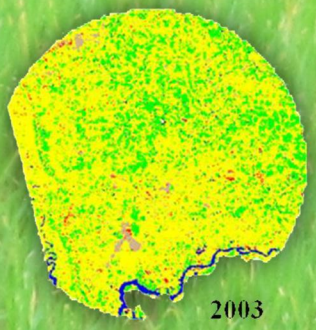
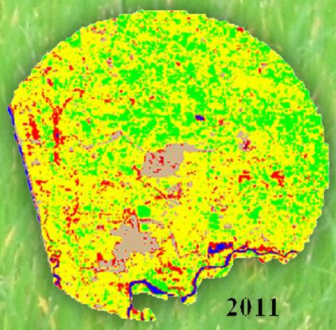
ENVIRONMENTAL PROFILE AND PEOPLE'S LIVELIHOOD ASPECTS IN THE VICINITY OF COAL BASED THERMAL POWER PLANT AT YELLUR PANCHAYAT, UDUPI DISTRICT

Report prepared in response to the request of Sri Sri Sri Vishwesha Theertha Swamiji, Pejavara Adhokshaja Matha, Udupi and Local People of Yellur





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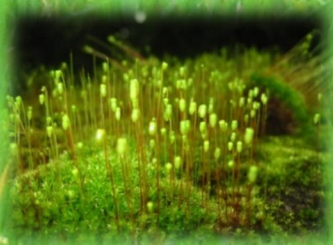

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		Udupi Power Corporation Ltd. (26th September 2011)	
	iv.	**letter to the Chief Minister of Karnataka, from Dr. Y B Ramakrishna**	
	v.	**TVR's email to DC dated 19th Dec and 20th Dec 2011**	
	vi.	**Public hearing excerpts**	
	vii.	**Letter from IMA regarding Health Issues**	
	viii.	**Media reports on the contamination**	
	ix.	**Amended Environmental Clearance and applicable environmental norms for non-compliance of norms and polluting the environment**	
	x.	**KSPCB notification dated 9th Dec 2011 giving consent for discharge of effluents..**	
	xi.	**Compensation to the affected fishermen families – Direction of the Chief Minister of Karnataka based on the proceedings of 23 Feb 2010 meeting**	
	xii.	**Gram Panchayat's Resolution against conversion of forest and agriculture land for acquisition of forest and agriculture land for transmission of electricity to Hassan**	

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जगद्गुरु श्रीमध्वाचार्यमहासंस्थानम्
उडुपि - ५७६ १०१, कर्णाटक.

Date : 19/04/2012

Foreword

ಪೆಡುಬಿದ್ರೆಯ ಬಳಿ ಸ್ಥಾಪಿತವಾಗಿರುವ ಉಡುಪಿ ಉಷ್ಣ ವಿದ್ಯುತ್ ಸ್ಥಾವರವನ್ನು ಸ್ಥಳೀಯರೂ ಮೊದಲಿನಿಂದಲೂ ವಿರೋಧಿಸುತ್ತಿದ್ದಾರೆ. ಈ ವಿದ್ಯುತ್ ಸ್ಥಾವರದಿಂದ ಪರಿಸರದ ಮೇಲೆ ಆಗುವ ದುಷ್ಪರಿಣಾಮದ ಕುರಿತು ಸಮಗ್ರ ಅಧ್ಯಯನವಾಗಬೇಕು ಹಾಗೂ ಸ್ಥಳೀಯರ ಸಮಸ್ಯೆಗಳು ಮತ್ತು ಆತಂಕಗಳನ್ನು ನಿವಾರಿಸುವತ್ತ ಸರ್ಕಾರ ಗಮನ ಹರಿಸಬೇಕು. ಅಭಿವೃದ್ಧಿಯ ಹೆಸರಿಗೆ ಈ ಯೋಜನೆಯನ್ನು ಕೈಗೆತ್ತಿಕೊಳ್ಳಬಾರದೆಂಬುದು ಮೊದಲಿನಿಂದಲೂ ನಮ್ಮ ನಿಲುವಾಗಿದೆ. ಜನರ ಕೋರಿಕೆ ಮತ್ತು ವಿರೋಧಗಳ ನಡುವೆಯೂ ಈ ಉಷ್ಣ ಸ್ಥಾವರ ತಲೆಯೆತ್ತಿ ನಿಂತಿದೆಯಾದರೂ ಕಳೆದ ಒಂದೂ ವರ್ಷದಿಂದ ಕಾಯೋಜನೆಯಲ್ಲಿ - ವಾಗಿದೆ.

ಪರಿಸರ ಹಾಗೂ ಜನಜೀವನದ ಮೇಲೆ ಆಗಬಹುದಾದ ದುಷ್ಪರಿಣಾಮ - ಗಳ ಬಗ್ಗೆ ಜನರ ಆತಂಕ ಇಂದು ನಿಜವಾಗಿದೆ. ಈ ಸ್ಥಾವರದ ನಿರಿಮದ ನಿವಕಡಣೆಯೂ ಕೊರತೆಯೂ ಹಿನ್ನೆಲೆಯಲ್ಲಿ ಇಲ್ಲಿನ ಪರಿಸರ, ಕೃಷಿ ಮತ್ತು ಜನಜೀವನದ ಮೇಲೆ ನೇರ ಆಘಾತವಾಗಿರುವುದನ್ನು ಈಗ ಕಂಡಿತ್ತೇವೆ. ಈ ಸಮಸ್ಯೆಗಳ ಅಧ್ಯಯನ ಮತ್ತು ಸೂಕ್ತ ಪರಿಹಾರಕ್ರಮಗಳನ್ನು ಸೂಚಿಸಲು ನೇಮಕಗೊಂಡ ತಜ್ಞರ ಸಮಿತಿಯಿಂದ ಇಬ್ಬರು ತಜ್ಞರನ್ನು ಕೈ ಬಿಟ್ಟಿರುವುದು ವಿಷಾದನೀಯ. ಈ ಇಬ್ಬರು ತಜ್ಞರನ್ನು ಮತ್ತೆಮ್ಮೆ ಈ ತಂಡದಲ್ಲಿ ಸೇರಿಸಬೇಕೆಂ - ದೂ ಆಗ್ರಹಿಸಿ ಯಾವಾಗ್ ನಿರತನಾದಾಗ ಕರ್ನಾಟಕ ಜ್ಞಾನ ಸರ್ಕಾರದ ಪ್ರತಿನಿಧಿಗಳು ನಿರಿಮಗಿ ಪ್ರತಿಕ್ರಿಯಿಸಿಲ್ಲ. ಆಗ ನಿರ್ಧರಿಸಿದಂತೆ ಈ ಇಬ್ಬರು ತಜ್ಞರೂ ತಮ್ಮ ಇತರ ವಿಜ್ಞಾನಿಗಳ ತಂಡದೊಡನೆ ಅಧ್ಯಯನ ನಡೆಸಿ, ಸಿದ್ಧಪಡಿಸಿದ ವರದಿ ನಮ್ಮ ಮುಂದಿದೆ. ಅವರಿಬ್ಬರಿಗೂ ಹಾಗೂ ಅವರ ತಂಡದ ಎಲ್ಲಾ ಸದಸ್ಯರಿಗೂ ಅಭಿನಂದನೆಗಳು.

ಭಾರತೀಯ ವಿಜ್ಞಾನ ಸಂಸ್ಥೆಯ ವಿಜ್ಞಾನಿ ಡಾ. ಟಿ.ವಿ. ರಾಮಚಂದ್ರ ಹಾಗೂ ಶ್ರೀ. ಬಿ. ರಾಮಕೃಷ್ಣ, ಅಧ್ಯಕ್ಷರು, ಕರ್ನಾಟಕ ರಾಜ್ಯ ಜೈವಿಕ ಇಂಧನ ಅಭಿವೃದ್ಧಿ ಮಂಡಳಿ ಇವರ ನೇತೃತ್ವದಲ್ಲಿ ಸಿದ್ಧಪಡಿಸಲಾದ ಈ ವರದಿಯನ್ನು ಸರ್ಕಾರ ಒಪ್ಪಿ, ಸೂಕ್ತ ಕ್ರಮಗಳನ್ನು ಸರ್ಕಾರ ಜರುಗಿಸುವುದೆಂಬ ಆತಿಭಾವನೆ ನಾವು ಹೊಂದಿದ್ದೇವೆ.

ಶ್ರೀ ವಿಶ್ವೇಶತೀರ್ಥ ಸ್ವಾಮಿಗಳು.

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ENVIRONMENTAL PROFILE AND PEOPLE'S LIVELIHOOD ASPECTS IN THE VICINITY OFCOAL BASED THERMAL POWER PLANT AT YELLUR PANCHAYAT, UDUPI DISTRICT

PREFACE

A coal based Thermal Power Plant (TPP) of capacity 2X500 MW was proposed in Nandikur village (Udupi taluk, Udupi district, Karnataka) in 1996 by Nagarjuna Power Corporation Limited (NPCL). This was followed by a proposal for 2X507.5 MW TPP in 2003 in the same region. However, these projects were stalled due to protests from local people. Later on, amidst the local protests, Lanco's Udupi Power Corporation Limited (UPCL) acquired land and commenced construction of a 2X600 MW TPP in Yellur village north of Nandikur with an assurance to set-up the state of the art TPP with the latest technologies and imported coal (with low ash and other contaminants). In-spite of the assurances of maintaining the clean environment, functioning/operation of TPP since July 2010 the region experienced large scale environmental contamination (land, water, air and biotic elements) affecting the livelihood of the local people. This led to massive agitations in the district demanding the district administration to intervene immediately to ensure safe drinking water, etc.

In response to this, a committee consisting of 6 experts and senior officials was constituted on 31st March 2011, in order to assess the environmental pollution based on the complaints received by the district administration. The committee submitted a mid-term report on 5thJuly 2011. The interim report was rejected by the public as neither the terms of reference nor the recommendations reflected the realities or offer any solution to them So they insisted on reconstitution of the committee with the experts of repute. Subsequently, the Pontiff of Pejavar Mutt, Sri Sri VishweshaTirthaSwamiji advised the Government of Karnataka (GoK) to include Dr.T.V.Ramachandra (Energy & Wetlands Research Group, Centre for Ecological Sciences, Indian Institute of Science, Bangalore 560012 & Member Western Ghats Task Force, Government of Karnataka) and Y.B.Ramakrishna (Executive Chairman, Karnataka State Biofuel Development Board, Government of Karnataka) as expert members into the committee. These members were included after ascertaining their willingness to serve in the committee by the office of Hon. Minister for Fisheries Sri. Krishna J. Palemar, GoK. Subsequently, Udupi Dy. Commissioner (DC) office issued a communiqué (MAG2CR848/2010-11/41913) indicating the reconstitution of the expert committee on 8thAugust 2011.

The first meeting of the reconstituted committee took place on 26thSeptember 2011 at 11 am in the Dy. Commissioners office. The committee deliberated on the causal factors of the pollution while taking into cognizance the prevailing environmental conditions of the region. In this regard, the newly inducted experts insisted on holding 1) A public consultation meeting to take into account the woes of the people; as there existed no written records of complaints of people of the region on the files except for some newspaper reports of agitation by the people and 2) A surprise visit to the TPP to assess the technical competency that was claimed. The public consultation meeting was held on 19thNovember 2011. The inducted expert members also insisted on the provision of safe drinking water, repair of roads, compensation for crop loss and addressing of health issues on priority.

The second meeting of the expert committee was scheduled on 21st December 2011 to discuss the outcome of the public consultation and one of the expert member was not even informed of the meeting. The Dy. Commissioner expressed his inability to work under pressure from different quarters as well as from some of the members of the committee. The representatives of the agriculture, horticulture, health departments were of the opinion that extensive damage has been done with regard to flora of the region and the water in several wells in the region were in fact, contaminated. It was decided to seek detailed report from respective departments for further action. In the meantime, the DY. Commissioner's office sent office communication (dated 29th December 2011) indicating exclusion of the 2 newly inducted experts from the committee without assigning any reasons whatsoever. It appeared from the local media reports, that the district administration was not comfortable with the deliberations of public consultations, field visit and also the expert members' insistence for surprise visit to TPP to assess the technical aspects and site conditions. On persistent query from public, the district administration and the then minister in-charge of the district gave frivolous reason, of members addressing the media as the reason for dropping the two members from the committee.

After public consultation of 19th November 2011, one of the members Sri Y B Ramakrishna highlighted the prevailing conditions in the region and the issues to be addressed on priority by the district administration. After the meeting and field visit, Sri. Y B Ramakrishna wrote a detailed letter to the Hon. Chief Minister and submitted in person on 21st Nov 2011 requesting his intervention on providing safe drinking water on priority and also to take up much needed repair of roads. Unfriendly attitude of the district administration and deteriorating environmental conditions (contaminated drinking water, poor crop yield, bad road conditions) and unceremonious removal of two experts of national and international repute, led to the agitation by local people and the Pontiff of Pejavar Mutt went on fast from 9th January 2011, demanding GoK for re-induction of the 2 expert members into the committee and completion of the report. Hon. Chief Minister deputed the district in-charge minister to convince the Pontiff to end the fast and agitation. It was agreed in presence of the media that Sri Sri. Pejawar Swamiji would request the two experts (dropped from the committee) to submit their independent report to him and the Govt would expedite the report of the truncated committee and a proper action will be taken based on the two reports until which the second phase (600 MW) will not be given the sanction for operation. As a result, the fast and agitation ended on 10th January 2011.

The technical report prepared with this backdrop, is based on the detailed field investigations (water, soil, biotic elements) and interaction with the local people. A team of researchers from Indian Institute of Science (IISc), Bangalore conducted a detailed scientific assessment of the environmental conditions of the region (during August – November 2011), which is deliberated in this report.

ENVIRONMENTAL PROFILE AND PEOPLE'S LIVELIHOOD ASPECTS IN THE VICINITY OF COAL BASED THERMAL POWER PLANT AT YELLUR PANCHAYAT, UDUPI DISTRICT

1.0 EXECUTIVE SUMMARY

Environmental status of a region is an assessment of prevailing environmental conditions apart from ecological entities and their interactions. Environmental profiling is performed by evaluating the physical, chemical and biological components along with functional abilities of an ecosystem. This includes assessment of threats due to anthropogenic activities which may alter the physical, chemical and biological integrity of the system.

The current study profiles the environmental aspects of Yellur (including Kolachur) and surrounding villages including Nandikur, Nadsal (including Tenka Yermal), Bada, Padebetu, Santhur, Palimar, Karnire and Hejamadi subsequent to the commissioning of coal based Thermal Power Plant (TPP). The current installed capacity of TPP is 600 MW and the proposal is in pipeline to augment the capacity to 1200 MW.

Conventional generation of electricity from fossil fuel based sources like coal results in serious environmental problems (pollution of air, water and land) with far reaching local and global implications (global warming, climate change). Higher greenhouse gas (GHG) emissions are the drivers of global warming and resultant climatic changes.

Primary data was collected from the field pertaining to land, water, soil and social aspects. Socioeconomic parameters were collected through structured questionnaires, interviewing local people, medical practitioners, etc. Water and soil samples were collected through stratified random sampling. Locations of the sampling points were recorded using pre-calibrated hand held Geographical Positioning System (GPS). The baseline demographic and environmental conditions prior to setting up of TPP were collected through government agencies, local NGOs, and published literatures. Representative water samples were collected in the immediate vicinity of TPP (core zone of 2 km) as well as buffer zone of 6 km during August to November, 2011. Parameters such as pH, Total Dissolved Solids (TDS), electrical conductivity, Dissolved Oxygen (DO), light penetration and turbidity were quantified in the field. Samples were collected in the sterilized containers for further analysis at laboratory. Inorganic anionic parameters (nitrates, sulphates, chlorides, phosphates), cationic parameters (calcium, magnesium, sodium, potassium), organic bio assays (BOD; biochemical oxygen demand), chemical assay (COD; chemical oxygen demand) and heavy metals (copper, manganese, iron, cadmium, lead, mercury, cobalt, chromium and zinc) were quantified through standard protocol as per APHA (1995, 2000) and NEERI (1988). The sampled water quality data was supplemented with the data collected from the regional Pollution Control Board (PCB). PCB has been monitoring the environment parameters regularly (monthly sampling, 2010 and 2011).Temporal spatial data (of 2003 and 2011) acquired

through space-borne sensors were analysed in order to understand the changes in land cover (vegetation and non-vegetation) and land use (built-up, forest, crop land, water bodies, etc.); 2003 corresponds to pre TPP while 2011 portray the situation after TPP commissioning. Temporal land use analysis reveals a decline in vegetation cover with an increase in built-up during 2003 to 2011.

During field investigations, the data pertaining to crop productivities and changes in phenological aspects (flowering, etc.) were collected from the local experts and experienced farmers.

Mismanagement of the environment is evident from the contamination of water (surface and ground), soil, and air apart from the impaired functional aspects of the biotic elements. This is evident from the reduced productivity (grains, jasmine flower, and horticultural produce – coconut, arecanut, livestock – milk), reproductive ability (livestock, poultry animals). Deposition of dust on the leaves is evident during the dry seasons. Also, deposition of dust with toxicants in the floral parts of the vegetation has induced phyto-toxicity leading to poor pollination and hence reduced productivity. Reduced population of pollinators (bees, etc.) has been reported in these villages due to the degradation of the environment.

