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No.J-12011/28/2010-IA.I
Government of India
Ministry of Environment & Forests

Paryavaran Bhavan
CGO. Complex, Lodi Road
New Delhi – 110 003

Dated : 30.9.2010

To

Engineer-in-Chief (P&D)
Department of Water Resources
Secha Sadan
Bhubaneswar - 751 001(Orissa)

Subject: Jeera Irrigation Project in the Bargarh District, Orissa by M/s. Department of Water Resources, Government of Orissa – TOR regarding

Sir,

This has reference to your Letter No.WG-Med-23/09/7339(WR) dated 22.5.2010, 7.8.2010, 6.1.2010 on the above mentioned subject.

2. The proposed project is a medium irrigation project. However, as Chattsigarh is within 10 km of the proposed project, as per EIA Notification, 2006, the proposal falls under "A" category project. The objective of scheme is to irrigate about 4800 ha in drought prone area of Bargarh District. The project envisages construction of a 1958 m long and 17.58 m high homogenous rolled earth fill dam across river Jeera. The dam will create a pond area of 770 ha. Total land requirement is 831.50 ha. Out of which 505.43 ha. – Private land; 256 ha.-Revenue land and 8.57 ha – Forest land. Due to land acquisition 7 villages are likely to be partially affected. No house is coming under submergence. The total project cost is about Rs. 123.79 Crores.

3. The above mentioned project was considered by the Expert Appraisal Committee at its meeting held on 21.8.2010.

4. The Ministry of Environment and Forests hereby accords approval of TORs as per the provisions of Environmental Impact Assessment Notification, 2006 along-with the following "Terms of Reference (TOR)" for preparation of EIA report:

EIA Studies

The baseline studies will consist of 3 seasonal studies (Pre-monsoon, monsoon and winter seasons) and should be conducted in the following study area.

Study Area: The study area should include the following areas:

- Catchment Area
- Submergence Area

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National Institute of Technolgy. Rourkela
for information and necessary action.

- Project Area to be acquired for various appurtenant works area within 10 km from main project components
- Various maps providing salient features of the project need to be depicted in proper scale map of at least 1:15,000 like

1. The location map of the proposed project.
2. The project layout should be superimposed on a contour map of ground elevation showing main project features (*viz.* location of dam, head works, main canal, branch canals, quarrying *etc.*) should be depicted in a scaled map.
3. Drainage map of the catchment up to the project site.
4. Soil map of the study area.
5. Geological and seismotectonic maps of the study area showing main project features.
6. Remote sensing studies, interpretation of satellite imagery, topographic sheets along with ground verification shall be used to develop the land use/land cover pattern of study area using overlay mapping techniques *viz.* Geographic Information Systems (GISs). False colour composite (FCC) generated from satellite data of study area should be presented.

A. BASELINE DATA

1. Geological and Geophysical Aspects

- Geography & physiography of the project area
- Design discharge & its RI (Recurrence interval)
- Regional Geology and structure of the catchment
- Seismicity, tectonics and history of past earthquakes in the area
- Critical review of the geological features around the project area
- Impact of project on geological environment
- Justification for location & execution of the project in relation to structural components (dam height)

2. Hydrology of the basin

- Hydro-meteorology, drainage systems
- Catastrophic events like cloud bursts and flash floods, if any should be documented.
- For estimation of Sedimentation rate direct sampling of river flow is to be done during EIA to get actual silt flow rate (to be expressed in ha-m km-2 year-1). The one year of EIA study should provide an opportunity to do this for ascertaining the actual silt flow rate.
- Water availability for the project and the aquatic fauna
- Design discharge and its recurrence interval
- Physical, Chemical and Bacteriological parameters of surface water such as temperature, pH, electrical conductivity, total dissolved solids (TDS), DO, turbidity, salinity, alkalinity, Ca, Mg and total hardness, chlorides, iron, manganese, arsenic, fluorides, nitrogen (organic, ammonia, nitrite and nitrate), phosphate, sulphate, sulphides, heavy metals (mercury, lead, chromium, cadmium and zinc), biochemical oxygen demand (BOD), chemical oxygen demand (COD), total organic carbon (TOC) and total oxygen demand (TOD) and Bacteriological parameters that comprises of fecal and total coliform

