site. The plant would be served mainly by Paradip port which is located at a distance of 500 km.

7. The annual production plan for the proposed project would be as follows**:**

			MTPA
A.	**Intermediate products**		
	Hot metal	..	1.46
	DRI	..	0.66
	Pig Iron	..	0.58
	Crude steel	..	1.50 ± 5%
B.	**Saleable steel***	..	1.44 + 5%
	Wire Rods	..	0.50
	Medium Section	..	0.55
	Light Section	..	0.39
	Total	**..**	**1.44**

Summary (Cont'd)

8. The process route considered is Production of hot metal through blast furnace & hot direct reduced iron (HDRI) through direct reduction plant (DR plant) followed by electric arc furnace (EAF)/Induction furnace (IF) for conversion of both hot metal and HDRI to liquid steel (BF+DR-EAF+IF).

9. The bulk consumption of raw materials would be iron ore in the form fines, coke, pellets, limestone, dolomite and some amount of anthracite. The estimated consumption of these principal raw materials would be of the order of 7.8 MTPA. Anthracite and PCI coal amounting to nearly 0.2 MTPA would be imported from Australia and the rest of the raw materials would mainly be made available from the indigenous sources. Regarding additives, such as limestone, dolomite and quartzite, the estimated consumption would be of the order of 0.94 MTPA. On the whole, the raw materials consumption rate would be about 5.2 t/t of crude steel.

10. The make up water requirement for the proposed expansion project has been estimated at about 1610 cum/hr (i.e. 8.5 MGD). The said quantity of water would be required for process use, make-up water to the circulating cooling water circuit, plant sanitary and other miscellaneous use within the plant. The source of water is Sheonath river, through an intake pump house constructed at the south side of the plant boundary.

11. There would be in-plant power generation captive power plant (CPP), of around 295 MW and BF gas top recovery turbine (TRT), of around 4.5 MW. Hence, the total in-plant power generation is about 299.5 MW. The total estimated power requirement of the plant would be 1,288 million kWh per year.

Summary (Cont'd)

12. The main production facilities as planned for the 1.5 MTPA integrated steel plant would be as follows:

Sl. No.	**Production Unit**	**Configuration**	**Production capacity**
1	Coal Washery	1.5 MTPA	0.4 MTPA Washed Coal 0.6 MTPA Coal Middlings
2	Sinter Plant	1 x 248 sq m	2.25 MTPA Product Sinter
3	Blast Furnace DR Plant	1 x 1008 cum + 1 x 550 cum 1 x 500 TPD (Existing) 3 x 500 TPD	1.46 MTPA Hot Metal 0.66 MTPA
4	Lime/dolo Calcining Plant	2 x 600 TPD	0.3 MTPA Lime
5	Steel Melt Shop	EAF - 2 x 90 T	1.54 MTPA
		LF - 1 x 15 T 2 x 90 T	Liquid Steel
		IF - 3 x 15 T (Existing)	
		VD - 1 x 90 T	
		Continuous Caster- Billet caster - 1 x 2 strand Billet cum bloom caster – 2 x 4 strand	1.50 MTPA Crude Steel
6	Rolling Mill	Wire Rod Mill	0.5 MTPA Wire Rods
		Medium Section Mill	0.55 MTPA Beams, Channels, Rounds & Squares
		Light Section Mill	0.39 MTPA Beams, Channels, Rounds & Squares

13. The plant is likely to be completed within a period of 36 months from the Go-Ahead date. Resourceful contractors would be deployed for main packages.

Summary (Cont'd)

POLLUTION MITIGATION MEASURES

14. In the raw materials handling section comprising stockpiles, conveyor transportation, sizing etc, the fugitive dusts would be arrested by covered conveyor, water sprinkling and water fogging with compressed air (dry fogging).

15. For handling of lime dusts, room air cleaning of stock houses of Sinter Plant and Blast Furnaces, electrostatic precipitators (ESPs) and bag filters of adequate capacities and efficiencies have been envisaged respectively. Bag filters have also been considered for arresting BF cast house fumes and secondary fume emissions of SMS at the time of charging and tapping from the EAF converter.

16. Dust emissions would take place from the combustion flues of various furnaces and kilns. The dust laden waste flue gases would be cleaned by Bag Filters. Lime dusts and dolo dusts of the respective kiln combustion flues would be arrested in fabric filters.