Field investigations reveal stunted growth of saplings (very evident in the TPP's green belt), drying of leaves, corrosion of metals and resultant damage to tin roofs, dish antennas, transmission lines, railway tracks, fencing of TPP boundary, enhanced respiratory diseases, non-palatable grasses (livestock refrain from feeding on grasses), etc. This is due to deposition of supersaturated saline mist on soil and foliage. The saline mist gets released from the cooling towers, which is locally dispersed by the wind to the nearby localities even up to 2 km. The altitudinal gradient of the location has also enhanced the dispersion. Salt deposition on: 1) foliage has resulted in 'leaf burn' as leaf tissue is damaged due to contact with highly ionized salts,2) crops, has attenuated the yield due to phyto-toxicity, 3) metal fixtures and accessories leading to corrosion due to the formation of metal oxides.

Analysis of the water samples collected from surface and ground water bodies within 2 km zone reveal higher inorganic anions, cations and heavy metals beyond the permissible limits of Bureau of Indian Standards (BIS) and World Health Organization (WHO). Similarly, the analysis of water samples of the villages of Yellur (including Kolachur), Nadsal (including Tenka Yermal) and Santhur by PCB also reveal of contamination. Release of effluents (oil spills rich in hydrocarbons) directly to natural drains at north-western side (Yellur) of TPP has been observed during the field work and also reported by local people in the vicinity. Also, the release of coal mix effluents directly into the streams has been noticed at north-western (Yellur), south-western (Yellur, Padebetu, Tenka) and southern (Kolachur) sides. The irresponsible act of releasing untreated effluents (rich in salinity, heavy metals, hydrocarbons) is primarily responsible for contamination of water (ground and surface waters) and land resources. Due to these, higher accumulations of contaminants in the environment have affected human and livestock dependent on the water bodies and agriculture fields. The severity of the contamination is felt even at

coastal region which is over 4 km (as effluent contaminated water passes through the agriculture fields). The presence of zinc, cadmium, lead, iron, cobalt, nickel, copper, chromium, manganese in water samples in the core zone (within 2 km) and also in soil samples of buffer regions of TPP reveal heavy metal contamination with xenobiotic compounds.

The transport and dry disposal of coal ash (fly ash) has resulted in the dispersion of ash particulates and fugitive dust in the neighbourhood. Intermittent release of ash pond water to nearby stream (eventually joins the Shambhavi river) in Santhur village has contaminated to ground water resources. Apart from these, leakage of saline water into agriculture fields has enhanced the salinity affecting paddy yield. Agricultural crop lands have been abandoned due to low crop yield subsequent to TPP's contaminations. The indiscriminate disposal of synthetic substances used for coating of the GRP pipeline has also added to the soil contamination.

Socioeconomic survey of residents within 6 km zone reveals the impact on livelihood of people due to reduced crop productivity, higher instances of human and livestock health issues, damages to infrastructure, etc. which further corroborates the environmental impacts (water, soil and biotic elements)with the contamination of water, air and soil. These are summarized as follows:

I. **Observations during field visits**

- ✓ Due to transport of coal in Open Type Box (BOBRN) wagons, spillage of coal and coal dust were occurring in the vicinity of TPP.
- ✓ Improper liners and coal stockyard without shelter has led to leaching during heavy monsoon, contaminating nearby land, ground water and surface water bodies.
- ✓ Corrosion of railway tracks (parts of Konkan Railway and coal track to TPP)
- ✓ Corrosion of fencing of the green belt (of TPP), tin sheets (within TPP complex)
- ✓ Corrosion of transmission lines (could be dangerous to life as there are chances of severe hazards due to heavy precipitation)
- ✓ Corrosion of iron pillar, silver plated door frame and door of the main entrance of Subramanya (Padabetu village) and Durgaparameshwari (Nandikur village) temples located within 2 km.
- ✓ Corroded agriculture implements, dish antennas, vehicle chassis, tin roofs, well pulleys, mesh cover to wells, etc. in nearby houses
- ✓ Salt accumulation on roof tiles and walls (distemper palletisation) adjacent to TPP
- ✓ Intentional disruption of public pathways by TPP (to restrict villagers in nearby Yellur village or a mechanism to pressurize villagers to dispose of their lands)
- ✓ Improper confinement of soil in TPP complex leading to large scale erosion of soil and subsequent deposition in nearby agricultural fields.
- ✓ Sacred grove in dilapidated state due to the negligence of the TPP management, hence hurting the local sentiment.
- ✓ Direct discharge of coal mix water to nearby streams

- ✓ Illegal use of natural drains/streams for disposing TPP effluents. As the stream passes through agriculture fields there is a contamination of land and biotic elements (humans, livestock, fishes, poultry, pets, etc.)
- ✓ Hydrocarbons oozing out from the TPP complex is contaminating nearby surface water sources (north-western side of TPP, Yellur village, Mr.Kariya Shetty house)
- ✓ Contaminated tube wells (yellow colour with oily film)
- ✓ Black dust deposition on vegetation (sacred grove, etc.)
- ✓ Salt deposition evident from saline taste of mist (deposited on foliage)
- ✓ Stunted growth of jasmine plants
- ✓ Chlorosis, necrosis and leaf burn (coconut, arecanut, banana, jackfruit, mango, and other vegetation)
- ✓ Reduced population of avifauna (dwindling peafowl population) indicator of enhanced pollution levels in the environment as birds are bioindicators.
- ✓ Skin rashes, lesions, nail deformation (Onychodystrophy) in humans (children as well as adults)
- ✓ Higher instances of coughing among local people (respiratory ailments such as asthma and bronchitis, impact of minute fly ash dust in mucus membrane in superior and inferior concha)
- ✓ Higher instances of miscarriage (livestock)
- ✓ Abandoned agriculture and horticulture fields
- ✓ Enhanced aggressive behaviour among humans due to psychological stress (which is more evident in TPP affected areas)
- ✓ Labour colony with poor basic amenities (sanitation, drinking water, etc.)
- ✓ Open defecation and contamination of nearby streams has led to mosquito breeding resulting in higher instances of malaria and chikungunya among the residents in and nearby labour colony.
- ✓ Higher instances of crime due to illegal drugs and liquor (labour colony)
- ✓ Indiscriminate disposal of solid waste – coal ash (fly ash and bottom ash)
- ✓ Non-functional slurry mixer (sluicer) near the ash pond
- ✓ Lack of scientific management of coal ash; direct dumping of dry ash to the ash pond
- ✓ Absence/poor liner in ash pond, contaminating nearby ground water sources and soil due to leaching from the ash pond
- ✓ Leaching from temporary confinement pond (TPP complex) and ash pond to nearby agriculture fields
- ✓ Indiscriminate disposal of polymer used for outer coating of GRP (Glass-fiber Reinforced Plastic) pipeline in the forest land.
- ✓ Collection of drinking water from faraway places (as ground water and surface water sources are contaminated)
- ✓ Insensitive TPP and district administration (provision of drinking water, maintenance of roads, health issues of local residents)
- ✓ Lack of adequate environment regulatory mechanism in the district.

- ✓ Poor post-project environment monitoring and non-compliance of environmental norms as per MoEF, GoI guidelines.
- ✓ Inadequate compliance of environment management plan suggested during environmental clearance.
- ✓ Absence of environment management cell at TPP for regular monitoring of environmental parameters related to air, water, soil, land and health (human, livestock).
- ✓ Arrogant behaviour of the security staff including TPP officials with the local people
- ✓ Implication of local people in false criminal cases by local police as well as district administration
- ✓ Deliberate weakening of local institutions (Gram Panchayats) and Civil Society Organizations
- ✓ Reduced fish yield in the ocean, higher instances of sea shore erosion where TPP effluents are discharged (liability to the district exchequer for TPPs misdeeds)
- ✓ Inadequate and inappropriate compensation to affected families
- ✓ Cascaded environmentally hazardous activities due to TPP (proposal for cement industry, etc.)
- ✓ Forced emigration of local people due to the prevailing adverse environmental conditions

II. **Water samples analysis** - ***Impacts due to contamination of water***

- Higher salinity in the water samples of wells in core zone (within 2 km)
- Saltiness, greenish coloration and oily layer in well water near to streams (carrying effluents discharged by TPP) at Nadsal (Tenka, western side of TPP)
- Skin rashes, lesions, nail deformation (Onychodystrophy),
- Skin itching in northern, southern and western sides, due to the contamination of stream water (consequent to effluent discharge)
- Changes in groundwater table (due to excess drawl of groundwater at TPP site)

III. ***Contamination of air environment***

- Transport (in open trucks) and dumping of dry coal ash
- Blackish particles settle on leaves, clothes kept for drying, objects inside home, food kept open, etc. in the core zone
- Salt deposits on leaves and roofing tiles in the core zone (deposits tasted salty)
- Corrosion of tin roofing sheets, agriculture implements, dish antennas, iron fencing, vehicle chassis, etc. in the core zone
- Drying of leaves and leaf burn associated with necrosis, chlorosis, etc
- Respiratory ailments like asthma, alveolar infections, bronchitis, etc
- Eye irritation and skin itching in south-eastern side closer to silos (where fly ash is stored).

IV. ***Impact on people's livelihood***

- Reduced paddy yield in the core zone (in the 2 km radius) – reduction by 57 to 66%
- Premature falling and reduced yield of areca and coconut
- Reduction in banana yield, plantain leaves
- Livelihood of weaker section of the society is threatened with poor or no flowering of jasmine, etc.
- Scarcity of water suitable for drinking and other domestic activities
- Forced displacement without appropriate rehabilitation of native forest dwellers
- Improper valuation of ecosystem goods and services while compensating the loss
- Harassment (of the affected residents complaining/agitating against pollution) by the district administration (police and civil)
- Non-payment of compensation to the local fishermen despite the direction of Chief Minister, Government of Karnataka, Meeting on 23rd Feb 2010 (Annexure XI)

V. ***Impact on livestock***

- Ailments related to skin, respiratory tract, etc.
- Miscarriages and decline in milk yield
- Fodder – due to uptake of heavy metal has become non-palatable
- Fodder – reduced grass productivity due to salt as well as ash dust deposition
- Non-palatable grasses, and other herbs due to contamination
- Poultry death due to consumption of effluent mixed stream water

VI. ***Impact on biodiversity***

- Reduced population of peafowl, foxes, wild boar, etc. within core zone.
- Disturbance in food chain due to reduced primary productivity and subsequent decline in species of fishes, crabs and frogs.
- Loss of snake habitat
- Removal of sacred groves and dilapidated state of existing groves
- Presence of pollution tolerant lichen species in the barks of vegetation closer to TPP further confirms pollution of air environment.
- Displacement of native human population

The impact of coal based TPP on water, land, air, vegetation, infrastructure, human health and livelihood, and livestock, their causes and required mitigation measures are summarised in Table i.

Table i: Field observations with causal factors and required mitigation measures

Impacts	**Causal factors**	**Required mitigation measures** (to be implemented by TPP with the regular monitoring of post project monitoring task force (appointed by the district administration involving all stakeholders' representatives))
WATER		
• Contamination of stream water	• Leakage from coal storage yard • Direct discharge of effluents • Discharge of coal mix water • Sustained seepage and frequent overflow from ash pond • Sewage from labour colony, open defecation in the vicinity of labour colony (the presence of feacal coliform bacteria in higher proportions further substantiates, mismanagement of sewage at TPP and also at labour colony). • Dumping of organic solid wastes	• Appropriate containment of coal and coal mix water by redesign of storage yard with drains and rainproof shelter • Proper impervious liner for ash pond • Treatment of effluents and only treated water to be let into surface water bodies (after passing through wetlands with native species of grass etc.) • Installation of sewage treatment • Segregation and treatment of solid wastes • Strengthen the regulatory mechanism at local levels with adequate and trained professionals
• Contamination of ground water	• Salinity intrusion ✓ Leakage from pipe ✓ Leakage of saline water due to improper storage • Deposition of salt on vegetation and subsequent discharge to soil with precipitation • Hydrocarbon inflow • Acidic salts like sulphates • Heavy metal leaching • Microbial contamination - Sewage from labour colony, open defecation in the vicinity of labour colony	• Avoiding supersaturated saline mist discharge from cooling towers • Leak proof salt tolerant pipe (water intake system) Proper storage of salt water, Remove salinity from water before use • Bioremediation of hydrocarbon based waste • FGDs and other desulphurization techniques (sulphur scrubber) for arresting sulphur • Treatment of coal mix water containing sulphates and heavy metals (bioremediation, ion exchange resins)
• Ground water table fluctuation	• Over exploitation of ground water	• Rainwater harvesting through surface water harvesting and reduced dependence on ground water at TPP • Implementation of Sujala Dhara programme to provide drinking water to the villages through the construction water storage tanks (with adequate safety and catchment conservation measures)
AIR		
• Salt deposition on leaves	• Supersaturated saline mist discharge from cooling towers	• Avoiding supersaturated saline mist discharge from cooling towers
• Ash dust	• Particulate matter dispersion • Transport of fly ash in open trucks • Dumping of dry ash in ash pond	• Install functional ESPs • Ash transport through closed conveyor belts • Alternate use of fly ash • Wet dumping of fly ash
• Un-burnt carbon particles	• Incomplete combustion of coal	• Improved thermal efficiency

• SOx, NOx emissions	• Improper air pollution control	• Install efficient FGDs and mechanism for deNOx
LAND		
• Mudslides, soil erosion	• Inappropriate land stabilization, soil management (exposed slopes) at TPP site	• Remediation through vegetation (grasses and shrubs as soil binders) • Slope stabilization through embankments
• Soil microbial contamination	• Open defecation (labour colony) • Discharge of effluents to streams • Discharge of labour colony sewage	• Provide appropriate sanitation facility • Treatment of effluents and sewage
• Salinity in soil	• Supersaturated saline mist discharge from cooling towers • Leakage from pipes – degradation of land, enhanced salinity has made soil unproductive and unfit for agriculture • Leakage of saline water due to improper storage • Deposition of salt on vegetation and subsequent discharge to soil with precipitation	• Avoiding supersaturated saline mist discharge from cooling towers • Leak proof salt tolerant pipe (water intake system) • Proper storage of salt water • Remove salinity from water before use • Scientific assessment of lands affected by salinity for restoring the land (fit for agriculture and sustain livelihood of people) • Beside the compensation for loss of crop for the particular year, it has to be extended till the salinity affected cropland are restored
• Degraded land	• Insufficient green cover	• At least 33% vegetation cover at the project site as per the environment norms of GoI and also as per the stipulations of environment clearance
VEGETATION		
• Leaf burning, drying of leaves	• Salt deposition on leaves • Salinity in subsoil root systems • Fly ash dust on leaves	• Avoiding supersaturated saline mist discharge from cooling towers • Leak proof salt tolerant pipe (water intake system) • Proper storage of salt water • Remove salinity from water before use
• Chlorosis and necrosis • Mottling and dwarfing • premature fall of coconut • non-flowering of jasmine • loss of Thulasi (*Ocimum sanctum*) • decrease in yield of paddy, banana, areca • reduced productivity of fodder crops (local grass, herbs)	• Phyto-toxicity due to salinity, SOx, NOx and heavy metals	• FGDs and other desulphurization techniques (sulphur scrubber) for arresting sulphur • Treatment of coal mix water containing sulphates and heavy metals (bioremediation, ion exchange resins)
• Particulate deposition on leaves	• Absence of multitier vegetation	• Plant appropriate saplings to mitigate dust and noise
INFRASTRUCTURE		
• Degradation of tin sheets, agriculture implements, vehicle	• Salt deposition and consequent corrosion • SOx	• Avoiding supersaturated saline mist discharge from cooling towers • FGDs and other desulphurization techniques

chassis, dish antenna, well pulleys, wire mesh of wells, transmission lines, railway tracks, fencing, roof tiles, • Flake formation in distemper for walls		(sulphur scrubber) for arresting sulphur
HUMAN HEALTH AND LIVELIHOOD		
• respiratory ailments like asthma, alveolar infections, bronchitis, etc. • eye irritation and skin itching Skin rashes, lesions, nail deformation (Onychodystrophy), • Digestive disorder	• Respirable suspended particulates • Leakage/discharge of hydrocarbon based substances • Contamination of surface/ground water bodies and soil from coal mix water due to fugitive dust suppression or rainfall run-off. Exposure of coal to air and water results in the oxidation of the pyrite to sulphate and sulphuric acid, causing acid mine drainage. • Contamination of water – SOx, heavy metals, • Faecal contamination • Allergenic responses	• Functional ESPs • FGDs and other desulphurization techniques (sulphur scrubber) for arresting sulphur • Avoiding supersaturated saline mist discharge from cooling towers • Bioremediation for heavy metals • Treatment of effluents and sewage • Using closed conveyor belts for transfer of fly ash • Wet disposal of ash • Multitier and well maintained green belt around the TPP as well as ash pond
• Conversion of water tanks (constructed under Sujaladhara programme for supplying drinking water to nearby villages – Santhur). • Livelihood of weaker section of the society is threatened with poor or no flowering of jasmine, plantain leaves, thulasi, etc. • Reduced yield of agricultural (paddy, etc.) and horticultural (Areca, coconut, cashew, tamarind, Guava, etc.) crops • Scarcity of water suitable for drinking and other domestic activities • Forced displacement without appropriate rehabilitation of native forest dwellers • Improper valuation of ecosystem goods and services while compensating the loss	• Conversion of water tank/pond to ash pond, depriving local people of their basic need – clean drinking water • Phyto-toxicity • Effluent contaminating water sources • Indifferent attitude/apathy of TPP officials towards local people • Inhuman district authorities (forced eviction of local inhabitants during high monsoon at midnight) and insensitive to environment contamination complaints.	• Restore/ construct water pond/tank with adequate safety measures to provide drinking water to the villages • FGDs and other desulphurization techniques (sulphur scrubber) for arresting sulphur • Treatment of coal mix water containing sulphates and heavy metals (bioremediation, ion exchange resins) • Avoiding supersaturated saline mist discharge from cooling towers • Sensitise district authorities (including DC) of environmental ethics, valuation of ecosystem services and goods • Issue of CFO (Consent for continued operation) by regulatory authorities only on compliance of environmental norms • Environmental Management Cell (EMC) with qualified environmental professionals for regular monitoring and environmental auditing • Capacity building of the district administration of India's environmental legislations pertaining to air, water, environment, forest dwellers rights, fundamental rights of the citizens, Biodiversity act, MSW rule, etc. • Strengthen the regulatory mechanism at local levels with adequate and trained professionals

