SUMMARY OF ENVIRONMENTAL IMPACTS OF POSCO PROJECT.

This summary contains basic facts about the proposed POSCO project in Odisha, the background environmental conditions surrounding the project area, the current status of rapid piecemeal EIA and the needed framework for unbiased EIA of all project components taken together. The summary also includes preliminary quantitative assessment of CO2 emissions, water abstraction and uses from two major rivers the Mahanadi and the Brahmani, the assessment of total solid waste generated by the project and the total assessment of the land requirement of the project. The summary draws attention to the major potential environmental and social impacts of the proposed project based on the solid, liquid and gaseous emissions over the lifetime of the project (30 years). The summary concludes, based on the above estimation and consideration of risk factors, that the project will result in enormous environmental and social damage to the entire region and the state of Odisha and therefore enters the strong plea that the environmental clearance to the project should be withdrawn / cancelled.

A. Fact Sheet: POSCO Project

   i.  Proposed output of the steel is 12 million ton per annum (to be developed in phases, as per the MoU)

   ii. Captive power project – 1300 MW.
        The above two integrated into “the Steel Project”

   iii. Input requirement of iron ore is 20 million tonnes per annum, to be extracted from a mining lease area containing 600 million tones of ore (“the Mining Project”)

   iv.  Development of transportation corridor, including dedicated Port facility for dispatch of Steel Products / Ore (“the Transportation Project”)

   v.   87 Km long pipeline for carrying water to the project site (“the Water Project “)

   vi.  Townships to house project personnel at steel plant (682 hectares) and Mining sites (227 hectares), (“the Township Project”)
vii. Iron ore mining to be undertaken by the company at a site approx 200. km from the location of the Steel Complex. The above “Projects” are named in the MoU between the company and Government of Odisha.

viii. Coal supply for the power project to be undertaken from a captive coal block within Odisha, possibly to be undertaken by another entity, not specified.

ix. Coking coal supply for steel production is not specified.

B. Pre-existing Environmental considerations:

i. Project area adjacent to existing petroleum refinery operated by Indian Oil Corporation, approx 1 km.

ii. Project area adjacent to existing port infrastructure and town of Paradeep located 10 km distance.

iii. Project area adjacent to exiting industrial estate 5 km with units producing a variety of petro-chemicals downstream from existing petroleum refinery.

iv. Project area close to breeding grounds of Olive Ridley turtles, an endangered species. A study conducted by National Institute of Oceanography for the proposed port clearly states that the potential negative impacts on the marine ecology can arise during the construction and operational phases of the proposed port.

v. Project area falls within a region prone to cyclonic storms which are projected to increase in frequency/ intensity due to global warming; this has risk implications for disposal of environmental pollutants (solid wastes, liquid effluents, and gaseous pollutants); dispersal can be very widespread as a consequences of extreme weather event, posing grave risk to human communities and all biotic species – terrestrial, amphibian, marine and avian.

C. Existing status of Environmental Impact Assessment (EIA)

i. Only a “Rapid EIA” has been conducted by consultants.

ii. Rapid EIA only reflects 4 Million ton per annum of steel production.
iii. Rapid EIA does not cover all the “Projects” taken simultaneously to uncover total environmental impact of the entire proposed undertaking, which will add to pre-existing environmental loading in the region.

iv. Rapid EIA does not quantify the total amounts of gaseous emissions, liquid effluents / wastes and solid wastes from the overall proposed undertaking. Since the project has been granted Special Economic Zone (SEZ) approval, it will receive an entire range of public subsidies while the environmental damages and risks have not been quantified – this is tantamount to subsidizing local and global environmental destruction.

v. Indeed the rapid EIA is full of irrelevant scientific and technical jargon intended to create the misleading impression of profound depth of study while actually suppressing the genuine fact-based analysis that should have been undertaken. In Latin, this strategy is referred to as “ Suppressio veri, suggestio falsi “

D. Necessary Framework for an unbiased EIA

i. In principle, the EIA should cover all the projects of the company and its subsidiaries taken together.

ii. In principle, the above EIA should also consider pre-existing background environmental loading in the region.