17. The main source of CO would be the blast furnace gas (BFG). The BFG would be recovered for in-plant fuel use. CO would also be present in the off gas of coal based DR plant. This CO laden gas would be combusted in the After Burning Chamber (ABC), in the presence of excess air, to ensure complete combustion of CO. All combustion processes of by-product fuel gas would be provided with micro-processor based combustion control devices so as to ensure full combustion of CO in presence of required excess air. Stack heights for all the facilities in the Steel Plant would range from 30 m to 110 m depending on the emission volume and pollutants loading.

Summary (Cont'd)

18. A summarised list of air pollution mitigation measures for respective plant is presented below:

Sl. No.	Plant/ Section	Pollution sources	Pollutant emissions	Mitigation measures
1.	Raw materials Handling Section (RMHS)	- Open stockpiles, bedding & blending yard, conveyor transportation for all production facilities	Fugitive dusts	Water sprinkling, covered conveyors, dry fogging at transfer points
		- Closed area crushing/screening bunkers loading	Fugitive dusts	Dry fogging and bag filter based DE system
2.	Coal Washery	- Open stockpiles, conveyor transportation for all production facilities	Fugitive dusts	Water sprinkling, covered conveyors, dry fogging at transfer points
		- Closed area crushing/screening bunkers loading	Fugitive dusts	Dry fogging and bag filter based DE system
3.	Sinter Plant	- Central Plant dedusting area - Waste Flue Gas	Dusts, SO_2 & NOx	Electrostatic Precipitation (ESP) for dusts
4.	Blast Furnace	- Stock house - Cast house - BF Stove	Dusts Dusts SO_2, NO_x	Bag filter based DE system Bag filter based DE system ESP
5.	Direct Reduction Plant (Coal based)	- WHRB stack emission - Plant dedusting system	Dust, SO_2 & NOx	ESP Bag filter based DE system
6.	SMS (EAF, IF, LF, VD)	Primary emissions from EAF & LF	Dust/ Fumes, SO_2, NO_x	Water cooled duct and Bag Filter
		Secondary emissions from EAF,& LF	Dust/ fumes	Bag Filter
8.	Mill Furnaces	Off gas from furnace heating	NOx, Dust	Low NOx oxy-fuel burner
9.	Calcination Plant	Kiln waste gas	NOx, Dusts	Bag Filter
9.	Captive Power Plant	Flue gas from boiler furnace	SO_2, NOx, Dusts	ESP

19. In order to mitigate the continuous noise within the working area, measures like selection of low noise prone rotary equipment and vibration dampening would be one of the plant design aspects. In addition, noisy equipment would be housed separately. Operational people would run those noise prone machines from the sound proof control room/cabins. Steam ejectors would be provided with

Summary (Cont'd)

silencers. With all these mitigation measures, it is planned to have workzone noise level of Leq for continuous 8 hours duration within 85 dB (A), if measured at 3 m distance from the noise source.

20. The process wastewater would mostly contain suspended solids, except the mill effluent, containing additional floating oil and grease.

21. The effluent containing TSS only would be passed through clari-flocculation plant for each originating source to recover clarified water. The treated clarified water would get recycled to the direct cooling/cleaning circuit.

22. The mills effluent from the respective mills would be separately treated to recover floating oil and TSS by passing through oil skimmers, clari-flocculators and pressure filters.

PRESENT ENVIRONMENTAL SETTING

23. For the purpose of environmental impact assessment (EIA), the study area has been demarcated into two (2) zones, namely,

i) the core zone, that is, the green field site of 803.05 acres where the proposed facilities would come up; and

ii) the buffer zone, surrounding the core zone, with an aerial coverage of about 10 km from the periphery of the proposed project site. Environmental impacts if any are considered to be contained within this area of 10 km radius.

Summary (Cont'd)

24. The proposed project would be set up within the existing premises of Hospet Steels Limited and the area adjacent to the existing plant. The site is located in Bilaspur district of Chhattisgarh. The site lies between latitudes 21°52'40" –

    21°54'25" N and longitudes 82°02'10" - 82°04'55" E. Bilaspur city is located about 34 km north east and Raipur city about 70 km south west of the Plant site.