LIVESTOCK		
• Ailments related to skin, respiratory tract, etc. • Miscarriages and decline in milk yield • Fodder – due to uptake of heavy metal has become non-palatable • Fodder – reduced grass productivity due to salt as well as ash dust deposition • Non-palatable grasses, and other herbs due to contamination • poultry death due to consumption of effluent mixed stream waters	• Respirable suspended particulates • Leakage/discharge of hydrocarbon based substances • Contamination of surface/ground water bodies and soil from coal mix water due to fugitive dust suppression or rainfall run-off. Exposure of coal to air and water results in the oxidation of the pyrite to sulphate and sulphuric acid, causing acid mine drainage. • Contamination of water – SOx, heavy metals, • Phyto-toxicity • Effluent contaminating water sources	• Avoiding supersaturated saline mist discharge from cooling towers • Bioremediation for heavy metals • Treatment of effluents and sewage • Functional ESPs • FGDs and other desulphurization techniques (sulphur scrubber) for arresting sulphur • Using closed conveyor belts for transfer of fly ash • Wet disposal of ash • Multitier and well maintained green belt around the TPP as well as ash pond

The act of contaminating air, water and soil impinges on the fundamental rights of local population for clean air and water. Water act of 1974 emphasizes the polluter pays principle and as per the provision of Water Act of Government of India the polluter is to be penalized and action has to be taken as per the prevailing law of the land for contaminating vital natural resources. As per the Environment Act of GoI, TPP and district administration (including regulatory authorities) are required to:

- comply with the norms stipulated by MoEF while granting environmental clearance;
- set up an environmental cell for regular monitoring of air, water, land and social elements (humans and livestock);
- ensure clean water for drinking and irrigation. The quality of the water shall be as per the stipulated guidelines (BIS 10500, NEERI);
- conduct mandatory monthly environmental auditing to ensure compliance of the environmental norms as per the stipulations;
- conduct mandatory third party auditing outsourced to a reputed institution with adequate technical and scientific capability;
- ensure air quality management through mitigation of emission by installation of functioning gadgets (ESP, FGD, NOx burners, etc.). Contaminations in the air, soil and water environment is mainly due to non-functional environmental gadgets - even simple gadgets such as slurry mixer is non-functional;
- stop supersaturated saline mist discharge from the cooling tower;
- refurbish current ash pond with impervious liners and proper mix of fly ash with water to prevent its dispersion in the air;
- create a green belt in the immediate vicinity with a multitier vegetation which has higher tolerance to dust and other contaminants. Setting up residential quarters for TPP officers

(including CEO's) in the immediate vicinity would also ensure sustained maintenance of the region's air and water integrity;

- provide alternate livelihood for affected people (jasmine growers, arecanut and coconut plantations, paddy cultivators, etc.);
- supply of treated water to all residents in the affected villages (without any discrimination);
- management and regular maintenance of the roads to ensure better infrastructure in the region;
- transport of ash only through closed containers via conveyors to prevent spillage and dispersion through wind;
- coal storage yard with impervious liners and adequate drainage apart from protection from incessant high precipitation;
- Restoring connectivity of the natural drains while ensuring zero effluent discharge;
- Scientific evaluation of agriculture lands (affected by salinity, etc.) by an independent competent authority and ensure the implementation of recommendations to enhance the soil productivity;
- Compensation to be provided to all affected families (till lands are restored as per scientific committee recommendations and restoration of crop productivities comparable to the earlier years – before commissioning of TPP);
- Establishment needs to shed colonial style of functioning and address social and environmental issues on priority;
- Need to adopt appropriate latest machineries (than outdated refurbished machineries) to minimize pollution.

> ***"Few people realize that the 21st century is going to be the century of the environment. Technological change in this century is going to be heavily driven by the environmental imperative. Any nation that forgets to invest in environmental science and technology will only do so at its own peril - its economy and the lives and health of its people. Human technologies will be forced to mimic nature's cycles and gentleness. Else they will threaten the very survival of the human race." - Anil Agarwal, Founder - Centre for Science and Environment***

Legal framework: Table ii lists the environmental issues and the violations. Consistent sustained environmental violations are evident from the prevailing health conditions (biotic and also abiotic components of the ecosystem/region). It is painful to any sensible citizen of India to see the indifferent attitude of the district administration not taking firm action against the polluters but adopting hostile approach towards the public.

Table ii: **Environmental issues with violations of the legislations of GoI** applicable to all regions, of federal states in India

Environmental issues at Yellur	**Violation of the environmental laws and regulations**
Supersaturated saline mist discharged from cooling towers of the TPP into the atmosphere and consequent deposition in vicinity, resulting in reduced crop productivity, stunted vegetation growth, corrosion of metal utilities, increased salinity of soil and water, loss of livelihood, etc.	• Constitution of India - Article 21 –Right to life (Judicial interpretation of Article 21 - Protection of life and personal liberty) "No person shall be deprived of his life or personal liberty except according to procedure established by law." (Right to live with pollution free water and air for full enjoyment of life', health, environment, housing etc has emerged as an inherent and implied right through judicial interpretation) • Constitution of India, Recommended as Articles 30 C, 30 D - Fundamental right to safe drinking water, clean environment etc (third generation rights) • Environment Protection Act 1986, Chapter 3 "No person carrying on any industry, operation or process shall discharge or emit or permit to be discharged or emitted any environmental pollutants in excess of such standards as may be prescribed.." • Section 22 of the Air Act, 1981 - *Discharging or causing or permitting to be discharged the emission of any air pollutant in excess of the standards laid down by the State Board* • Section 24 and 43 of the Water Act, 1972 - *Prohibition on use of stream or well for disposal of polluting matter and penalty for contravention thereof* "No person shall knowingly cause or permit any poisonous, noxious or polluting mater as determined by the State Board to enter into any stream or sewer or on land; or No person shall knowingly cause or permit to enter any other matter which may impede the flow of water of the stream in a manner leading or may likely to lead to a substantial aggravation of pollution due to other causes or of its consequences. Imprisonment … and with fine." • Section 25/26 of the Water Act, 1972 "…no industry or process can discharge sewage or trade effluent into a stream or well or sewer or land in excess of the standards & without the consent of the Board …punishable with imprisonment ..." • Non-compliance of stipulations of environmental clearance by MoEF • Punishable as per Polluter Pays Principle* and also Indian criminal code
Discharge of effluents from TPP and ash pond including hazardous wastes to nearby natural streams resulting in contamination of surface and ground water bodies, unavailability of potable water, contamination of soil, skin diseases in humans, etc.	• Constitution of India - Article 21 –Right to life (Judicial interpretation of Article 21 - Protection of life and personal liberty) • Constitution of India, Recommended as Articles 30 C, 30 D - Fundamental right to safe drinking water, clean environment etc (third generation rights)Constitution of India, Directive Principle – Right to health • Environment Protection Act 1986, Chapter 3

	• Section 24 and 43 of Water Act, 1972 - *Prohibition on use of stream or well for disposal of polluting matter and penalty for contravention thereof* • Section 25/26 of the Water Act, 1972 • Hazardous Wastes (Management and Handling) Rules, 1989 *Responsibility of occupier for handling of wastes* "The occupier generating hazardous wastes ..... shall take all practical steps to ensure that such wastes are properly handled and disposed of without any adverse effects which may result from such wastes and the occupier shall also be responsible for proper collection, reception, treatment, storage and disposal of these wastes either himself or through the operator of a facility....." *Packaging labeling and transport of hazardous wastes* "(1) Before hazardous wastes is delivered at the hazardous waste site, the occupier or operator of a facility shall ensure that the hazardous wastes is packaged in a manner suitable for storage and transport and the labelling and packaging shall be easily visible and be able to withstand physical conditions and climate factors. (2) Packaging, labelling and transport of hazardous wastes shall be in accordance with the provisions of the rules issued by the Central Government under the Motor Vehicles Act, 1988 and other guidelines issued from time to time." • Non-compliance of stipulations of environmental clearance by MoEF • Punishable as per Polluter Pays Principle* and also Indian criminal code
Leakage of salt water intake pipeline and contamination of nearby water bodies and land resulting in increased salinity in unavailability of potable water, reduced paddy productivity	• Constitution of India - Article 21 –Right to life (Judicial interpretation of Article 21 - Protection of life and personal liberty) • Constitution of India, Recommended as Articles 30 C, 30 D - Fundamental right to safe drinking water, clean environment etc. (third generation rights) • Hazardous Wastes (Management and Handling) Rules, 1989 • Punishable as per Polluter Pays Principle* and also Indian criminal code
Inconsiderate disposal of plastic coating from GRP pipeline and contamination of soil resulting in deterioration of soil quality and possibility of leaching to nearby water bodies	• Constitution of India - Article 21 –Right to life (Judicial interpretation of Article 21 - Protection of life and personal liberty) • Constitution of India, Recommended as Articles 30 C, 30 D - Fundamental right to safe drinking water, clean environment etc. (third generation rights) • Hazardous Wastes (Management and Handling) Rules, 1989 • Punishable as per Polluter Pays Principle* and

	also Indian criminal code
Inadequate green cover around TPP and ash pond	• Environment policy 2006 • Non-compliance of stipulations of environmental clearance by MoEF
Mismanagement of coal ash (open transport) and ash pond (improper liner resulting in leaching to nearby water bodies, dry disposal resulting in dispersion of fugitive dust particles in the vicinity, discharge of ash mixed water to nearby stream)	• Constitution of India - Article 21 –Right to life (Judicial interpretation of Article 21 - Protection of life and personal liberty) • Constitution of India, Recommended as Articles 30 C, 30 D - Fundamental right to safe drinking water, clean environment etc. (third generation rights) • Environment Protection Act 1986, Chapter 3 • Section 24 and 43 of Water Act, 1972 - *Prohibition on use of stream or well for disposal of polluting matter and penalty for contravention thereof* • Section 25/26 of the Water Act, 1972 • Section 22 of the Air Act, 1981 - *Discharging or causing or permitting to be discharged the emission of any air pollutant in excess of the standards laid down by the State Board* • Hazardous Wastes (Management and Handling) Rules, 1989 • Non-compliance of stipulations of environmental clearance • Punishable as per Polluter Pays Principle* and also Indian criminal code
Destruction of scared groves (nagabana, village forest) during construction of TPP	• Indian Forest Act, 1927 – Chapter 3 and 4 • Forest Conservation Act 1980 – Section 2 • Biological Diversity Act, 2002 • Wildlife Protection (Amendment) Act, 2002 – Section 36 and 36c – Declaration and management of community reserve
Fluctuations in ground water levels in the vicinity of TPP	• Water Cess Act, 1977, Requiring specified industries to pay cess on their water consumption
Reduction in crop productivity (agriculture, horticulture) due to phytotoxicity and emissions from coal burning	• Section 22 of the Air Act, 1981 - *Discharging or causing or permitting to be discharged the emission of any air pollutant in excess of the standards laid down by the State Board* • Punishable as per Polluter Pays Principle* and also Indian criminal code
Impact on livelihood of tribal community growing jasmine flowers	• Tribal act • Forest dwellers act 2006
Mismanagement of solid waste	• Violation of MSW rule

Sewage contamination	• Violation of water Act 1981
Removal of sacred groves, loss of biodiversity, - flora and fauna	• Punishable as per provisions of the Indian Forests Act, 1927 (16 of 1927) and Forest (Conservation) Act, 1980 (69 of 1980) the Wildlife (Protection) Act, 1972 (53 of 1972) and also Biological diversity act 2002.

***Polluter Pays Principle (PPP)**

Customary international laws:

OECD Joint Working Party on Agriculture and Environment, 2001

"... the polluter should be held responsible for environmental damage caused and bear the expenses of carrying out pollution prevention measures or paying for damaging the state of the environment where the consumptive or productive activities causing the environmental damage are not covered by property rights."

Judiciary in India recognizes the PPP

Judgments delivered by the Supreme Court of India on various cases further substantiates the environmental consciousness of the Judiciary and also rich legislations in India, which unfortunately not being implemented due to laxity of government officials and regulatory agencies.

- "The enterprise must be held to be under an obligation to provide that the hazardous or inherently dangerous activity in which it is engaged must be conducted with the highest standards of safety and if any harm results on account of such activity, the enterprise must be absolutely liable to compensate for such harm, and it should be no answer to the enterprise to say that it had taken all reasonable care and that the harm occurred without any negligence on its part .If the enterprise is permitted to carry on an hazardous or inherently dangerous activity for its profit, the law must presume that such permission is conditional on the enterprise absorbing the cost of any accident arising on account of such hazardous or inherently dangerous activity as an appropriate item of its overheads. Such hazardous or inherently dangerous activity for private profit can be tolerated only on condition that the enterprise engaged in such hazardous or inherently dangerous activity indemnifies all those who suffer on account of the carrying on of such hazardous or inherently dangerous activity regardless of whether it is carried on carefully or not. This principle is also sustainable on the ground that the enterprise alone has the resource to discover and guard against hazards or dangers and to provide warning against potential hazards."
- "The Polluter Pays Principle means that absolute liability of harm to the environment extends not only to compensate the victims of pollution, but also to the cost of restoring environmental degradation. Remediation of damaged environment is part of the process of sustainable development"
- "Where an enterprise is engaged in a hazardous or inherently dangerous activity and causes harm to any one on account of an accident, the enterprise is strictly and absolutely liable to

compensate all those who are affected by the accident and such liability is not subject to any of the exceptions as laid down in tortuous principles of strict liability…"

- "The 'Polluter Pays' principle demands that the financial costs of preventing or remedying damage caused by pollution should lie with the undertakings which cause the pollution, or produce the goods which cause the pollution, Under the principle it is not the role of Government, to meet the costs involved in either prevention of such damage, or in carrying out remedial action, because the effect of this would be to shift the financial burden of the pollution incident to the taxpayer."
- "The 'Polluter Pays Principle' as interpreted by this Court means that the absolute liability for harm to the environment extends not only to compensate the victims of pollution but also the cost of restoring the environmental degradation. Remediation of the damaged environment is part of the process of 'Sustainable Development' and as such the polluter is liable to pay the cost to the individual sufferers as well as the cost reversing the damaged ecology."
- "We are however, of the view that "The Precautionary Principle" and "The Polluter Pays Principle" is essential features of "Sustainable Development." The "Precautionary Principle" – in the context of the law – means:(a) Where there are threats of serious and irreversible damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. (b) The "onus of proof" is on the actor or the developer/industrialist to show that his action is/was environmentally benign. (c) We have no hesitation in holding that the precautionary principle and the Polluter Pays Principle are part of the Environmental Law of the Country."

ENVIRONMENTAL PROFILE AND PEOPLE'S LIVELIHOOD ASPECTS IN THE VICINITY OF COAL BASED THERMAL POWER PLANT AT YELLUR PANCHAYAT, UDUPI DISTRICT

2.0 INTRODUCTION

Environmental status of a region is determined by assessing the prevailing environmental conditions apart from ecological entities and their interaction. It represents the overall health and sensitivity of an ecosystem. Environmental status/profile assessment becomes essential for arriving at appropriate management strategies while ensuring the sustainability of natural resources. The environment profile assessment is done by evaluating the physical, chemical and biological components along with its functional abilities of an ecosystem. This includes the assessment of threats due to anthropogenic activities (like mining, dam construction, making of road or railway lines, spread of gas pipelines, building of an industry) which may alter the physical, chemical and biological integrity of the system. An attempt has been made to assess the environmental status of Yellur Panchayat and nearby villages as there have been changes in the local environment with the setting up of a power station for electricity generation using coal.

India with a population of 1.21 billion has an installed electricity generating capacity of 181 GW (as on 31st august 2011) shared by the state (45.88%), central (31.15%) and private (22.95%) sectors. Coal is the dominant fuel with 99.50 GW installed capacity, followed by other sources like hydro (38.20 GW), renewable sources (~20 GW), gas (18GW), nuclear (4.78GW) and oil (1.19 GW). Total electricity generation in the country is about 811 Billion Units (BU) [1]. The national average of Transmission and Distribution (T&D) losses is about 27 % and energy deficit is nearly 10% [2]. The high losses and widening deficit suggest a paradigm shift towards energy efficiency practices.

Energy planning in India continues to be disintegrated in approach and supply sided evident from the push for large scale power projects. However, indigenous coal resources are unable to supplement the increasing energy demands due to fast depleting coal stocks. The government through congenial policy interventions has encouraged private players into large scale thermal power projects based on imported coal, ignoring the potential of clean and renewable sources of energy like solar, wind, biomass, geothermal, etc. that could be exploited and strategically integrated with the existing power grid or utilized off-grid. Also improvements in end-use energy efficiency through energy-efficient devices for lighting, heating etc. would further scale down the dependence on large power projects. This necessitates decentralized energy planning considering the regional energy demands, scope for energy conservation apart from the scope for location specific renewable energy sources[3,4].

Conventional generation of electricity from fossil fuel based sources like coal results in serious environmental problems (pollution of air, water and land) with far reaching local and global implications (global warming, climate change). Higher greenhouse gas (GHG) emissions are the drivers of global warming and resultant climatic changes.