iii. The EIA has to be based on authentic figures quoted from the Detailed Project Report (DPR) of the entire project, inclusive of all components; the DPR to be made publicly available so that piecemeal approaches are avoided and public verification is possible.

iv. EIA should quantitatively sum up the entire gaseous effluents from all operations / activities as also break up of various components of the effluent stream in to SPM, SOx, NOx, etc. CO2 to be separately quantified for climate considerations.

v. EIA should quantitatively sum up the entire liquid effluents from all operations / activities as also break up of various components of the effluents
streams; total quantitative abstraction of water from the surrounding environment to be worked out; points of storage / disposal and methodologies of treatment / disposal to be specified.

vi. EIA should quantitatively sum up the entire solid wastes from all operations / activities as also break up of various solid wastes components; points of storage / disposal and methodologies of treatment / disposal to be specified.

vii. Each of these three effluents streams to be modelled for exploring their impacts; these impacts to include impacts on human populations (particularly health and livelihood), impacts on other biotic species (terrestrial, aquatic, marine and avian with particular care w.r.t habitat destruction, destruction of breeding locations etc.), impact on forest and other lands, impacts on other eco-systemic elements and environmental resources.

viii. These modeled impacts to be tested against the principal environmental legislations in force (laws for Air / Water Pollution control, Solid Waste Management, Environmental Protection, Forest and Wildlife conservation, Biodiversity Conservation etc.)

ix. Modelled impacts to be tested against emerging policies of Government of India w.r.t climate change, particularly as these emanate from PM’s Council for Climate Change, having been publicly notified into 8 National Missions and embody voluntary commitments of Government of India to other countries; projects coming up in remote areas should be carefully scrutinized as they may otherwise escape mainstream notice.

In the light of the above methodology, the rapid EIA fails on almost all counts and deserves to be brushed aside.

The following sections present a preliminary quantitative analysis of the comprehensive project impacts, based on publicly available data, and inputs from local communities. These cover

a. Sum total of CO2 emissions from all components, on annual basis

b. Sum total of liquid effluents and total water abstraction by the project on annual basis.
c. Sum total of solid wastes generated by all project components, on an annual basis.

Against each of these estimates, the largest potential impacts and risk factors are indicated, on a life cycle basis. All estimates are based on transparent stated assumptions which are in line with existing institutional guidelines and/or globally acceptable methodologies.

E. Estimation of Annual CO2 emissions

These are further sub-divided into (E1): emissions from steel manufacture; (E2) Emissions from Captive Power Plant, (E3) Transportation related emissions; (E4) mining related emissions; (E5): Townships related emissions.

E1: Emissions from Steel manufacture

Assumption: One ton of steel output produces 1.69 tonnes of CO2
Source: “A global approach to CO2 emissions reduction for the steel industry”; a position paper issued by World Steel Association, February 2010;
Data: Steel Production capacity planned: 12 million tonnes per annum
Calculation: Therefore, annual CO2 emission = 12 million x 1.69 = 20.28 million tonnes per annum.

E2. Emission from Captive Power Plant

Assumptions: i. Power plant operates 7000 hours per year (80 % PLF)
   ii. One Kwh of electricity requires 700 gms of coal input (Tariff determination guidelines of CERC / CEA)
   iii. Ash content Indian Coal = 30 
   iv. CO2 emission per Kwh generated = 1.5 kg CO2
Data: Captive Power Plant Size = 1300 MW
Calculations: (1) Number of Units of electricity generated annually
   = 1300 (MW) x 1000 (KW per MW) x 7000 (hours)
= 9100 x 10^6 Kwh = 9100 million units p.a.

(2) 9100 million units x 1.5 (Kg CO2 per unit of electricity) = 13650 million Kg CO2
= 13.65 million tonnes CO2 Per annum.

E3: Transportation related Emissions

a. Emissions from dedicated railway line of 20 m.t.p.a. of iron ore from mines (Sundhargarh district) to steel plant, an estimated distance of 200 km; plus return of empty rakes; data insufficient
b. Emissions from truck fleet for transportation of 20 m.t.p.a. of ore from mining face to railway siding; data insufficient
c. Emissions from transport of 12 m.t.p.a. of finished steel product from steel plant to Paradeep port, a distance of approx 12 km; data insufficient

Calculations: Total transportation emissions not estimated but will be additionally significant due to huge quantities transported.