25. The available organic carbon in the range of 0.26% to 0.42%, indicates lower level of organic carbon present in the soil of surrounding agricultural lands of the project site. The results of SAR value in the range of 5.42 to 6.51 indicate more than optimal level of Sodium, calcium and magnesium present in all sampling locations. The bulk density ranging 1.4 to 1.5 gm/cc, with the results of available Nitrogen, Phosphate, Potassium, Sulphate, Chloride, Iron and Copper value indicates the nutrient level is more than sufficient at all locations and this type of soil is very good for plant growth.

26. The total hardness of all surface streams as reported ranges from 133.33 – 206.67 mg/l. The average DO level for all surface streams ranges between 5.87 - 6.6 mg/l whereas average BOD level ranges between 3.0 – 5.0 mg/l. Total coliform count ranges from 330 – 493.33 MPN/100 ml across various surface water sampling locations. It has been observed that the Faecal coliform is also on the higher side and hence, not fit for human consumption without disinfection.

27. The total hardness (TH) and total dissolved solids (TDS) content in ground water were found to be in the range 265 – 366 mg/l and 618 -781 mg/l respectively at the selected

Summary (Cont'd)

locations as against the allowable standards of 200 mg/l for TH and 500 mg/l for TDS. Chromium, lead, arsenic and other heavy metals are found to be below detection limit (bdl).

28. The average concentration (24 hrs) of PM_{10} and $PM_{2.5}$ are in the range of 50.7 – 61.3 mcg/cu m and 23.3 – 27.2 mcg/cu m respectively. The SO_2 and NO_X values are well within the permissible values for rural areas as set by NAAQS. The CO and PAH values are either below detection limit (bdl) or much below the NAA.

29. To assess the chemical characteristics of PM10 collected on Whatman filter paper, the dust samples were analysed for silica, heavy metals, benzene soluble fraction and presence of polyaromatic hydrocarbons. The dust mainly contains of iron & silica and not any harmful constituent.

BIOLOGICAL ENVIRONMENT

30. The study area is mainly consists of single cropped agricultural lands, scrub lands, human inhabitations, rivers, canals & ponds. There is no thick vegetation cover in the study area. The green cover of trees and shrubs are found along the road sides, periphery of agricultural lands, bank of rivers, canals & ponds etc, in the study area. There also a sacred grove with a ruined heritage temple called Devrani-Jethani temple is an archeological excavation, which has regional cultural importance in the study area. However, the proposed project site is slightly undulating barren land with scattered vegetation cover.

Summary (Cont'd)

31. The Climate of the study area has greatly influenced the formation of scrub vegetation of Plash (*Butea monosperma*) and Babul (*Acacia catechu*). There are few waste lands, barren lands and fallow lands where Palash (*Butea monosperma*) and Babul (*Acacia catechu*) are scattered abundantly, forming bushes in some places.

32. Several medicinally important plants found in the study area, among them most common species are Bel (*Aegle marmelos*), Akanda (*Calotropis gigantea*), Jamal ghota (*Jatropha curcas*), Indian Mallow (*Abutilon indicum*), Ishwarmool(*Aristolochia indica),* Satavar (*Asparagus racemosus*), Datura (*Datura stramonium*), Bathua (*Chenopodium album*), Tulsi(*Ocimum sanctum*), Sickle senna (*Cassia tora*) *etc.*

33. There are no Reserve or Protected forest, National Parks, Wild Life Sanctuaries, Elephant/Tiger Reserve, Migratory routes, Nesting - Breeding Zone with in the study area except the perennial water bodies Sheonath river and Maniari river.

HUMAN ENVIRONMENT

34. The total population of fifty five (55) villages and one (1) Nagar Panchayat as indicated by the census data, has increased from 56371 to 78023 over a period of 10 years from 2001 to 2011. The decadal population growth rate is 38.41 per cent.

The national average sex ratio was 933 in 2001. The sex ratio in the study area then was 963, much higher than the national average. In 2011 the national average was that of 940. Comparatively the sex ratio in the PIA continued to be higher at 988.

Summary (Cont'd)

35. Majority of the local population reside in owned houses. The houses are either 'pucca', 'semi pucca' or 'kutcha', with basic amenities. The local population is aware of the ongoing state of affairs and was open to dialogue during discussions and surveys.

36. Major sources of livelihood in the project influence area are farming and agricultural labour; casual and contract labour in Employee Guarantee Schemes (EGS) brick kilns, rice mills, domestic arenas, construction areas etc; factory work and service; small scale business related to animal husbandry, poultry, fishing, dairy and *upla making*; petty shop establishments such as utility stores, cycle repair stores etc; and in profession such as drivers, cleaners etc.