2.1 Electricity in Karnataka:

The state of Karnataka with the population of 61.12 million (as per 2011 census) meets its electricity requirements through the state, central or private operated hydro, thermal, renewable and nuclear units. These are supervised by the Karnataka Power Corporation Limited (KPCL) under the administrative control of Energy Department, Government of Karnataka (GoK). As part of its power sector reforms, the Karnataka Electricity Board (KEB) was dissolved into the T&D wing called Karnataka Power Transmission Corporation Limited (KPTCL) in 1999 followed by the formation of Karnataka Electricity Regulatory Commission (KERC). The KPTCL was unbundled into the following distribution companies [5]:

- Bangalore Electricity Supply Company Limited (BESCOM)
- Mangalore Electricity Supply Company Limited (MESCOM)
- Hubli Electricity Supply Company Limited (HESCOM)
- Gulbarga Electricity Supply Company Limited (GESCOM)
- Chamundeshwari Electricity Supply Corporation Limited (CESCO)
- Karnataka Renewable Energy Development Limited (KREDL)

The installed capacity of electricity generation has doubled over the decades, (Figure 1). As of June 2011, the state had an installed capacity of 11.45 GW compared to 2.67 GW in 1990. The share of hydro, thermal (coal, diesel, gas), nuclear and renewable (wind, cogeneration, biomass, solar) sources in the total installed capacity of the state is presented in Figure 2. It can be seen that hydro has the highest share (32%) followed by thermal (27%), wind (15%) and cogeneration (14%). Thermal share in the state increased from 420 MW in 1990 to 3057 MW in 2011 [5].

Figure 1: Growth of installed electricity capacity in Karnataka [IMEI]

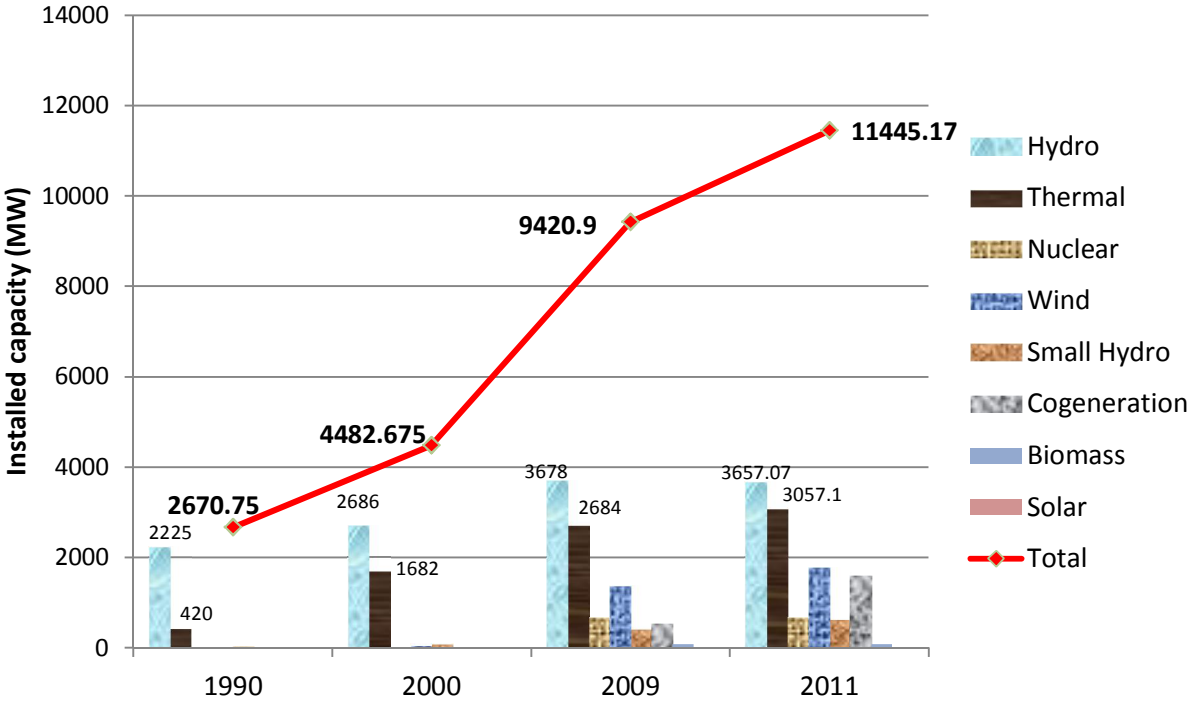
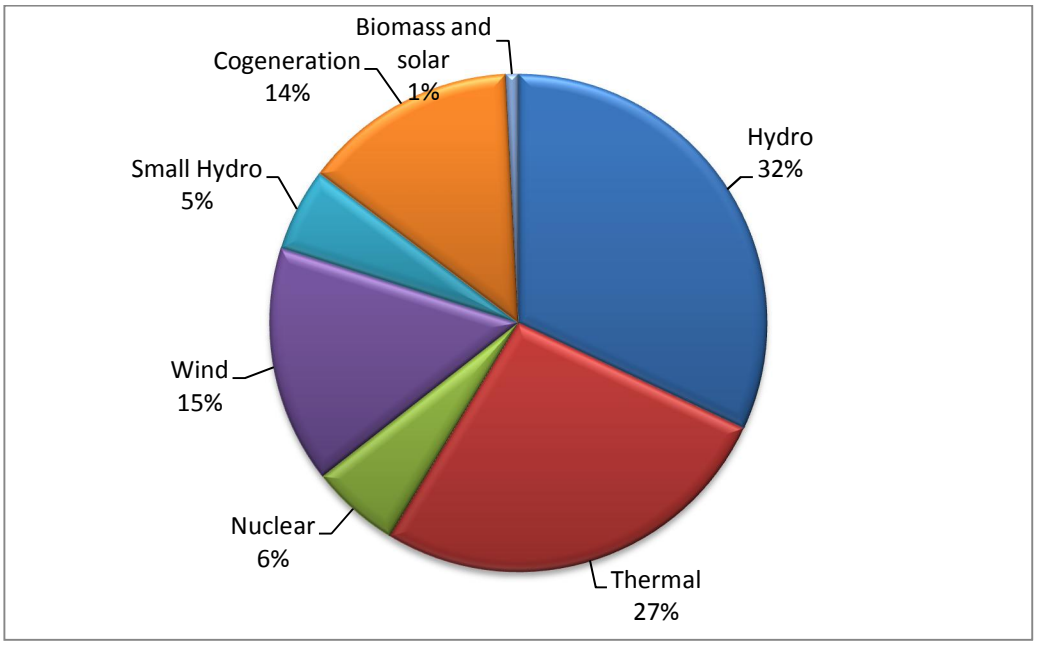


Figure 2: Share of different energy sources in installed electricity capacity [IEMI]



Karnataka has T&D lines of over 638890 circuit kilometers within the state which is nearly 9% of the national installation. The T&D losses are recorded at 18.9% (national average of 27.2%). However, the average Aggregate Technical and Commercial (AT&C) losses is 33.57% and average collection efficiency is 84.33% for the T&D companies viz. MESCOM, HESCOM, GESCOM, CHESCOM and BESCOM (Figure 3). The national averages of AT&C losses and collection efficiencies are 30.93% and 93.20% respectively. This underscores the fact that efficiency improvement continue to be of low priority in the state. Due to losses of the order of 12288 MU annually, the net electric energy generated and energy realized vary enormously as seen in Figure 4 [5].

Figure 3: Losses incurred during transmission and distribution in Karnataka, 2008 [2]

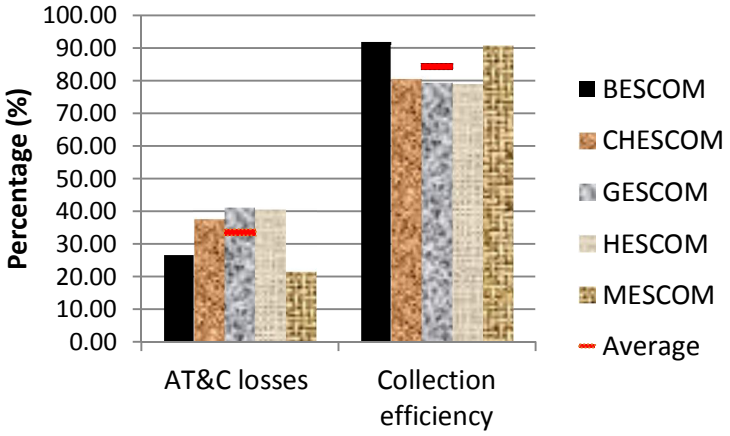
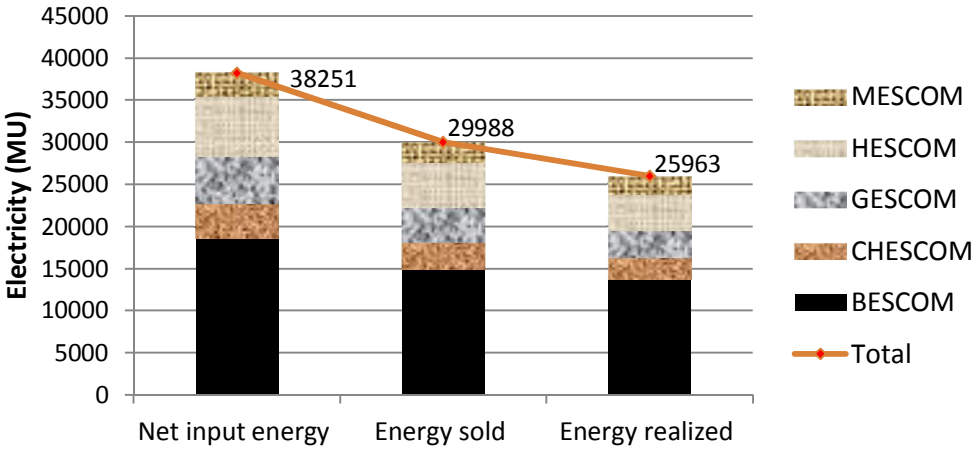


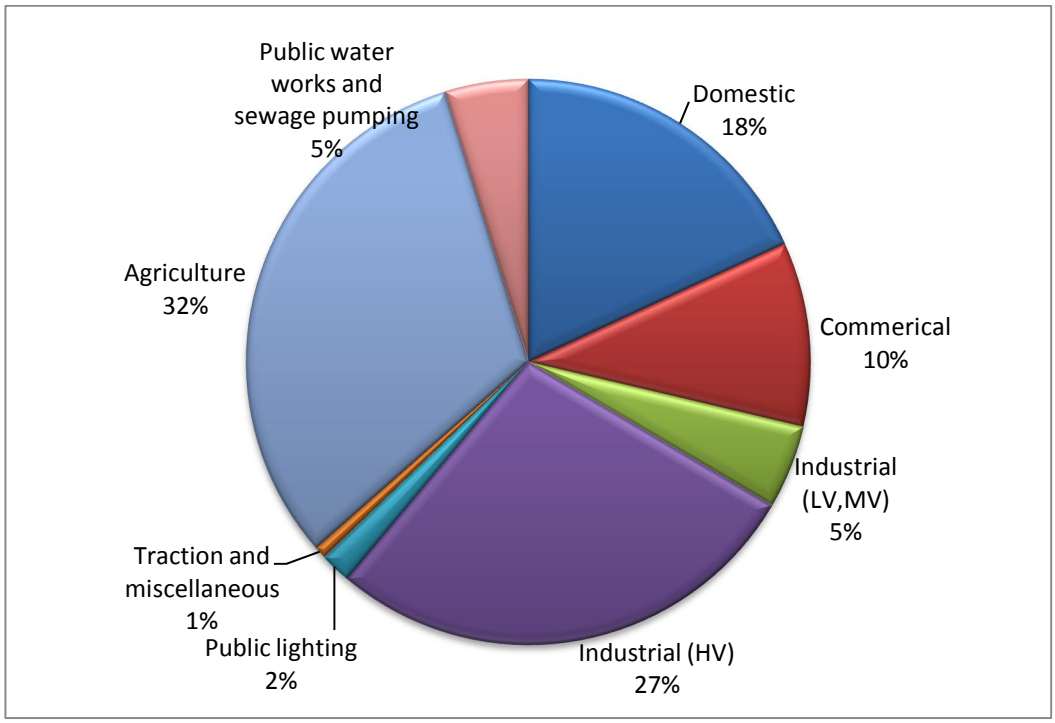
Figure 4: Electricity transmission and distribution through T&D companies in Karnataka, 2008 [2]



Agricultural sector is one of the major consumer of electricity (32%) in the state followed by high voltage industrial (28%), domestic (18%), commercial (10%) and the remaining sectors (Figure 5). The Energy Department of GoK records an energy deficit of 7.60% and peak deficit of 7.30%. These deficits could be encouragingly minimized if efficiency improvement programmes are effectively directed to bring down the load. The per capita annual electricity availability is about 903 kWh. There are a total of 24395 villages in the state of which 61 are yet

to be electrified despite intensive electrification move through the Rajiv Gandhi Grameen Vidyuthikaran Yojana (RGGVY) programme during the last decade [http://recindia.nic.in/].

Figure 5: Electricity sales to ultimate consumer utilities in Karnataka, 2008[2]



2.2 Further capacity addition in Karnataka

The GoK has unfortunately adopted supply augmentation path evident from the push for 13375 MW of capacity addition through the state, central and private sectors by 2016. The highest capacity addition is implemented through the state owned KPCL followed by National Thermal Power Corporation (NTPC), Individual Power Providers (IPPs) and Renewable Energy (RE) developers. Of the total proposed and ongoing projects, coal based thermal power plants (KPCL, NTPC and IPPs) share is11100 MW. This accounts to 83% (coal based) compared to hydro, gas and renewables (Tables 1, 2, 3). Moreover, the state has an assured share of 4064 MW in ongoing and proposed central generating stations to be operational latest by 2020, which are primarily coal based (Table 4). This mode of coal based capacity addition will have ramifications to the 1) environment - due to increased pollution levels and related issues and 2) economy - due to exhausting domestic coal reserves and increased dependence on imported coal.

Renewable Energy Policy (2009-2014) of the state targets a capacity addition of 4.3 GW through renewable sources with an investment of INR 23890 crores (by 2014). Wind power generation has the highest share in total installed renewable energy capacity and an addition of 2.9 GW has been targeted (2014). The Karnataka Solar Energy Policy (2011-2016) for promotion of grid-connected solar projects targets 126 MW addition based on solar photovoltaic (PV)/thermal

technology. Karnataka Renewable Energy Development Limited (KREDL) is promoting urban and rural electrification through renewable technologies. Solar PV plants in Kolar, Belgaum and Raichur (3MW each) are already commissioned in the state. Also, 88 MW of total biomass based electricity is installed in the state. Karnataka has enormous solar (global horizontal radiation 5.41-6.02 kWh/m^2/day), wind (16499 MW), biomass (1122.9 MW) and small hydro resource potential for electricity generation. Moreover, with advancement in energy conversion technologies, the prospects of renewable energy based electrification are vast. In spite of the potential and prospects of renewable energy, continued dependence on coal for meeting electricity needs of the state is lamentable [6, 7, 8, 9, 10].