E4: Mining related emissions from drilling, blasting and other operations;

Emission not estimated

E5: Township Emissions

Two townships are planned, one at the plant site (682 hectares) and the other at the mining site (227 hectares), Totaling about 909 hectares of township size.

Emission not estimated

Total CO2 emissions: Steel Plant (E1) = 20.28 million t.p.a.
Captive Power Plant (E2) = 13.65 million t.p.a.
Total (E = E1 + E2) = 33.93 million t.p.a.
This quantity of CO2 emissions is well over 2% of India’s total current national emission of about 1500 million t.p.a. of CO2.

Conclusions:

(1) This quantity of CO2 emissions negates the policies and efforts of Government of India to voluntarily curb the growth of CO2 emissions in the economy; these annual emissions will be “locked-in” for a period of at least 30 years, if not more.

(2) In order to mitigate emissions, GOI has set ambitious targets under Green India Mission, inclusion of clean energy up to 15% of grid electricity by 2020 and under Sustainable Habitat Mission, which will be negated by the above increase in emissions.

(3) The emissions will be recorded under Indian emissions for a long time in the future while the benefit of using the steel will go to a foreign country, South Korea. The local environmental and health damages will have to borne by local communities while public monies from SEZ subsidies will be accruing to the company: in effect, we shall be publicly subsidising the global CO2 damage as well as local environmental and public health damage and risks.

(4) Local sources report that the company intends to swap part of the high quality local ore for imported low quality ore under the false technical plea of excess aluminum content in the local ore. In actuality, it is likely that foreign steel producers located in developed countries will swap their low quality ores in order to reduce their CO2 emissions and escape the Kyoto related penalties as applicable within developed countries. In effect, their excess emissions will be transferred to India’s account through the transfer of inferior ores, adding further to the problem of curbing national emissions. This aspect deserves to be seriously investigated by GOI.
(5) The contribution of SO\textsubscript{X} and NO\textsubscript{X} in the gaseous emissions can be similarly calculated, based on the chemical composition of the coal to be used in the power plant and the steel plant. These constituents will also be very large and acidic in nature.

(6) The combination of CO\textsubscript{2}, SO\textsubscript{X} and NO\textsubscript{X} gases, all being acidic in nature, will lead to acid deposition effects on large stretches of the surrounding environment. In particular, note should be taken of health damage to urban and rural communities, acid damage to surrounding good quality agricultural land and crop yields, damage to downwind forests, and damage to the marine environment. These are indicated below.

(7) Contrary to the prevailing perception of the health impacts of gaseous emissions, the effects are far more widespread spatially than is being conceded. Current international research has demonstrated that airborne particles from smokestacks can, under certain environmental conditions, travel as far as 2500 km from the point of origin. In this case, there are several major cities of Odisha at various distances from the proposed site of the steel plant / power generation complex – Paradeep at 10 km, Puri around 100 km, Bhubaneswar and Cuttack around 120 km. These are the cities with large populations and the widespread health impact will have to carefully considered and can’t be ignored.

(8) The acid deposition impact on the entire Mahanadi basin will also have to be considered particularly as it contains large areas of pristine forests teeming with wild life. Similarly the impact of acid deposition on the marine habitat of endangered species like to Olive Ridely turtles will also have to be considered particularly since the habitat will be further disturbed by the proposed dedicated port for export of steel.

(9) Long term acid damage impact on the protected monuments dating back to the twelfth century – the Sun Temple at Konark (70 km distance) and the Jagannath Temple at Puri (100 Kms) will also have to be considered.

F : Estimation of total water abstraction and liquid waste generation
**F1 : Water abstraction**

Assumptions: (1) 3.3 cu.m. of water per tonne of steel produced
(2) 3 cu.m of water per tonne of ore processing
(3) 3 liters of water per unit of electricity generated
(4) 10% of water wastage in pipeline and related losses

Data: 12 m.t.p.a. of steel production
      20 m.t.p.a. of ore processed
      9.1 billion Units of electricity generated per annum.