37. According to the primary study, women belonging to lower income group households mainly work as casual labourers under EGS or/and as contract workers at construction sites, agricultural fields, rice mills, brick kilns and domestic arenas. The factory employment for women is nil in the PIA. The primary study affirmed that lower income group women in the PIA are hard working section of the population engaged in double shifts of work (i.e of both home and work).

38. The medium and large scale leading industries located nearby are Mangal Sponge and Steel Private Limited, Jayaswal Neco Industries Limited and Bhatia Wine Merchants Private Limited (Bottling Plant).

39. Government primary health centres are in villages like Dagori, Amerikappa and Bhantapara. Most villages in the PIA have access to Anganwadi centres. The programmes are effectively concentrating on pre natal and post natal health along with total well being of children below five years of age.

Summary (Cont'd)

The government hospitals are located in Sargaon and Bilha. Private medical services are available at Bilha and Chunchniya. The emergency service number 108/102 can be availed by the villages of PIA. The service addresses emergency situations even at the interior corners of the villages.

40. The major sources of water are bore wells, tubewells/handpumps, and surface water bodies like ponds. There are significant numbers of private bore wells in the PIA too. During summer season, the supply of water is irregular and the groundwater level decreases. On demand the company provides water to Dagouri and Majhidera (hamlet of Ameri Akbari) villages through tankers. In the village of Salfa, tanker is operated by the Nagar Panchayat.

41. The practice of open defecation is widespread in the PIA. Initiatives by the Government, private companies and the community have not yet been able to address the issue. Households having personal latrines in the PIA are nominal. Additionally the latrines proposed by government are either yet to be constructed and in many cases left undone. The local population affirmed that the proposed designs and materials are of inferior quality. Few villages manage their waste by transforming it to compost; however the issue of solid waste management in the PIA has not yet assumed importance.

42. Financial Institutions like banks are mainly in the area of Bilha. Post offices (like in Nipaniya) and Gramin banks (like in Ameri Akbari) are common institutions relating to savings and finance. In case of loans, the villagers make transactions amongst themselves. Few loan money from *sahukars* too. Few *Mahila Samuhs* operate in the PIA too.

Summary (Cont'd)

43. Anganwadi centres facilitate early childhood education in majority villages in the PIA. Education facilities in most of the villages are restricted to primary or middle level education. For high school education, students enroll in schools of Bilha and Sargaon. With regard to college education, students enroll in colleges of Amerikappa and Bilha. To pursue professional degree courses (such as medical or livelihood courses) and industrial training students go to Bilha.

ENVIRONMENTAL IMPACT ASSESSMENT

44. Initial scoping of environmental impacts of the project has been evaluated by the MoEFCC. Accordingly, the Terms of Reference (ToR) of EIA has been firmed up. In addition, other relevant impacts such as selection of process technology, social issues etc have also been covered in the EIA.

45. EIA findings and the mitigation measures to minimize the negative impacts on environment are summarized below:

No.	Activity	Environ-mental impacts	Mitigation measures	Benefits
i)	Establishment of Project	Industrial Development	- Water conservation - Pollution control measures - Solid wastes management - Greenbelt development - Social upliftment etc	- Infrastructure improvement; - Employment generation; - Revenue earning by the Government in the form of taxes & duties; - a capital asset of the State; - wide scope for economic development of the nearby areas
iii)	Construction	Temporary adverse impact due to emission of dusts, discharge of construction wastewater and safety of construction workers	- Mechanised construction to reduce the construction period - Dust abatement by water sprinkling - Stoppage of noise prone work during night time	- Prevention of surface stream pollution - Reasonably clean workzone environment

Summary (Cont'd)

						- Safety practices and use of Safety appliances - Proper management of liquid & solid discharge		
iv)		Water withdrawal from Sheonath river		Adverse, if adequate conservation measures are not adopted		- Water conservation by closed loop recycling of wastewater after treatment - Use of treated wastewater in various non-production uses - 'Near Zero Liquid Discharge' model adopted - Rain water harvesting in ponds		River water withdrawal would be minimum without affecting other downstream users.
v)		Discharge of Plant Wastewater		Adverse, if untreated wastewater is discharged to the nearby stream		- Wastewater Treatment for respective production shops - Recycling of treated wastewater within the respective plant to conserve water - Providing CETP for final treatment of CT blowdown, treated plant sanitary wastewater and other effluents - The treated effluent from clariflocculator of CETP would be stored in Guard Pond for other low end uses such as greenbelt/landscape maintenance, slag quenching etc. - A part of the treated water from the clariflocculator of the CETP would be further treated in ultra filtration (UF)/ Reverse Osmosis (RO) plant for use as fresh make up in the plant - 'Near Zero Liquid Discharge' model adopted		- Reuse of treated wastewater collected in the Pond - As there would be no discharge into the surface stream, the quality of surface stream would not be greatly affected.