Table 1: Ongoing and proposed power projects[5]

Projects taken up by	Capacity MW
Karnataka Power Corporation Limited (State)	6675
National Thermal Power Corporation (Central)	4000
Independent Power Providers (Private)	1900
Renewable Energy Developers (State, Private)	800
Total	13375

Table 2: Projects under KPCL [5]

Project Description	Capacity MW	Target
Coal based ongoing projects		
BTPS U-2	500	2011
Yeramarus	1600	2014
Edlapura	800	2014
BTPS U-3	700	2014
Chattisgharh	1600	2015-16
Hydro based proposed projects		
Munirabad	10	2013
Gundia	400	2015
Ghataprabha	20	2015
Shivanasamudram	345	2015
Gas based proposed projects		
Bidadi	1400	2014
Tadadi	2100	2015

Table 3: New projects by Central and IPPs [5]

Projects	Capacity MW	Target
UPCL U-2 coal based ongoing IPP project	600	2012
Kudgi - NTPC coal based ongoing project	4000	2015-16
Jewargi Coal based proposed IPP project	1300	2015-16

Table 4: On-going and proposed central generation stations where Karnataka has share[5]

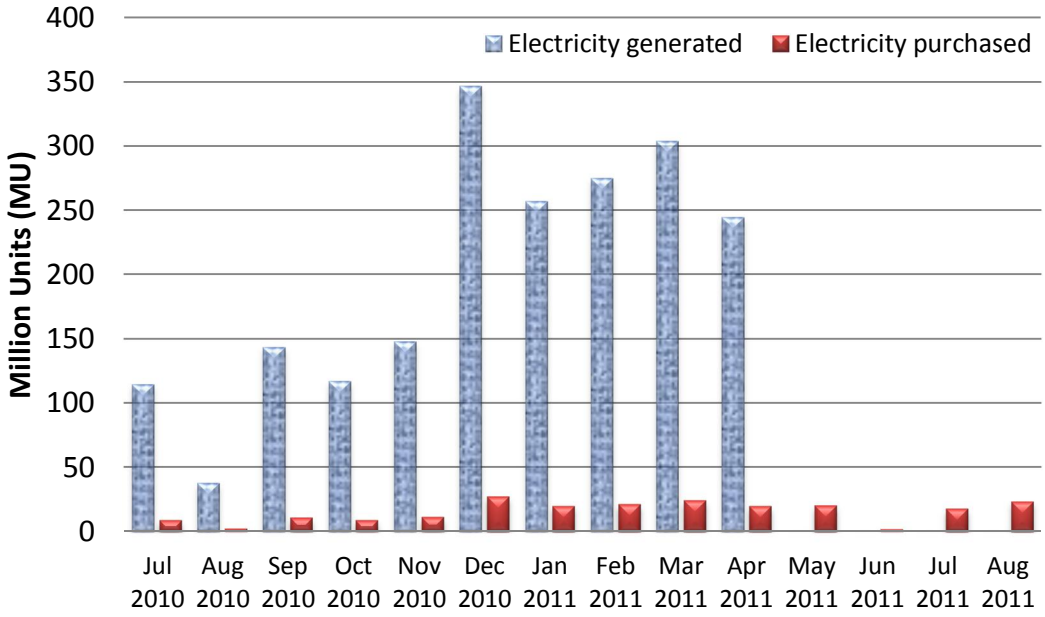
Project Name	Installed Capacity MW	State Share MW	Status	Proposed date of operation
Simhadri Stage-II, Unit-1 & Unit-2(2X500)	1000	176	On going	I Unit Synchronized with Grid on 2nd April 2011, SCOD is July 2011: II Unit : Janauray2012
NLC Extension Unit-1 and Unit-2 (2X250)	500	110	On going	I Unit : July 2011, II Unit: March:2012
Kudankulam Unit-1and Unit-2(2X1000)	2000	442	On going	I Unit : June 2011: II Unit: March-2012
Vallur Unit-1, 2 and 3 (3X500)	1500	111	On going	I Unit: October 2011, II Unit: January 2012, III December-2012
Tuticorin Unit-1 and Unit-2 (2X500)	1000	158	On going	I Unit: August 2012 and II Unit: October 2012
Nyveli (Unit-1 & Unit-2) (2X500)	1000	71	Proposed	2014-15
Sirkali Unit-1, 2 and 3 (3X660)	1980	369	Proposed	2015-17
Kudgi Unit-1 to 5 (5X 800)	4000	2000	Proposed	2015-18
Pudimadaka Unit-1 to 5 (5X 800)	4000	600	Proposed	2017-20
Total	16980	4064		

2.3 Electricity in Udupi district

Agricultural, industrial, domestic and commercial sectors are the major consumers of electricity in Udupi district which is distributed by MESCOM (that also caters to the districts of Shimoga, Chikmagalur and Dakshina Kannada). The RGGVY programme under GoI is considering 248 already electrified villages in Udupi district (50 in Karkal, 99 in Kundapur and 99 in Udupi taluks) for intensive electrification. The district has 437 factories, 8310 small scale industries and Padubidri Industrial Area.

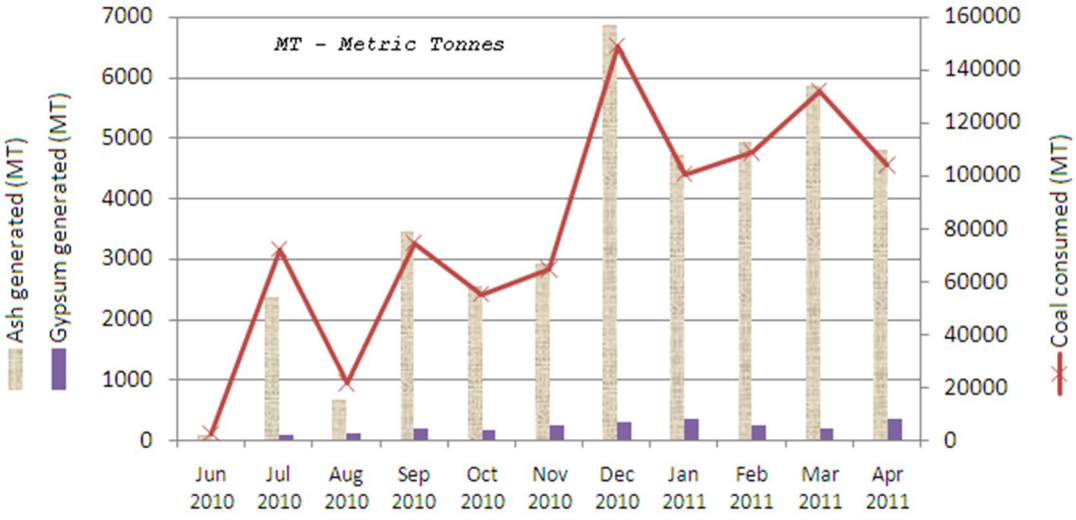
A 600 MW coal based Thermal Power Plant (TPP) was installed in Yellur village of Udupi taluk despite the serious environment concerns raised by the local people and energy experts. This plant is operated by Udupi Power Corporation Limited (UPCL) since July 2010, which sells electricity to the Mangalore Electricity Supply Company (MESCOM). As per UPCL reports, the rate of coal consumption is 0.407 kg/kWh, boiler efficiency is 87%, consumption of coal is 3.421 Mt per year at 80% PLF and generation of electricity is about 7008 kWh per kW. Figure 6 shows the month wise electricity purchased by MESCOM from July 2010 to July 2011 at its share of 8.33% from the TPP. UPCL claims to have synchronised with the state grid for electricity distribution. Figure 6 reflects the share of electricity purchased by MESCOM. The coal consumption per unit (kWh) of electricity generated ranges from 0.349 to 0.628 kg. Also, the quantity of fly ash generated to unit amount of coal consumed ranges from 0.0314 to 0.0462 (Figure 7).

Figure 6: Monthly electricity purchased by MESCOM from the TPP



Note: Electricity generation data from May to August 2011 are not available

Figure 7: Monthly coal consumed, ash generated and gypsum (FGD) generated from the TPP



2.4 Coal-based electricity generation

Electricity generation in the country is predominately coal based and the following sections discuss feedstock, technology as well as the possible environmental impacts.

Coal as a feedstock: Coal is a sedimentary rock containing combustible organic matter in the form of macerals (dehydrogenated plant fragments) as well as inorganic matter formed millions of years ago from plant materials decomposed aerobically and later metamorphosed under anaerobic conditions at high temperature and pressure. Proven reserves of coal are economically recoverable using existing technology and forms less than 10% of the global estimated reserves. Based on nature of plant/mineral materials and conditions of formation; peat, lignite, sub-bituminous, bituminous and anthracite varieties of coals are found. 'Type' refers to the coal's composition, the origin of the organic portion, and its organic components. 'Rank' rates the maturity of coal by the degree of metamorphism they have undergone. It correlates generally with carbon content and heat content of the coal. Lignite has the least and anthracite has the highest ranks. 'Grade' gives the quality or suitability of coal for a particular purpose.

The geological coal reserves in India are estimated at 276.81 billion tonnes (upto a depth of 1200 m and seam thickness of above 0.9 m), of which proven reserves are only 40%. These are mostly of anthracite, sub-bituminous, bituminous and lignite types. According to the Integrated Energy Policy Report (IEPR) of the Government of India (GoI), the extractable reserves are speculated to last only for another 40-50 years. The percentage composition of Indian coal is given in Table 5 [11]

Table 5: Constituents of Indian coal, based on samples from 30 TPPs

Constituent	Percent
Carbon	38–60
Volatile matter	1–36
Water	3–43
Silicon oxide	45–63
Aluminum oxide	15–36
Iron oxides	2–20
Calcium oxide	Trace–12
Magnesium oxide	Trace–5
Ash	3–60
Sulphur	0.3–8.3
Phosphorus	<0.5

The Gross Calorific Value (GCV) of different grades of Indian coals ranges from 1330 - 6200 kcal/kg (Table 6). Good quality coal with high GCV is used for metallurgical industries and the lower quality ones (almost 78% of the total) are used for electricity generation. The current demand for Indian coal is above 700 million tonnes (mt) per annum, and the gap in supply is met through imports from Indonesia, Australia and South Africa. Also, these imported coals are of higher quality in comparison to Indian coals (Table 7). **However 'mineral nationalism' advocated by many countries in recent times would certainly affect the coal imports and hence power generation in India (with too much dependence on coal)**.

Table 6: Grades of Indian coal and their Gross Calorific Value (GCV)

Grade	GCV (kcal/kg)
A	Exceeding 6200
B	5600 – 6200
C	4940 – 5600
D	4200 – 4940
E	3360 – 4200
F	2400 – 3360
G	1300 – 2400

Table 7: Comparison of domestic and imported coals [Properties of coal]

Coal	Average GCV (kcal/kg)	Moisture	Ash	Volatile matter	Fixed Carbon
Indian Coal	4,000	5.98	38.63	20.7	34.69
Indonesian Coal	5,500	9.43	13.99	29.79	46.79
South African Coal	6,000	8.5	17	23.28	51.22

Coal ash: The inorganic matters in the form of minerals ranging from 2-40% for different varieties of coals are considered as impurities. The major mineral matters include alumino silicate clays, silica, carbonates of calcium, magnesium or iron and sulphides among other traces [12]. All elements in coal excluding carbon, hydrogen, nitrogen, oxygen and sulphur contribute to formation of coal ash which is a mixture of oxides (silica SiO_2, alumina Al_2O_3 and magnetite Fe_2O_3), hydroxides, carbonates, silicates and sulphates of calcium, iron, aluminum and other metals in trace amount[13]. Indian coal has very high ash content. The MoEF through its notification in 1999 mandates the coal-based TPPs for proper and timely utilization of fly ash generated. Indian TPPs generated over 116 million tonnes (Mt) of fly ash in 2008/09, and is projected to increase to 170 Mt by 2012. Cement sector consumed 42.5%, while 16.4% was used for construction (road/embankments/dykes) and 12.3% for land reclamation [2]. However, mismanagement of coal ash results in environmental issues, which is discussed in Annexure I.

Coal-based thermal power technology: Raw coal containing impurities undergo beneficiation, wherein coal is reduced in size through breaking (>75 mm), crushing (<75 mm) and grinding (< 6 mm) using size reduction equipments. Many further physical and chemical processes are involved in coal beneficiation and this 'washed coal' is used for electricity generation [14]

The major segments of a coal based TPP are 1) fuel supply and preparation, 2)boiler with furnace, 3) turbine and generator, 4) heat rejection unit, 5) condenser, 6) cooling tower and 7) units for emissions reduction and disposal. Washed coal is conveyed from bunkers to the mills for pulverizing and drying using pre-heated air. The coal combustion in the furnace generates

heat (at 1400-1600°C) and releases flue gases where nearly 6% of the fuel heat is lost. Through the heat exchanger surface, the steam generator (boiler) receives heat from the hot flue gases and boils water to high pressure steam which drives large turbines. The turbines connected to the generators convert thermal energy of steam to mechanical energy where ~50% of the fuel heat input is lost. Further, the generator converts the mechanical energy from turbine to electricity at gross installed capacity. At one end of the furnace, flue gases are cooled down by the super-heater (SH), the re-heater (RH) and the feed water pre-heater (economiser). The air heater uses flue gas heat for combustion air and the cooled flue gas reaches exit temperature. Induced-draught fans that run on auxiliary power from the TPP are used to transport flue gases to different filtration units and finally help release the filtered gases through the flue stack. The exhaust steam from turbines is converted back to water in the condenser. This condensate is sent to the boiler as feed through a stream of preheating processes. In order to make-up for the loss, water is constantly fed into this stream through a De-mineralizing (DM) unit which removes undesirable salts causing hardness. The closed cooling water circuit in the condenser absorbs the waste heat of the exhaust steam. It is re-cooled in natural-draught cooling towers which releases the heated cooling air to the atmosphere. The power output from the TPP is called net output capacity and is the difference of gross installed capacity and auxiliary power requirements within the plant. These auxiliary requirements include electricity for coal milling, feed pump, combustion air, flue gas fans, station service transformer etc which ranges from 6-10% of the gross output. So the total efficiency of a thermal power plant is the ratio of net output capacity to the supplied fuel power. This total efficiency is based on various components like steam generator efficiency, thermal efficiency, mechanical losses of the turbine, generator efficiency, electrical and mechanical losses of the generator, auxiliary power efficiency etc. The highest potential for improving efficiency in thermal plants is found in the steam generator section. Plant Load Factor (PLF) of a power plant is the ratio of the actual power generated to the total power generation capacity and highlights the overall performance of TPPs [14]

There are 107 TPPs in India under the central, state and private sectors with a total installed capacity of 99.50 GW (52% of the total installed capacity), generating electricity from coal or lignite. The average PLF of central and private thermal utilities in India is above 70% though state sector falls below due to the unavailability of coal, etc. Earlier studies reveal that only 30% of the coal based TPPs in India have high technical efficiencies [15]. Addition of capacities and life extension projects for existing plants has also been envisaged by GoI. Captive Power Plants (CPPs) based near the coal mines majorly cater to the iron-steel, chemicals, aluminium, automobile, and cement industries. More number of Ultra Mega Power Projects (UMPPs) with private participation is being proposed in the country. The Ministry of Power (MoP) envisages the UMPPs to use supercritical technology to achieve higher fuel savings. Coal based Merchant Power Plants (MPP) which were initiated to attract private participation can trade the electricity generated on a competitive market facilitated by the GoI. Supercritical technology operating at higher efficiencies and producing lower emissions is expected to dominate capacity addition by the end of thirteenth Five-year plan [2]

2.5 Emissions from coal-based thermal power generation

SO_x: Sulphur occurs in organic and inorganic forms. Inorganic forms like pyrite constitutes 30-70% of the sulphur in coal with trace amounts of marcasite, gypsum and iron sulphate. Organic forms like thiophene, organic suphide, mercaptan and organic disulphide constitutes the rest. Suphur in coal is approximately 10% and results in formation of major oxides like sulphur dioxide (SO_2) and traces of sulphur trioxide (SO_3) [12]. The combustion of hard coal having sulphur content of 1% with 90% conversion results in SO_2 emission levels of 1.6–1.7g/m^3[14]

NO_x: Nitrogen constitutes 0.5-2% of coal and during combustion produces ~95% nitrogen monoxide (NO) and ~5% nitrogen dioxide (NO_2) referred generally as nitrogen oxides (NO_x). On combustion of high-volatile hard coal (with nitrogen content of 1.5%), a complete conversion of nitrogen would produce NO emissions of 4,500 mg/m^3 at 6% O_2 [14]**.** The conversion reactions are:

$O + N_2 \leftrightarrow NO + N$ (high oxygen condition) (1)
$N_2 + 2OH \leftrightarrow 2NO + H_2$ (low oxygen condition) (2)
$CH_i + N_2 \leftrightarrow HCN + N$ (hydrocarbon radical participation) (3)

CO_x: Huge amount of CO_2 is produced during the combustion of coal and released into the atmosphere. Coal-based TPPs in India emit around 980 gCO2/kWh contributing to 60% of CO_2 emissions (where CO_2 shares over 50% of the overall GHG emissions) in the country [16].Incomplete combustion of coal results in production of carbon monoxide (CO), hydrocarbons and soot (negligible). In fact, CO is an intermediate during formation of CO_2 on complete combustion [14]

Trace elements: Coal also contains many trace elements including mercury, selenium and arsenic naturally. Although abundance of mercury in coal is comparatively lower, the higher consumption of coal results in significant release. Almost 90% of the mercury is not retained in the ash and hence quantification is cumbersome from the flue release. Based on a detailed literature survey, the world-wide average mercury content is 0.10±0.01 ppm. If expressed on an ash basis, bituminous rank coals contain 0.87±0.08 ppm Hg, and lower rank coals contain 0.62±0.06 ppm. Analysis of Indian bituminous coal revealed Hg contents ranging from 0.15 to 0.87 ppm [17]

2.6 Environmental impact of coal-based power generation

Impact of fly ash (heavy metal leaching, bio-accumulation, mutagenicity, genotoxicity, radioactivity): During formation of coal ash, traces of vaporous pollutants and heavy metals also accumulate over the ash particles. The quantity and distribution of particles depend on the ash content in coal, combustion systems and combustion conditions. Coal ash contains toxic elements which are hazardous for living organisms. **Elements having lower mass (Cu, Zn) precipitate with the fly ash**, while elements having higher mass (Co) settle in bottom ash [18].

Enrichment of components is found to be higher in fly ash when compared to bottom ash [19].Based on the nature of coal and combustion conditions, fly ash may contain various levels of heavy metals such as antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, and zinc [20]. These elements can potentially be released to the soil, surface water, and groundwater by leaching processes also affecting the biodiversity

A study of three coal thermal plants based in Delhi reveals the heavy metal contents of fly ash and bottom ash (Table 8). Heavy metal concentration in fly ash is higher than bottom ash. **Cr and Zn concentrations are higher in fly ash** while Mn is higher in bottom ash [18]. According to the analyses on fly ash and bottom ash samples collected from five thermal plants (ranging from 90-3000 MW capacities) in India, concentrations of toxic elements, such as arsenic, mercury, lead and cadmium were in the range as given in Table 9. Enrichment of components was found to be higher in fly ash when compared to bottom ash [19]. The investigation of heavy metals in groundwater (bore wells) near an ash disposal site in Orissa, India showed high concentrations of iron, barium, copper, manganese, lead, vanadium and zinc [21].It was reported that fly ash contains higher concentrations of Boron (B), Cobalt (Co), Chromium (Cr), Cadmium (Cd), Molybdenum (Mo), Nickel (Ni), Arsenic (As) and Selenium (Se) than normally found in soils [22].