- *Give a table of SYI values and identify the sub-watersheds of various priorities based on SYI values in the EIA report*
- *Baseline data on soil and water propertiesare to be collected from 15-20 well distributed locations in the proposed command area. Groundwater table fluctuation record for past 10 years to be given in the EIA report*
- *The proposed irrigated area is small, but even then introduce demonstartion of pressurised irrigation in a few parcels of land measuring about 500 ha at each location at the project cost. Also draw-up a suitable crop plan for this.*

3. Biological Resources

i. Flora

- General vegetation pattern and floral diversity *viz.* trees, shrubs, grasses, herbs, significant microflora *etc.* Vegetation should cover all groups of plants
- Forests cover and forest types
- Water body inundating forest area
- Vegetation profile, no. of species in the project area, etc.
- Community Structure through Vegetation mapping
- Species Diversity Index (Shanon-Weaver Index) of the biodiversity in the project area as well as plant fossil & phytoplankton
- Documentation of economically important plants, medicinal as well as timber, fuel wood etc.
- Endemic, endangered and threatened species
- Impact of impoundment and construction activities on the vegetation
- Cropping and Horticulture pattern and practices in the study area.
- Location of any Biosphere Reserve, National Park or Sanctuary in the vicinity of the project , if any

ii. Fauna

- Fauna study should be carried-out for all group of animals
- Inventorisation of terrestrial wildlife and present status
- Zoogeographic distribution/affinities, Endemic, threatened and endangered species and animal fossil

iii. Avifauna

- Status for all groups of avifauna
- Resident/Migratory/Passage migrants
- Zoogeographic distribution/affinities, endemic, threatened and endangered species & animal fossils
- Impact of project on threatened/endangered taxa, if any

iv. Aquatic Ecology

- Aqua- fauna like macro-invertebrates, zooplankton, phytoplanktons, benthos etc.
- Conservation Status

Fish and Fisheries

- Fish migrations, if any
- Breeding grounds
- Impact of dam building on fish migration and habitat degradation
- Overall ecological impact upto 10 Km d/s

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- Management plan for conservation areas and threatened/endangered taxa

v. **Remote Sensing & GIS studies – various maps** Various maps providing salient features of the project need to be depicted in proper scale map of at least 1:15,000 like

- The project layout should be superimposed on a contour map of ground elevation showing main project features (*viz.* location of dam, head works, main canal, branch canals, quarrying *etc.*) shall be depicted in a scaled map.
- Delineation of critically degraded areas in the directly draining catchment on the basis of Silt Yield Index as per the methodology of AISLUS
- The location map of the proposed project.
- Land use and land cover mapping
- Drainage pattern/map
- Soil map of the study area
- Geo-physical features, slope and relief maps Geological and seismotectonic maps of the study area showing main project features.
- Remote sensing studies, interpretation of satellite imagery, topographic sheets along with ground verification shall be used to develop the land use/land cover pattern of study area using overlay mapping techniques *viz.* Geographic Information Systems (GISs). False colour composite (FCC) generated from satellite data of study area should be presented

vi. **Socio-economic aspects**

- Land details*
- Demographic profile
- Ethnographic Profile
- Economic structure
- Development profile
- Agricultural practices
- Cultural and aesthetics sites
- Infrastructure facilities: education, health and hygiene, communication network, etc.
- Impact on socio-cultural and ethnographic aspects due to dam building report.

**Report would include list of all the Project Affected Families with their names, education, land holdings, other properties, occupation, etc.*

vii. **Collection of data pertaining to water (physico-chemical and biological parameters), air and noise environment and likely impact during construction and post construction periods.**

viii. **Air Environment**

- Baseline Information on ambient air quality in the project area covering aspects like SPM, RSPM, Sox, NOx
- Noise Environment
- Traffic density in the project area

ix. **Construction Methodology and Schedule including the tunnel driving operations, machinery and charge density, etc.**

B. IMPACT PREDICTION

Air

- Changes in ambient levels and ground level concentrations due to total emissions from point, line and area sources
- Effects on soils, material, vegetation, and human health
- Impact of emissions DG sets used for construction power if any, on air environment.

Noise

- Changes in ambient levels due to noise generated from equipment, blasting operations and movement of vehicles
- Effect on fauna and human health

Water

- Changes in quality
- Sedimentation of reservoir
- Impact on fish fauna
- Impact of sewage disposal

Land

- Changes in land use and drainage pattern
- Changes in land quality including effects of waste disposal
- Riverbank and their stability
- Impact due to submergence

Biological

- Deforestation and shrinkage of animal habitat
- Impact on fauna and flora (including aquatic species if any) due to decreased flow of water
- Impact on rare and endangered species, endemic species, and migratory path/route of animals, if any
- Impact on breeding and nesting grounds, if any
- Impact on animal distribution, migration routes (if any), habitat fragmentation and destruction due to dam building activity

Socio-economic Aspects

- Impact on the local community including demographic changes
- Impact on economic status
- Impact on human health
- Impact on increased traffic
- Impact on Holy Places and Tourism
- Positive as well as negative impacts likely to be accrued due to the project are to be listed.