Summary (Cont'd)

vi)		Air pollution from production processes		Adverse due to emission of heat, dusts, SO2, NOx, CO and VOC		- Covered storage & conveying systems for dry raw materials - Water sprinkling and dry fogging for suppression of fugitive dusts - Bag filter based workzone fugitive dust extraction devices - ESP based systems for waste gas cleaning - Tall stacks for better dispersion of airborne pollutants		- To keep ambient air less polluted and maintain standards of ambient air quality - Prevent endemic diseases of the community
vii)		Workzone noise		Adverse due to noise from rotary/vibrat or machines/ equipment, steam ejection etc		- Selection of low noise prone rotary equipment, vibration dampening and dynamically balanced of rotating parts - Housing of noise prone equipment in a separate enclosure - Operation from the noise shield cabins/pulpits - Administrative control		Operation and maintenance personnel would not get noise exposure more than 85 dB (A) for a continuous period of 8 hrs.
viii)		Solid wastes generation		Adverse, if the solid wastes generated are stockpiled in open area for years together		- Maximum practicable processing of solid wastes either by reuse within the plant or by selling or by other gainful use - To avoid contamination of ground water due to leaching, the storage yard would require suitable liner		- To block minimum land area for solid wastes dumping - Maximum reuse of solid wastes for commercial/ useful purpose to prevent ground water contamination
x)		Health		Adverse on the occupational health of the working personnel and community people		- On-line monitoring of emissions and wastewater release and corrective actions if pollution level exceeds the design target - Occupational health care of the plant personnel as per international practice		- Check on the occupational ailments/hazards - Prevention on the loss of production mandays
xi)		Safety		Adverse due to safety lapses		- Extensive safety measures for the plant operation and maintenance, electrical installations, fire safety measures		- Avoidance of accidents causing minor to fatal injury of the plant personnel - Avoidance of dangerous

Summary (Cont'd)

						including fire/smoke detection alarms, portable CO detectors and personnel safety appliances		events like gas leak, fire, injuries etc
xii)		Peripherial Socio-economy		Beneficial		- As a part of Corporate Social Responsibility (CSR), social upliftment programmes in consultation with local people for development of education, infrastructure, health & drinking water supply and physical environment		- Acceptance of the project by the local population through accountable & transparent measures - Sustainability of the project by believing in the principle that social responsibility becomes an integral part of the business - Social upliftment and employment opportunity for the local people

46. For implementation of the proposed environmental mitigation measures, the estimated capital expenditure (CAPEX) would be around Rs. 520 crores. Of the total estimated CAPEX Rs. 300 crores would be spent towards various forms of pollution mitigation measures and balance Rs. 220 crores

have been provided for greenbelt development, eco-restoration, on-line monitoring & environmental laboratory and energy conservation.

ENVIRONMENTAL RISK ASSESSMENT

47. It is presumed that the proposed project would be designed, engineered and installed with the standard code of practices of engineering, best practicable safety measures and environmental safeguards.

48. In spite of adaptation of best engineering of the plant and facilities, accidental events cannot be ruled out due to some design deficiency or improper operation and maintenance or

Summary (Cont'd)

malfunctioning of the various control systems installed. This may affect life, property and environment.

49. Hazard potentials at this pre-engineering stage of the project have been identified. Some of the potential hazards may arise due to failure of effluent treatment plants, fuel gases storage and handling systems, pollution control systems, electric short circuits, unsafe storage and handling of oily wastes etc.

50. After design freeze or prior to commissioning, it is proposed to have HAZOP study with consequences, particularly for handling of fuel gases and combustible products, to take further safeguards in the plant engineering and operation manuals.

51. Safety during construction and operation would be of utmost importance. The plant would have its own on-site & off-site management plan to deal with various emergencies. Also, various aspects of Disaster Management Plan (DMP) have been discussed and it is suggested to get a DMP report

prepared that would help the plant personnel tackle disastrous events.