Table 8: Heavy metals in fly ash and bottom ash samples collected from 3 TPPs

Sample	Cr	Mn	Pb	Zn	Cu	Ni	Co
Fly ash (mg/kg)	87-103	47-139	20-56	60-124	56-83	28-63	8-18
Bottom ash (mg/kg)	54-74	84-182	10-16	29-44	40-50	26-32	9-11

Table 9: Heavy metals (mg/kg) in fly ash and bottom ash samples collected from 5 TPPs

Sample	As	Hg	Pb	Cd
Fly ash	0.19–0.35	0.51–2.13	7.6–35.3	0.6–0.93
Bottom ash	0.1–0.29	0.41–1.58	8.8–28.28	0.49–0.79

A study by Natusch *et.al* [23] reveals that Na, SO_4, As, Se, Mo, Cr, and Pb levels were higher in fly ash affected ground water than in samples from unaffected areas. Baba *et.al* [24] studied the effect of Yatagan TPP on surface and ground water. Their study revealed that concentrations of Ca^{2+}, Cd^{2+}, Pb^{2+}, and SO_4^{2-} exceed the WHO limits in wells outside the ash pond and near the plant.

Leaching of soluble ions zinc (Zn), lead (Pb) and iron (Fe) from ash ponds into the ground water was observed in studies near Vijayawada Thermal Power Station. The leaching potential of ash ponds is higher due to diurnal and seasonal variations in temperature, moisture and other parameters. The water samples within a distance of 10 km around the TPP showed an increase in TDS, calcium hardness, magnesium, total hardness, chlorides and alkalinity [25]. Studies indicate that leachability of cationic metals such as cadmium, chromium, zinc, lead, mercury, and silver increases with decreasing pH values or at acidic conditions [26].

Bio-accumulation of heavy metals in plants lead to increased elemental composition eventually entering the food chain. An investigation of fly ash contaminated regions in Uttar Pradesh, India showed the bio-accumulation of heavy metals like iron, zinc, copper, molybdenum, boron, silicon, aluminium, chromium, lead, cadmium, mercury and arsenic in native aquatic, terrestrial and algal species in the vicinity [26]

Leachate from fly ash dumpsites has genotoxic potential and may lead to adverse effects on vegetation and on the health of exposed human populations. A study on the mutagenicity and genotoxicity effects of fly ash leachate showed predominance of the metals like sodium, silicon, potassium, calcium, magnesium, iron, manganese, zinc, and sulphate. The Ames Salmonella mutagenicity assay conducted on two-tester strains and genotoxicity assay on fly ash leachate carried in vitro on human blood cells and *in vivo* on Nicotiana plants indicated that the leachate was directly mutagenic and resulted in DNA damage in whole blood cells, lymphocytes, and in Nicotiana plants [27].

Certain organic constituents contained in coal, during combustion results in formation of organic pollutants (mutagens and carcinogens) like Polycyclic Aromatic Hydrocarbons (PAH) and Polychlorinated biphenyls (PCB) which are adsorbed to the fly ash. The quantity of organic pollutants like PAHs and PCBs generated during coal combustion depends on the feed quality, combustion temperature, residence time in the combustion zone, turbulence and air to fuel ratio. Due to high rate of coal consumption, reasonable amounts of fly ash are released through the stack even in presence of ESPs. Based on the fly ashes generated from five thermal plants in India, the concentration of Benzo(a)pyrene which is the most potent carcinogenic and mutagenic Polycyclic Aromatic Hydrocarbons (PAH) varied as 0.82 - 18.14 ng/g. The total PAHs and Polychlorinated biphenyls (PCB) in the fly ash samples were found to be in the range of 43.61 - 936.14 ng/g and 7.34 ng/g - 178.69 ng/g respectively [28].

Investigations in thirty power plants in India reveal enrichment of radionuclide by 2-5 times in the fly ash compared to coal samples, which are of same order as ambient soil (Table 10) [11].

Table 10: Radionuclide in coal, fly-ash and soil samples collected from 30 TPPs in India

Radionuclide	Concentration in Bq/kg			
	Coal	Fly-ash		Soil
Ra-226	11.1–66.6 (24.1)	40.7–151.7 (77.7)	44.4–155.4 (88.8)	14.8–155.5 (37)
Ra-228 Th-228	18.5–92.5 (38.5)	96.2–177.7 (125.8)	74.0–214.7 (136.9)	18.5–155.4 (69.6)
K-40	14.8–444.1 (82.5)	148.0–840.1 (373.8)	373.9–632.9 (377.5)	11.1–706.9 (396)

SO_x, NO_x, CO_x: Table 11 lists an assessment of CO_2, CO, SO_2 and NO emissions of elevenTPPs in India with varied installed capacities (60, 67.5, 210 and 250 MW) [29]**.** Increased levels of CO_2 are a concern for global warming and rising temperatures. Enhanced levels of SO_x and NO_x

change the quality of water during precipitation (acid rain refers to the precipitation with dissolved SO_x and NO_x). The rain water enriched with SO_x and NO_x leads to acidification of aquatic ecosystem, acidification of soil, damage to vegetation at higher elevation, decay of building materials and paints, formation of smog, enhances ground level ozone, impaired functioning of the upper respiratory system in humans and animals (mammals, amphibians, etc.). In addition to this, their particulate matter derivatives—sulphates and nitrates—contribute to visibility degradation and harm public health. High concentrations of sulphur dioxide have affected breathing, causing respiratory illnesses, and also aggravating existing heart and lung diseases. Exposure at very low concentrations can irritate the lungs and throat and cause bronchitis. Also, an exposure to low levels of SO_2 over a long period depletes the respiratory system's ability to defend against bacteria and foreign particles [30, 31, 32].

Table 11: Range of CO_2, CO, SO_2 and NO emission from TPPs in India

	Emission per unit (kWh) of electricity			
	CO_2	**CO**	**SO_2**	**NO**
Range of emission from all power plants in India	0.776 - 1.49 kg	0.055 - 24.49 g	5.21 - 15.99 g	1.54 - 3.263 g
Average emission coefficient	0.998 kg	3.393 g	8.696 g	2.420 g

***Trace elements*:** The trace elements that are released during combustion will have potentially harmful impacts to both human health and the environment. Nearly 50 – 60% of the mercury is retained in the cleaned coal whose combustion in TPPs pose threat of release to the environment **17**.

Other pollution impacts: The hydrobiological parameters in the vicinity of ash pond and cooling water outfall from Ennore Thermal Power Station recorded an increase in mean temperature (35 °C), salinity (3.5%), nitrite, ammonia, phosphate, silicate, suspended solids, BOD and decrease in pH (8.1), dissolved oxygen (DO) (5.5 mg l^{-1}), nitrate [33]. An increased TDS, TSS, hardness, calcium, magnesium, and chlorides in Satpura dam due to the effluents discharged from TPP was reported at Sarni, Madhya Pradesh [34].

Coastal TPPs are associated with marine pollution. The temperature of water was high up to 2 km from discharging point of Tuticorin TPP and the depth of Bay, ash layer and turbidity of the water increased due to ash slurry discharge [35]. The cooling water discharge of Tuticorin TPP to Tuticorin Bay deteriorated the fish population [36]. The ash slurry and cooling water discharge to shore of Bay of Bengal increased temperature, salinity, nitrite, ammonia, phosphate, silicate, suspended solids, BOD and decreased the dissolved oxygen, nitrate and total gross productivity [33]. Discharge of water with high temperature can result in increase of photorespiration and decrease in biomass productivity (algae) leading to a decline in fish production.

2.7 Mitigation of Pollutants

Along with other impurities, minerals are removed during beneficiation in coal washeries. The extraneous mineral matters causing ash formation are physically separable even up to the extent of less than 1% [12].

***Particulate reduction*:** Mechanical separators, fabric filters or Electrostatic Precipitators (ESP) are used to remove particulates from flue gas based on emission limit requirements. Mechanical separators remove particulates based on their property of inertia. Removal efficiency increases with increasing particulate size and reaches up to 90%. ESPs charge the particulates and deflect them using an electric field. They have high particulate removal efficiency of up to 99.8 % with less pressure losses and are economical for large power plants. Fabric filters are permeable filtering media made of synthetic or natural fibers on which particulates are collected and removed at specific intervals. Certain filters even reach up to 99.9% particulate removal efficiencies and are economically viable alternatives for ESPs. However, its usage is less common in large power plants [14]

***SO_x reduction*:** Desulphurisation methods are used to reduce sulphur content of the fuel and desulphurise flue gas. Sulphur content in coal is reduced majorly through physical processes during coal preparation. In the case of coal containing 70% of sulphur pyrite and 30% of organic sulphur, the physical cleaning reduces the sulphur content by ~50%. However, organic suphur bonded to the carbon is difficult to be removed [12]. Sulphur oxides (SO_x) in flue gas can be captured by alkali, alkaline earth or metal oxides. These processes work in dry (additive injection in furnace), semi-dry or wet (downstream desulphurization) conditions and typically employ limestone ($CaCO_3$), lime (CaO) or hydrated lime ($Ca(OH)_2$). Lime being abundant is a more commonly used capturing agent, delivering gypsum as a reusable byproduct. Dry additive processes achieve only up to 60% desulphurisation efficiency and are minimally employed. Wet processes achieve 95-99% and semi-dry processes achieve around 80% [14].

***NO_x reduction*:** Primary measures for limiting formation of NO_x include low NO_x burner, furnace air staging, coal re-burning etc with reduction efficiencies in the range of 30-60%. These are called combustion engineering methods. Secondary downstream $DeNO_x$ processes are mostly based on reduction of NO already formed during combustion of coal. Two commonly used methods are Selective Non-Catalytic Reduction (SCNR) and Selective Catalytic Reduction (SCR) where NO is reduced to molecular nitrogen and water vapour by ammonia (NH_3). NO removal efficiency of 30-50% is typically achieved (upto 70% on favourable conditions) especially in furnaces with low thermal outputs and small furnace cross section where SCNR method is suitably employed. SCR method uses less amount of NH_3 with higher NO_x removal efficiency of 70-90% on favourable conditions [14].

3.0 OBJECTIVES

The objectives of this study are to:

1) assess the environmental status of Yellur Panchayat and surrounding villages subsequent to the commissioning of a coal based Thermal Power Plant (TPP);
2) quantify the impacts (if any); and
3) suggest appropriate policy action.

4.0 STUDY REGION

4.1 Location – geography, climate, vegetation

The study region includes Yellur as well as surrounding villages of Padebetu, Nadsal (Tenka Yermal), Nandikur, Santhoor, Karnire, Bada and Palimar (and parts of other villages) as shown in Figure 8 within a buffer zone of 6 km majorly located in Udupi taluk, Udupi district, Karnataka. The focus area of the current study is a core zone of 2 km around Yellur village (Figure 9). The region is sandwiched by Western Ghats in the east and Arabian Sea in the west. The river Shambhavi, a tributary to river Mulki flows nearly 4 km south of the Yellur village. The Digital Elevation Model (DEM) in Figure 10 shows topography and terrain of the study region with high and low lands. It can be seen that elevation varies from mean sea level (0 m) to 65 m and high lands are concentrated in the north to east sector.

Figure 8: Study region

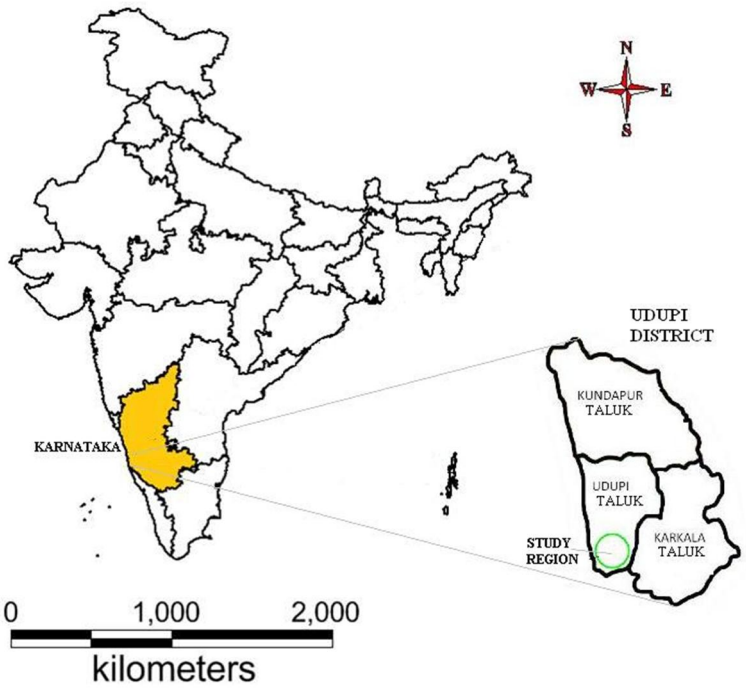


Figure 9: Study region (core zone in red and buffer zone in green) with village boundaries

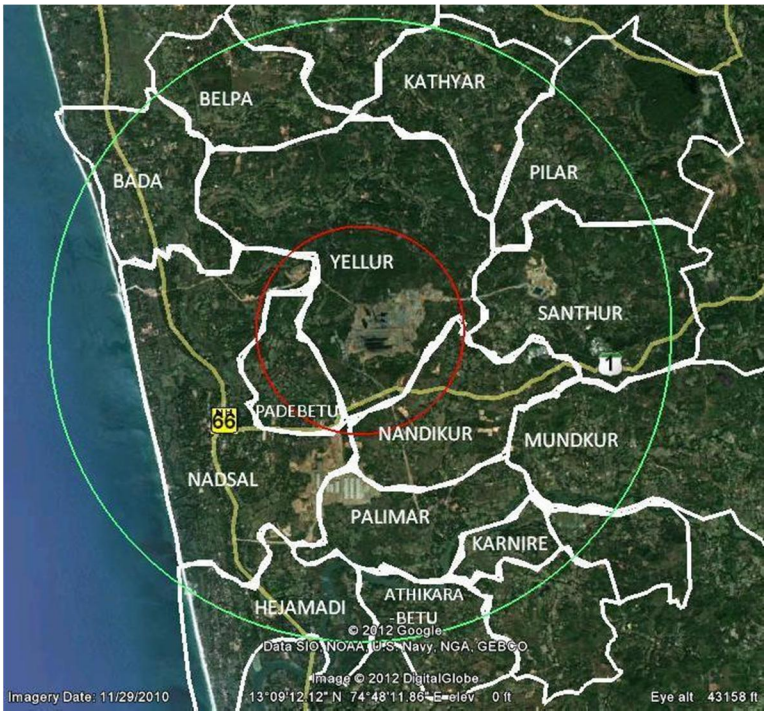
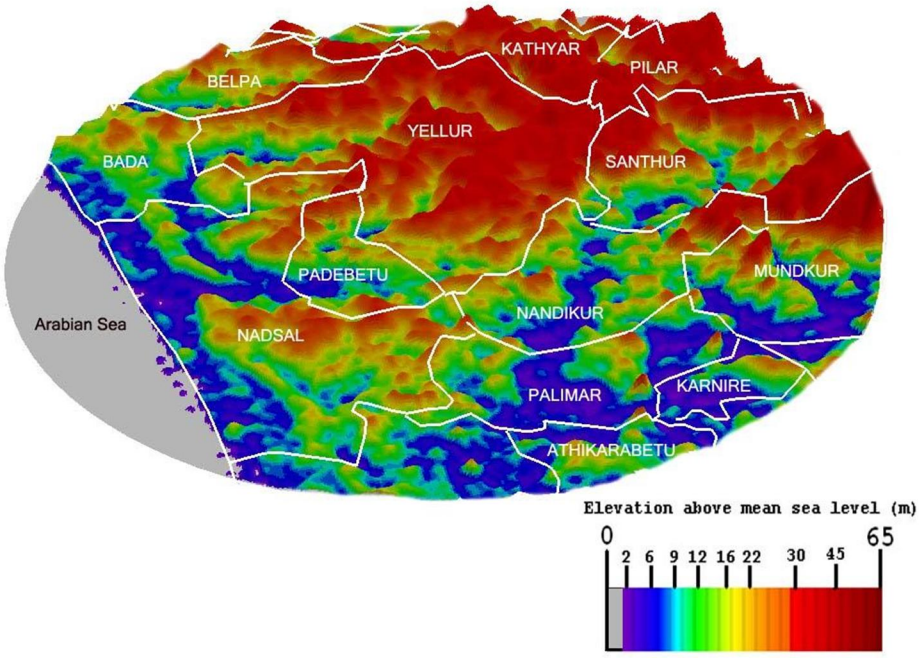


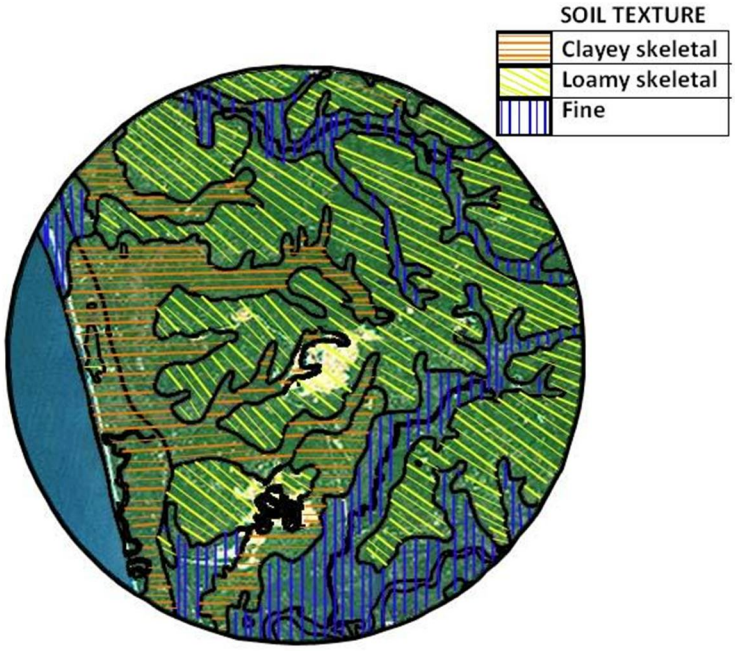
Figure 10: Digital Elevation Model (DEM) of study region with village boundaries



The soil in the interiors of the region is majorly lateritic red type with high porosity and permeability while the coast is rich in alluvium. Soil texture varies from fine to clayey skeletal to loamy skeletal (Figure 11). It is acidic in nature due to heavy runoff, abundant in nitrogen but

deficient in potassium and phosphorous. Due to its high infiltration rate, inter-connected aquifers of the region are recharged during rains.