Calculations: F1 – Water consumption in Steel production
              = 12 m.t.p.a x 3.3 x 1000 lit / cu.m
              = 39.6 billion liters of water per annum

F2 – Water consumption in ore processing
     = 20 m.l.p.a x 3.0 x 1000 lit/cu.m
     = 60 billion liters of water per annum

F3 – Water consumption in electricity generation
     = 9.1 b.u x 3 lit/unit = 27.3 billion liters of water per annum

Total water requirement at plant and mining sites = F1 + F2 + F3
= 39.6 + 60 + 27.3 billion liters p.a = 126.9 billion liters p.a.

Therefore, water abstraction needed (add 10% losses) = 126.9 + 12.69
= 139.50 billion liter per annum, say 140 billion liters per annum.
This estimate does not include the two townships water requirements.

**Conclusions:**

(1) Of the total abstraction, about 80 billion liters p.a. will be abstracted from Mahanadi basin and 60 billion l.p.a from Brahmani basin. The latter basin will be deeply affected as the mining area is in the midst of pristine forest, destroying part of Brahmani catchment. Further, water quality will be affected by mining run off (acid leaching) from mining overburden as well as impact of water pollution from iron ore processing. There is no information on location of ore processing facilities and disposal of flushing.
2. The damage to Brahmani river from water abstraction as well as water quality deterioration, will persist for about 300 km downstream of the mining site as well as affecting the rich coastal delta and the marine areas into which the Brahmani will discharge the pollutants. Health and livelihood damages in this 300 km sketch have to be considered.

3. The total water drawn for the project is estimated to exceed the annual water requirements of five of the largest cities of Odisha including Bhubaneswar and Cuttack.

4. The Mahanadi basin is already stressed due to over exploitation of its water resources; the additional abstraction of water for this project will tilt the balance towards unsustainability of the river and it’s entire basin. The future of agriculture and food security in both basins will be jeopardized due to lack of irrigation development caused by water diversion to industrial projects and damage to water quality.

5. Forest and habitat destruction around and downstream of the mining area will be massive, extending to the rich biodiversity of the coastal delta and the adjacent marine habitat.

6. Climate change is predicted to cause disturbances in hydrological regime in the future. The over abstraction of water and its long-term commitment to the project will prove detrimental to the ability of local and tribal communities to withstand the impacts of future global warming and reduction in agricultural yields.

7. There is a need for risk analysis of water/marine pollution caused by a cyclonic event which may result in overflow / breaching of effluent storage, washing of stored solid wastes into the river /sea etc. Such releases will threaten the already endangered Olive Ridley turtles which come to the coast near the project site for laying eggs. A total of 33 cyclonic storm have crossed the coast within a radius of 200 km from Paradeep port during the period 1971 to 1995, of which 7 were cyclonic storms. (Ref. A study conducted by National Institute of Oceanography (NIO), Regional Centre, Visakhapatnam)

**G. Estimation of annual solid generation**

Solid waste will be generated in three principle ways due to plant operations.
G1: Slag / Solid waste from steel making operations

Since 20 million tons of ore will be annually converted into 12 million tons of steel, the difference of 8 million tonnes per annum has to be fully accounted for at the plant site. Some part of it will appear as mining tailings at the mining site and the balance as slag at the plant site. A mass balance which includes the additional quantities of limestone added to the blast furnace operations will have to be factored in. The location of land for the storage / disposal of the slag and other solid waste will have to be scrutinized for the above risk factors associated with cyclonic activity, including leaching of polluted rainwater / storm water into the aquifers and local aquatic bodies and their impact on human health.

G2: Fly ash from Power project

This will be about 30% of the annual quantity of coal burnt in the power plant.
Annual quantity of fly ash = Annual electricity generation x 0.7 kg coal/unit x 0.3
= 9.1 billion units x 0.7 kg x 0.3 = 1.91 billion kg = 1.91 million tons of fly ash p.a.

The location of the land for storage / disposal of the fly ash will also have to be scrutinized for cyclonic risk factors and leaching into aquifers and local water bodies.