ENVIRONMENTAL MANAGEMENT PLAN

52. In order to have effective management of the overall environmental performance of the plant including social commitments, it is essential to have a comprehensive environmental management plan (EMP). This plan includes a proper organization structure, responsibilities, planning, budgeting, training etc.

Summary (Cont'd)

53. The operation of the plant would have to comply with the environmental regulations, public liability, Government Notifications etc as applicable from time to time for industrial operation.

54. Without proper organizational set up, EMP cannot be enforced. It is, thus, proposed to build a suitable organizational structure having three functional wings, namely, (i) Environment, (ii) Health and (iii) Safety, for implementation of the mitigation measures and continuous improvement on overall performance of the plant. The organisation would be manned by experienced professionals in the areas of environment, health and safety (EHS).

55. The functions of EHS cover monitoring, regulatory compliance, remedial measures planning, budgeting, implementation and occupational health care and safety. The organization is required to adopt comprehensive environmental management, social responsibility management system and occupational health care systems of the plant as required by ISO-14001-2004, SA-8000-2008 and

OHSAS-18001-2007 respectively, in addition to quality management system of ISO-9002.

56. Few elementary disaster management measures to prevent disaster due to the above mentioned hazards are as follows:

- Design, manufacture, operation and maintenance of all plant machineries/structures as per applicable national and international standards as laid down by statutory authority,

- Intelligent formulation of layout to provide 'Assembly Point' and safe access way for personnel in case of an

Summary (Cont'd)

hazardous event/disaster, as can be inferred from Risk & Consequence modeling.

- Proper emergency (both on site & off-site) preparedness plan, emergency response team, emergency communication, emergency responsibilities, emergency facilities, and emergency actions shall be developed.

- Proper Alarm system and training the personnel for appropriate response during disastrous situation.

- Complete fire protection coverage for the entire plant as per regulatory stipulations.

- Creation and maintenance of Disaster Management cell with adequately trained personnel who can handle all sorts of emergency situation.

- Provision of funds for prevention of disaster, mitigation, capacity-building and preparedness.

It would be advisable to carry out a detail DMP at the design stage itself to frame a proper scheme for disaster management. However, this would be subjected to subsequent improvements as and when required for safe and efficient operation of the plan.

57. Besides on-line monitoring devices fitted with major stacks and effluent discharge, it is proposed to have continuous monitoring of ambient air quality (AAQ) at four different

locations within the plant area. The pollutants to be monitored would include PM_{10}, $PM_{2.5}$, SO_2, NOx, CO and O_3 as per the MoEFCC Notification No. GSR 826(E) dated 16th November 2009. The online stack monitoring devices, continuous AAQ stations and continuous effluent analysis

Summary (Cont'd)

sensors would be directly connected to the central monitoring system.

58. NISL would undertake various initiatives for uplifting the socio-economic status of the local people by providing health and education facilities, skill development, etc. The total expenditure towards social upliftment activities for the proposed expansion is estimated at Rs. 250 Crore (Rupees Two Hundred and Fifty Crore only)

ENVIRONMENTAL IMPACT STATEMENT AT OPERATIONAL STAGE

Environmental Attributes	Impact on baseline	
	Project without mitigation measures	Project with mitigation measures and EMP
I. Physico-chemical		
Soil cover	-1	0
Land use (Solid waste storage)	-1	0
Sheonath River water resource	-1	0
Waste water receiving body water quality	-3	0
Ground water resource	0	+1
Ground water quality	0	0
Ambient air quality	-2	0
Workzone air quality	-2	0
Workzone noise	-2	0
Ambient noise	-1	0
II. Biological		
Terrestrial ecology	0	+1*
Aquatic ecology	0	0
III. Human		
Infrastructure	0	+2
Temporary Employment generation	+1	+3
Economic upliftment of locals	+1	+3
Social upliftment and education	+1	+3
Health	0	+2
Safety	0	+2
IV. Aesthetics		
Climate	0	0
Landscape	-1	0
Green coverage	+1	+2*

* Due to greenbelt development to the extent of 33% of area to be acquired.

Legend: **'1'** = Marginal**; '2'** = Moderate**; '3'** = Significant**; '4'** = Irreversible
(+ve) = Beneficial; **(-ve)** = Adverse