Figure 11: Soil texture in the study region



The region has four distinct seasons: 1) rainy season (June-September), 2) warm and damp post-monsoon season (October-November), 3) winter season (December-February) and 4) summer season (March-May**).** It has a maritime climate with temperatures ranging from 22°C to 36°C, annual average rainfall of 4035 mm and humidity ranging from 61% to 91% [37]. The land-sea breezes are frequent with higher number of wind calms (<0.5 m/s). The predominant winds in winter are towards East, summer is towards North-Northwest and monsoon is towards West.

The vegetation in the region is largely evergreen and deciduous type. It comes under the tropical semi-wet type. Wide ranges of flora and fauna are identified in the region. Some of the terrestrial flora include *Acacia spp., Albizzia spp.*, etc. Paddy is the major crop of the region. Pulses like black gram, green gram, horse gram, cow pea; fruits like mango, banana, pineapple, jackfruit, sapota; vegetables like pumpkin, gourd, sweet potato, bean, brinjal, lady's finger, tomato, onion, garlic; and horticultural crops like coconut, arecanut, pepper are grown in the region. The fertility of the land especially in coastal and midland zones is low and hence careful management is necessitated [38]**.**

4.2 Demography and livelihood

Udupi is one of the three coastal districts of Karnataka. The Suvarna Karnataka development Corridor passes through the district of Udupi. Nearly 20 % of the work forces are cultivators and 15 % are agricultural labourers. About 14% of rural people are involved in household industries. Udupi taluk has highest density of population compared to Kundapura and Karkala taluks in the

Udupi district. It also has the highest percentage of SC and ST in the district. Agriculture is the predominant activity and the net sown area is highest in the taluk (37%). Low cropping intensity is reported due to lack of irrigation facilities. The area under cropping is in decline also due to high cost of cultivations and labour scarcity. Well organized and mechanized marine fishing is a major source of income for the coastal inhabitants. Having heavy rainfall, the region has a number of tributaries and backwaters providing prospects for inland fisheries. Large and medium scale industries in the region include cashew-nut processing, rice mills, coconut powder units, fish canning and processing, fish meals and fish oil units, fish net manufacturing, printing units, granite units, readymade garments, auto parts etc [39].

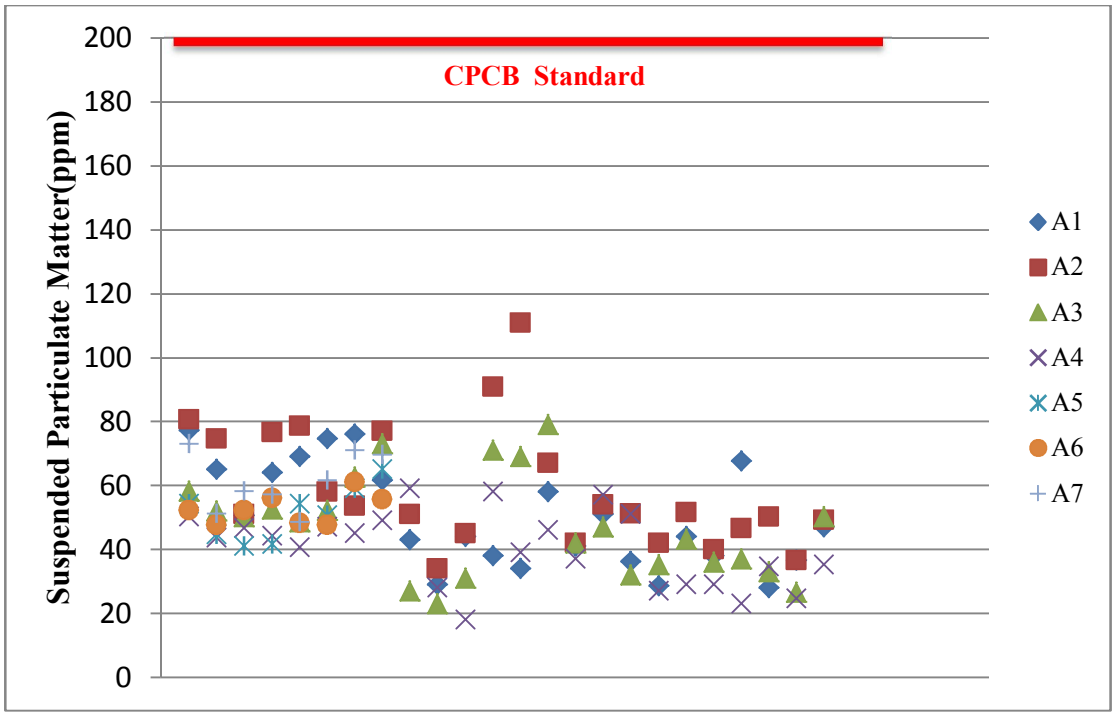
4.3 Baseline environmental conditions of the study region

Air quality: According to the earlier studies in 1992 and 1997, air quality of the region was exceptionally good. Ambient air quality was measured for the locations given in Table 12 during summer, winter and monsoon seasons in 2001 prior to any developmental activities. The Suspended Particulate Matter (SPM) and nitrogen oxides (NO_x) were within the Central Pollution Control Board (CPCB) limits (Figure 12). Air quality measurement in the summer of 2007 reveals an increase in Respirable Particulate Matter (RPM) and SPM with the TPP construction commencement (Figure 13) [40, 41, 42].

Table 12: Air quality sampling locations

Code	Sampling village
A1	Nandikur
A2	Hejmadi
A3	Kollur
A4	Santhur
A5	Nadsal
A6	Nandikur
A7	Panchwedka

Figure 12: Ambient air quality measurements in the study region



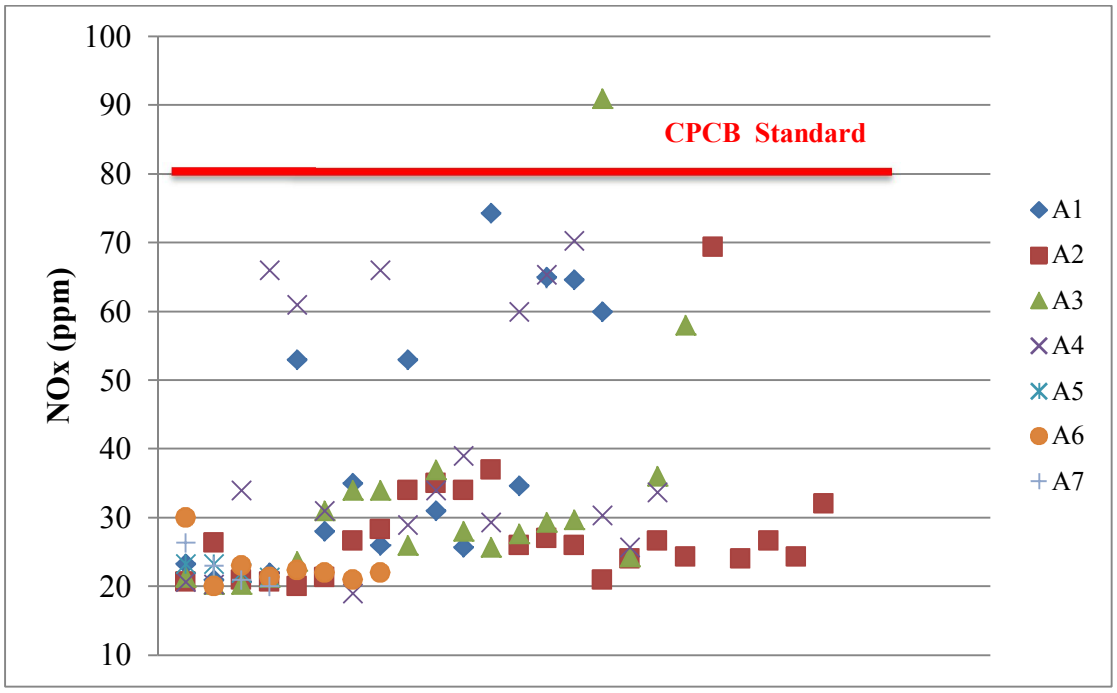
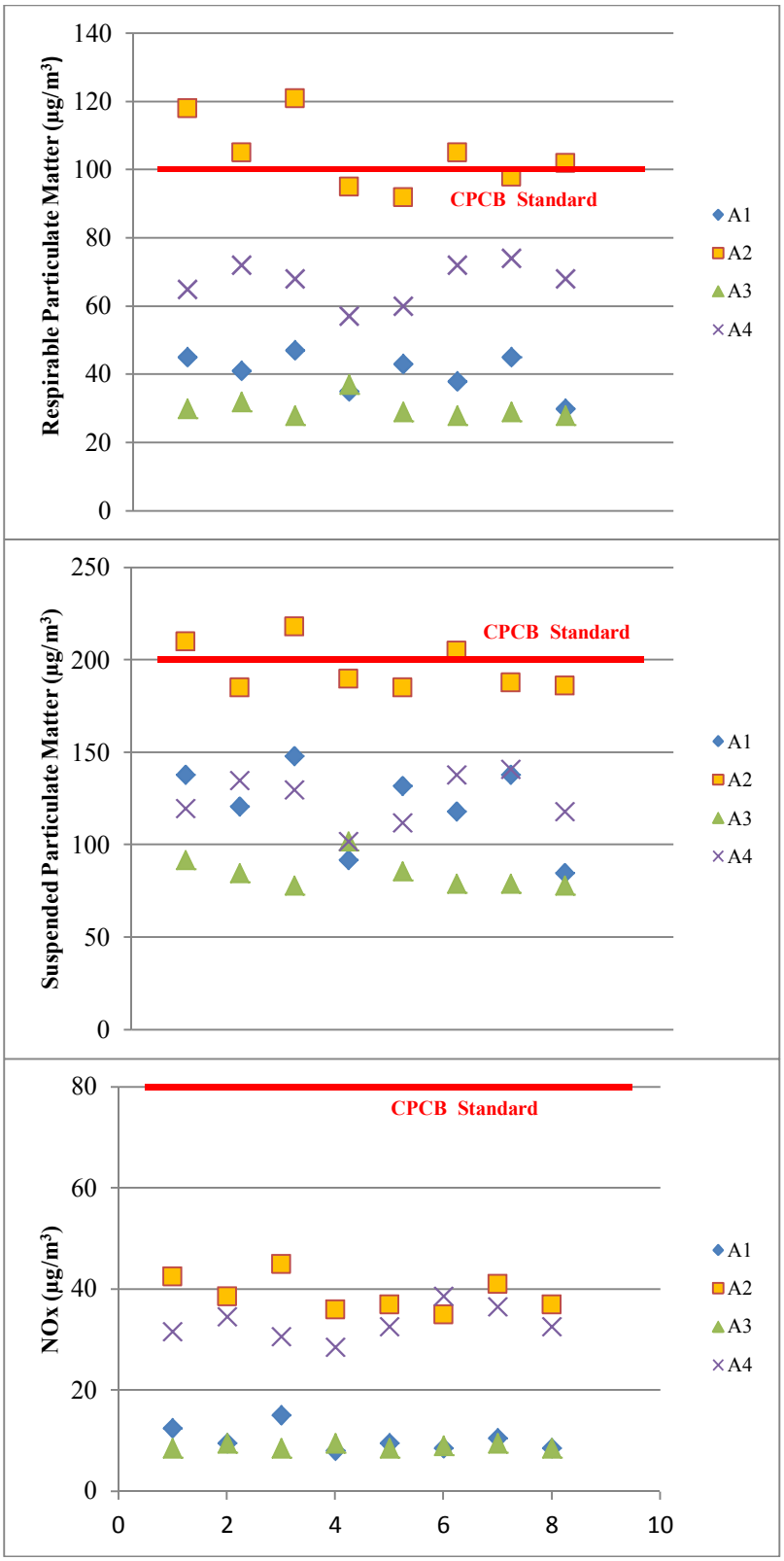


Figure 13: Air quality measurements in the study region after construction of TPP



Water quality: Earlier studies of 1992 and 1997, indicate that the rivers had good flow in the monsoon and lean waters in other seasons. The shallow aquifers of the region storing huge

amounts of rainwater were utilized through open wells while deep aquifers were exploited through bore wells. Over 90% of the surface area recharged the underground aquifers through infiltration of rain water. The water quality of the region was good without any significant contamination [40, 41].

The water quality of the region [42] was studied based on surface and ground water samples collected from 3 different locations as given in Table 13 during summer, winter and monsoon seasons in 2001. The results of physico-chemical analysis of water samples are given in Table 14.

Table 13: Water quality sampling locations

Code	Location of sampling
W1	Well water from Nadisal Village
W2	Well water at Nandikur Village
W3	Stream at Addey beside Ganapathi temple in Nandikur village

W1: During summer the Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Chlorides, Sulphates, Sodium and Phenolic compounds were above the permissible limits as per WHO. During Monsoon the iron content of the water sample was above the permissible range. The Coliform organisms were high during winter and monsoon.

W2: The results of analysis for all the 3 seasons indicate that the well water in the area is good except for oil and grease during winter and iron in monsoons which were higher than the permissible limits. In all 3 seasons the Coliform organisms were 1800 MPN/100 ml. Thus the water sample of Nandikur Village was good.

W3: The result of analysis of this sample shows that the iron, oil and grease and coliform organisms were above the permissible limits in all seasons.

4.4 Recent developmental activities

The study region is part of *Padubidri Industrial Area* as recognized by the Karnataka Industrial Areas Development Board (KIADB). Yellur village has a 600 MW TPP (13.158 º N, 74.797 º E) been operational since June 2010 supplying electricity to the power distribution company, MESCOM. An ash pond is also situated nearly 3.5 km from the TPP in Santhur village (Figure 9). The TPP covers a total land area of 262.10 ha and the break-up for different land requirements is given in Table 15.

Table 15: Land requirement for TPP in the study region

Category	Area (ha)
Plant site (including 30% green belt)	170.07
Rehabilitation and resettlement	23.11
Ash disposal site (including 30% green belt)	45.45
Other infrastructure (pipeline, pump house etc)	23.48
Total project	262.10

Table 14: Seasonal report of baseline water quality of the study region

Parameters	Units	Summer			Winter			Monsoon			WHO STANDARDS	IS value
		W1	**W2**	**W3**	**W1**	**W2**	**W3**	**W1**	**W2**	**W3**		
TSS	**ppm**	454	30	28	10	12	14	49	NT	25	100	100
TDS	**ppm**	**17222**	8	16	40	52	46	45	29	21	500	500
Total volatile solids	**ppm**	75	2	4	5	6	10	21	10	12		
Colour		Cl	Cl	Cl	Cl	Cl	Cl	Cl	Cl	Cl		
Temperature	**ºC**	29.5	26	29.5	26	27	23	29	27.5	29		
BOD	**ppm**	195	NR	26.4	3	4	20	9	NR	2		
COD	**ppm**	350	NR		15.6 8	19.6 1	62.7 4	13	NR	9		
Chlorides	**ppm**	**9264**	86	9.6	10	15	15	13	13	6	250	250
Sulphides	**ppm**	0.4	ND	ND	nil	nil	nil	NT	NT	NT		
Sulphates	**ppm**	**1096**	1.9	2.1	3	4	8	1.4	NT	0.5	200	150
Fluorides	**ppm**	0.5	0.0 5	0.1	nil	nil	nil	0.05	0.1	0.15	1	1
Sodium	**ppm**	**5000**	3	4	10	13.4	12	8	7	4	200	
Kjeldahl Nitrojen	**ppm**	2.5	2.5	4.1	nil	nil	1.4	1.33	1.32	2.13		
Residual chlorine	**ppm**	NT	NT	NT	nil	nil	nil	NT	NT	NT		0.2
pH		7.1	6.2	6.8	7.5	7.5	7.5	6.5	5.5	6.5	6.5-8.5	6.5-8.5
DO	**ppm**	5	NR	4	6.8	6.4	6	7	NR	6.9		
phenolic compounds	**ppm**	**0.04**	**0.0 1**	**0.02**	nil	nil	nil	ND	ND	ND	0.001	0.001
Oil and Grease	**ppm**	ND	ND	0.8	nil	<1	<1	2	ND	0.92		
Insecticides	**ppm**	ND	ND	ND	nil	nil	nil	NT	NT	NT		
Cyanides	**ppm**	ND	ND	ND	nil	nil	nil	ND	ND	ND	0.05	0.05
Copper	**ppm**	0.03	ND	ND	BDL	BDL	BDL	ND	ND	ND	0.05	0.05
Zinc	**ppm**	0.02	0.0 2	0.03	0.07	0.1	0.14	0.04	0.04	0.03	5	5
Iron	**ppm**	0.1	0.3	**1.5**	0.2	0.3	0.3	**0.8**	**1.2**	**0.5**	0.3	0.3
Boron	**ppm**	ND	ND	ND	nil	nil	nil	ND	ND	ND	1	1
Arsenic	**ppm**	ND	ND	ND	nil	nil	nil	ND	ND	ND	0.01	0.05
Barium	**ppm**	ND	ND	ND	nil	nil	nil	ND	ND	ND	0.3	
Cadmium	**ppm**	ND	ND	ND	BDL	BDL	BDL	ND	ND	ND	0.01	0.01
Lead	**ppm**	ND	ND	ND	BDL	BDL	BDL	ND	ND	ND	0.05	0.1
Chromium	**ppm**	ND	ND	ND	BDL	BDL	BDL	ND	ND	ND	0.05	0.05
Mercury	**ppm**	ND	ND	ND	nil	nil	nil	ND	ND	ND	0.001	0.001
Nickel	**ppm**	ND	ND	ND	BDL	BDL	BDL	ND	ND	ND	0.001	
Selenium	**ppm**	ND	ND	ND	nil	nil	nil	ND	ND	ND	0.001	0.01
Silver	**ppm**	ND	ND	ND	nil	nil	nil	ND	ND	ND		
Coliform organism	MPN /100ml	280	350	180 0	1800	1800	1800	1800 +	1800 +	1800 +		

Numerals in **Bold** indicated values exceeding permissible limits, Source: PCB

5.0 MATERIALS AND METHODS

5.1 Field sampling and analyses

Water was sampled from select locations within a 2 km core zone as well as 6 km buffer zone around the TPP site during field visits from August to November, 2011. These sampling locations were assigned codes (ranging from 46 to 93) and spatially mapped over the study region (Figure 14). Two villages beyond the buffer zone were also visited for sampling to understand the impact (if any) beyond the study region. Table 16 lists the sampling locations collected during field visits. The water samples were collected depending upon accessibility and availability from open-wells, bore-wells, ponds, effluent outlets, streams etc. These were collected in one litre acid washed polythene bottles. On site laboratory studies as well as laboratory analysis were undertaken. The water quality parameters were analyzed with the help of standard methods (APHA, 1998). Table 17 lists the parameter wise method adopted for quantification. In addition to the primary field investigations, water quality analyses reports (for villages in the study region for the period December 2010 to June 2011 as well as in February, May and October, 2011) were collected from the regional office of the State Pollution Control Board (PCB).