C. ENVIRONMENTAL MANAGENET PLAN (EMP)

a) Catchment Area Treatment Plan

Delineation of micro-watersheds in the river catchment and mapping of critically degraded areas requiring various biological and engineering treatment measures. Identification of area for treatment based upon Remote Sensing & GIS methodology and Silt Yield Index (SYI) method of AISLUS coupled with ground survey. The prioritization of watershed for treatment based upon SYI. Spatial Information in each micro watershed should be earmarked on maps in the scale of 1:50,000. The Cat plan would be prepared with year-wise Physical and financial details.

b) Creation of Green Belt Plan around the Periphery of the Reservoir and Compensatory Afforestation Scheme in consultation with the State Forest department.

c) **Biodiversity Conservation and Wild life Management Plan** for conservation and preservation of endemic, rare and endangered species of flora and fauna (in consultation with the State Wildlife Department)

c) **Fisheries Development plan** for conservation/management of reverine fishes.

d) **Resettlement & Rehabilitation (R&R) Plan** along with social/community development. R&R plan would be framed in consultation with the Project Affected Persons (PAPs), Project Authorities and the State Government. R & R Plan would be drafted according to the NRRP 2007 and the policy of State Government

e) Disaster Management Plan.

f) Restoration and landscaping of working Areas: reclamation of borrow pits (quarry sites) and construction areas.

g) Public Health Delivery System including the provisions for drinking water facility for the local community.

h) Management during the Road Construction

i) Sanitation & Solid Waste Management Plan for domestic waste from colonies and labour camps, etc.

j) EMP is to give due attention to CAD and OFD works by planning to tap central assistance, if needed.

k) Periodic monitoring of groundwater table and changes in the chemical properties of soil, surface water and groundwater to be done

l) Environmental Monitoring Programme (With physical & financial details covering all the aspects form EMP).

m) **A summary of Cost Estimate for all the plans** (Cost for implementing all the Environmental Management Plans including the cost for implementing Environmental Monitoring Programme, aforesaid compensation, mitigation and management measures, etc.)

5. In case of change of scope of the project; fresh 'Scoping' clearance has to be taken.

6. For accreditation, the concerned consultant who should be engaged for preparation of EIA/EMP report is requested to register them with Quality Council of India (QCI)/NABET under the scheme of accreditation & register.

7. Consultants should include a "Certificate" in EIA/EMP report regarding portion of EIA/EMP prepared by them and data provided by other organization(s)/Laboratories including status of approval of such laboratories.

8. As per the provisions of the EIA Notifications of 2006, you are requested to submit draft EIA / EMP report as per above terms of references to the State Pollutions Control Board/Committee for conducting the Public Hearing / Public Consultation.

9. All the issues discussed in the Public Hearing / Public Consultations should be addressed to and incorporated in the final EIA / EMP report and submitted to the Ministry for considering the proposal for Environment Clearance.

10. The prescribed TORs would be valid for a period of 2 years for submission of EIA/EMP reports, after public consultation.

Yours faithfully,

(Dr. S. Bhowmik)
Additional Director

Copy to :

1. Secretary, Ministry of Water Resources, Shram Shakti, Bhawan, Rafi Marg, New Delhi-110001.
2. The Adviser (I & CAD), Planning Commission, Yojna Bhawan, New Delhi - 110001.
3. The Chief Engineer, Project Appraisal Directorate, Central Water Commission, Sewa Bhawan, R.K. Puram, New Delhi-110066.
4. Principal Secretary, Department of Water Resources, Government of Orissa, Bhubaneswar – 751 001.
5. The Principal Secretary, Department of Environment & Forests, Government of Orissa, Bhubaneswar – 751 001
6. The Member-Secretary,Orissa Pollution Control Board, A/118, Nilakanthanagar, Bhubaneswar – 751 012
7. The Regional Office, Ministry of Environment & Forests, Bhubaneswar, Orissa.
8. EI- Division, Ministry of Environment & Forests, New Delhi-110003.
9. Guard file.

(Dr. S. Bhowmik)
Additional Director