G3: Solid waste at mining sites

This consists of mining overburden disposed off next to the mine as well as mine tailings recovered from the ore processing operations. With the removal of 20 million tones of ore annually, this will be a very sizable quantity, being a fraction of the ore mined.
Specific information not available.
Total solid waste generation per annum = G1 + G2 +G3
= 8 + 1.91 + G3
= at least 10 million tonnes per annum or half the quantity of ore mined annually.
Since the estimated reserves of iron ore at the mining site is 600 million tons, the life cycle production of solid waste over the life of the project will be 300 million tonnes.
Conclusions:

1. The annual solid waste generation at 10 million tonnes per annum is a very large amount: the total cement production in the country is about 150 million tonnes per annum. So that the annual waste generated is about 6% of the annual cement production of India. The lifetime waste generated will be double the current annual total cement production of the country.

2. The disposal of this vast quantity will pose grave problems. Indiscriminate disposal will create further hazards to the ground water quality and health, as well as damage other biotic species.

3. No systematic disposal plan has been proposed, to be implemented over the lifetime of the project. It must be recognized that the annual quantity of solid waste produce is almost equal to the annual quality of steel produced.

H. Lifetime Emissions from the proposed project and Major Environmental implications

H1: Lifetime emissions of CO2
   33.93 million t.p.a. CO2 x 30 years = 1017.9 million tonnes p.a.

H2: Lifetime water consumption / diversion / liquid effluent generation
   140 billion liters p.a. x 30 years = 4200 billion liters

H3: Lifetime Solid Waste Generation
   10 million t.p.a. x 30 yrs = 300 million tonnes

Environmental Implications:
1. The huge gaseous emissions of acid forming gases (C02, SOx and NOx) will affect human health in major cities – Paradeep, Puri, Bhubaneswar and Cuttack, the health of a vast area of good quality forests in the hinterlands, soil acidification and crop damage in rich agricultural soils of the delta regions and river valleys and acid deposition damage to aquatic and marine habitats of endangered species. Acid deposition will also damage 12th century heritage sites at Konark (70 kms) and Puri (100 Km).

2. Large scale water abstraction and water quality damage to two major rivers – Mahanadi and Brahmani – will adversely affect the two rivers; the Mahanadi is over-exploited, the Brahmani will join it in terms of being over exploited. This will have further damage consequences for the deltas of the two rivers as well as altering the marine habitats where the rivers meet the Bay of Bengal. Moreover, since climate change is predicted to create massive hydrological uncertainties in the future, it would be unwise to commit to such large drawals over a long period of time leading to strangulation of the two large rivers and depriving the local communities and biota of access to life sustaining sweet water.

3. The huge quantities of solid wastes have the potential to further damage the environment over the long term through acid leaching to ground and surface water with consequences for terrestrial, aquatic and marine biota.

4. Extreme events like cyclones / storms, predicted to increase in destructive power, pose the grave risks associated with the widespread and uncontrollable dispersal of all effluents, resulting in widespread environmental damage to the region, in addition to ongoing damages due to routine pollution from plant operations /activities.

(I) Estimation of Land requirement for the Project

I.1 Land requirement of steel plant = 1820 ha
I.2 Land under mining lease = 6204 ha
I.3 Land for steel township = 682 ha
I.4 Land for mining township = 227 ha
I.5 Land for railways = not estimated
I.6 Land for dedicated port infrastructure = not estimated
I.7 Land for water pipelines = not estimated
I.8 Land for additional transport infrastructure (roads etc.) = not estimated

Total land requirement = 8933 ha (say 9000 ha) which doesn’t include several major requirements listed above. There has been tremendous local opposition to land acquisition.

**Overall conclusion and submission:**

1. Even a preliminary unbiased assessment of the environmental consequences indicates the highly damaging effects that are likely to accrue due to the operational activities of the project.

2. The piecemeal approach to Environmental Impact Assessment, the attempt to fob off an incomplete Rapid EIA as an authentic full fledged appraisal, the attempts to suppress vital information all indicate that the company has operated in bad faith and attempted to by-pass the existing environmental laws and policies of the Government of India.

3. The size of the project undertaking requires that a national view of the decision is imperative, given the magnitude of its consequences.

**In the light of the above, we strongly submit that the environmental clearance / approval to the project should be withdrawn / cancelled in the overall public interest as well as the interest of vulnerable local and tribal communities.**

This note was submitted to Ministry of Environment And Forest (MOEF) by National Centre For Advocacy Studies (NCAS) based at Pune, India.