Figure 14: Sampling locations in the study region; concentric circles 1 km apart depict the different strategic sampling zones

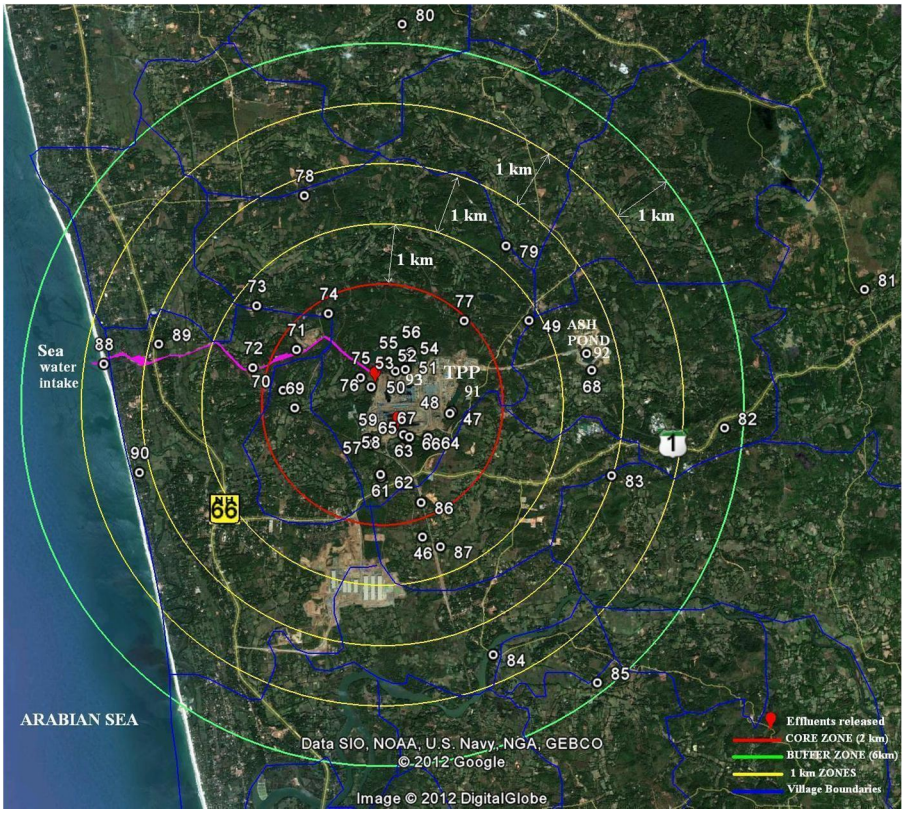


Table 16: Sampling locations in the study region

Sampling location code	Village	Location
46	Nandikur	Mr.Raghuram Shetty
47	Yellur	Mr.Vimal Mogerti
48	Yellur	Mr.Jayanth Bhat
49	Santhuru	
50	Yellur	Mr.Christian Fernandis
54	Yellur	Mr.Brijith D'Souza
56	Yellur (Kolachur)	Stream water with coal mix effluent
57	Yellur (Kolachur)	Mr.Bujanga Shetty
58	Yellur (Kolachur)	Mr.Jagannath Mulya
59	Yellur (Kolachur)	Coal mix effluent from TPP
60	Yellur (Kolachur)	Ms.Varija Shetty (Keshava Shetty)
63	Yellur (Kolachur)	Mr.Anantharam Bhat
64	Yellur (Kolachur)	Mr.Ithappa Poojary
65	Yellur (Kolachur)	Mr.Damodar Suvarna
67	Santhur	Ms.Sundari Shetty (Near Ash Pond)
69	Padebetu	Mr.Balakrishna Shetty
70	Padebetu	Ms.Kamala Mulya
74	Yellur	Ms.Kamala V. Jogi
76	Yellur	Mr.Kariya Shetty
77	Yellur	Ms.Calestine D'souza
78	Yellur	Ms.Jaya Poojary
79	Kathyar	Mr.Yogesh Poojary
80		Mr.Alen D'souza
81	Belman	Mr.Venkatramana Prabhu
82	Santhur	Ms.Hillary Fernandis
83	Santhur	Mr.Bhaskar Shenoy
84	Karnire	Mr.Santhosh
84	Karnire	Shambhavi river
85	Kabattar	Mr.Sundara Poojary
85	Nadsal (Tenka Yermal)	Paddy field near sea water intake pipeline leakage
86	Nandikur	Railway track coal leachate
87	Nandikur	Mr.Dhananjay
89	Nadsal (Tenka Yermal)	Public well near sea water intake pipeline leakage
89	Nadsal (Tenka Yermal)	Paddy near Lalitha's house
90	Nadsal (Tenka Yermal)	Mr.Sheikh Abdulla
91	Santhur	Mr.Siraj
92	Santhur	Ash pond
93	Yellur	Effluent discharge from TPP

Table 17: Standard methods followed for water quality analysis

Parameters	Methods	Reference
Onsite Measurements		
pH	Probe (Eutech EC 500)	Standard methods
Electrical Conductivity (µS)	Probe (Eutech EC 500)	Standard methods
Total Dissolved Solids (mg L^{-1})	Probe (Eutech EC 500) and Gravimetry	Standard methods
Dissolved Oxygen (mg L^{-1})	Probe(HANNA HI-9146)	(APHA, 4500-O B)
Turbidity (NTU)	Probe(2100P HACH Turbidimeter)	Standard methods
Oxidation Reduction Potential	Probe (Eutech EC 500)	Standard methods
Laboratory Measurements		
Chemical Oxygen Demand (mg L^{-1})	Closed Reflux, Titrimetric Method	(APHA, 5220 C)
Biological Oxygen Demand (mg L^{-1})	5-Day BOD Test	(APHA, 5210 B)
Alkalinity (mg L^{-1})	HCl Tritrimetric Method	(APHA, 2320 B)
Calcium Hardness (mg L^{-1})	EDTA Titrimetric Method	(APHA, 3500-Ca B)
Total Hardness (mg L^{-1})	EDTA Titrimetric Method	(APHA, 2340 C)
Chlorides (mg L^{-1})	Argentometric Method	(APHA, 4500-Cl- :)
Sodium (mg L^{-1})	Flame Emission Photometric Method	(APHA, 3500-Na B)
Potassium (mg L^{-1})	Flame Emission Photometric Method	(APHA, 3500-K B)
Phosphates (mg L^{-1})	Stannous Chloride Method	(APHA, 4500-P D)
Nitrates (mg L^{-1})	Phenol Disulphonic Method	NEERI (1988)
Sulphates (mg L^{-1})	Turbidometric method	(APHA, 4500-SO)

5.2 Land use land cover analysis

The spatio-temporal changes in land use and land cover (LULC) of the study region after the introduction of TPP as well as other developmental activities were studied using Remote Sensing (RS) with geospatial techniques. The collection of remotely sensed data involving monitoring of large areas enables the change analyses at local, regional and global scales over time [43]. Remote sensing data along with Global Positioning System (GPS) help in effective land cover analysis [44]. Successful utilization of RS data for LULC detection requires careful selection of appropriate data.

***RS data*:** 1) IRS 1C LISS III pan merged data (2003), 2) IRS – P6 LISS-III (2011), and 3) Google Earth (http://earth.google.com) summarised in Table 18 were used in this study.

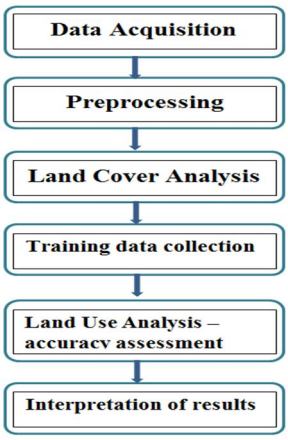
Table 18: Details of Remote Sensing data

Year	Satellite	Date of Acquisition	Resolution (m)
2003	IRS 1C LISS III – Pan Merged	23/01/2003	5m
2011	IRS P6 LISS III	08/01/2011	23.5

***Ancillary data*:** Ancillary data provides information to assist the interpretation of different land use types from remotely sensed images. In this study, topographic maps of scale 1:50,000 generated by Survey of India provided ground control points to rectify remotely sensed images and scanned paper maps. The GPS (Garmin GPS unit) provided location details and field measurements.

***Method*:** Figure 15 depicts procedure followed in the study. The RS data of IRS satellites (Indian Remote Sensing Satellites launched in the course of the Indian Space Programme) were used. This requires pre-processing stages like atmospheric correction and geometric correction in order to enable correct area measurements, precise localization and multi-source data integration [45, 46]. Geometric correction is the process of referencing a map/image to a geographic location (real earth surface positions) using GCPs (ground control points). GCPs were collected from the topo-sheet (SOI) as well as from field. This helped in geometrically correcting the distorted remote sensing data.

Figure 15: Procedure followed for analysis



***Land cover analysis and Land use analysis*:** Spatiotemporal change detection process involves determining the changes associated with LULC properties with reference to geo-registered multi temporal remote sensing data.

The monitoring of land cover involves the computation of vegetation indices. The land cover analysis was done using NDVI (Normalized Difference Vegetation Index). Among all techniques of land cover mapping, NDVI is most widely accepted and applied [47, 48, 49, 50]. Calculation of NDVI for multi-temporal data is advantageous in areas where vegetation changes rapidly. The

capability of capturing changes in land cover and extracting the change information from satellite data requires effective and automated change detection techniques [51, 52]. NDVI is calculated by using visible Red and NIR bands of the data reflected by vegetation. Healthy vegetation absorbs most of the visible light that hits it, and reflects a large portion of the near-infrared light. Sparse vegetation reflects more visible light and less near-infrared light. NDVI for a given pixel always results in a number that ranges from minus one (-1) to plus one (+1), using Equation 1

$$\mathbf{NDVI} = (\mathbf{NIR} - \mathbf{R}) / (\mathbf{NIR} + \mathbf{R}) \quad \ldots (1)$$

Training data was collected in order to validate the RS results and to improve the accuracy of image registration, preparing training sites and to check the accuracy of the classified data. The land use analysis was carried out with supervised classification scheme with select training sites. The supervised classification approach preserves the basic land use characteristics through statistical classification techniques using a number of well-distributed training pixels. Gaussian Maximum Likelihood algorithm is a common, appropriate and efficient method in supervised classification techniques by using availability of multi-temporal "ground truth" information to obtain a suitable training set for classifier learning. Supervised training areas are located in regions of homogeneous cover type. All spectral classes in the scene are represented in the various subareas and then clustered independently to determine their identity. The following classes of land use were examined: built-up, water, cropland, open space or barren land, and forest. Such quantitative assessments, will lead to a deeper and more robust understanding of land-use changes for an appropriate policy intervention. *GRASS GIS (Geographical Analysis Support System)*, which is a free and open source software having the robust support for processing both vector and raster files accessible at http://wgbis.ces.iisc.ernet.in/grass/index.php is used for the analysis. Accuracy assessments decide the quality of the information derived from remotely sensed data. The accuracy assessment is the process of measuring the spectral classification inaccuracies by a set of reference pixels. These test samples are then used to create error matrix (also referred as confusion matrix) kappa (κ) statistics and producer's and user's accuracies to assess the classification accuracies. Kappa is an accuracy statistic that permits us to compare two or more matrices and weighs cells in error matrix according to the magnitude of misclassification.

5.3 Socioeconomic survey

A socioeconomic survey was conducted based on contingency evaluation technique through a structured questionnaire. Stratified random sampling was adopted and samples were chosen so as to represent all categories in the villages (Yellur, Nadsal, Padebetu, Santhur, Nandikur, Palimar, Karnire) within 6 km buffer zone (Figure 9). The questionnaire covered the parameters relating to crops yield, vegetation, livestock, personal health and hygiene as well as livelihood. In addition, select medical practitioners were interviewed to understand the health instances related to the changes in environmental status subsequent to setting up of TPP.

6.0 RESULTS & DISCUSSION

6.1 Observations during field visits

- Due to transport of coal in Open Type Box (BOBRN) wagons, spillage of coal and coal dust were occuring in the vicinity of TPP.
- Improper liners and coal stockyard without shelter has led to leaching during heavy monsoon, contaminating nearby land, ground water and surface water bodies.
- Corrosion of railway tracks (parts of Konkan Railway and coal track to TPP)
- Corrosion of fencing of the green belt (of TPP), tin sheets (within TPP complex)
- Corrosion of transmission lines (could be dangerous to life as there are chances of severe hazards due to heavy precipitation)
- Corrosion of iron pillar, silver plated door frame and door of the main entrance of Subramanya (Padabetu) and Durgaparameshwari temples (Nandikur village).
- Corroded dish antennas, agriculture implements, vehicle chassis, tin roofs, well pulleys, mesh cover to wells, etc. in nearby houses
- Salt accumulation on roof tiles and walls (distemper palletisation) adjacent to TPP
- Intentional disruption of public pathways by TPP (to restrict nearby Yellur village or a mechanism to pressurize villagers to dispose off their lands)
- Improper confinement of soil in TPP complex leading to large scale erosion of soil and subsequent deposition in nearby agricultural fields.
- Sacred grove in dilapidated state due to the negligence of the TPP management, hence hurting the local sentiment.
- Direct discharge of coal mix water to nearby streams
- Illegal use of natural drains/streams for transporting TPP effluents to Arabian Sea. As the stream passes through agriculture fields there is a contamination of land and biotic elements (humans, livestock, fishes, poultry, pets, etc.)
- Hydrocarbons oozing out from the TPP complex is contaminating nearby surface water sources (northwestern side of TPP, Yellur village, Mr.Kariya Shetty house)
- Contaminated tubewell (yellow colour with oily film)
- Black dust deposition on vegetation (sacred grove, etc.)
- Salt deposition evident from saline taste of mist (deposited on foliage)
- Stunted growth of jasmine plants
- Chlorosis, necrosis and leaf burn (coconut, arecanut, banana, jackfruit, mango, and other vegetation)
- Reduced population of avifauna (dwindling peafowl population) indicator of enhanced pollution levels in the environment as birds are bioindicators.
- Skin rashes, lesions, nail deformation (Onychodystrophy) in humans (children as well as adults)
- Higher instances of coughing among local people (respiratory ailments such as asthma and bronchitis, impact of minute fly ash dust in mucus membrane in superior and inferior concha)

- Higher instances of miscarriage (livestock)
- Abandoned agriculture and horticulture fields
- Enhanced aggressive behaviour among humans due to psychological stress (which is more evident in TPP affected areas)
- Labour colony with poor basic amenities (sanitation, drinking water, etc.)
- Open defecation and contamination of nearby streams has led to mosquito breeding resulting in higher instances of malaria and chikungunya among the residents in and nearby labour colony.
- Higher instances of crime due to illegal drugs and liquor (labour colony)
- Indiscriminate disposal of solid waste – coal ash (fly ash and bottom ash)
- Non-functional slurry mixer (sluicer) near the ash pond
- Lack of scientific management of coal ash; direct dumping of dry ash to the ash pond
- Absence/poor liner in ash pond, contaminating nearby ground water sources and soil due to leaching from the ash pond
- Leaching from temporary confinement pond (TPP complex) and ash pond to nearby agriculture fields
- Indiscriminate disposal of polymer used for outer coating of GRP (Glass-fiber Reinforced Plastic) pipeline in the forest land.
- Collection of drinking water from faraway places (as ground water and surface water sources are contaminated)
- Insensitive TPP and district administration (provision of drinking water, maintenance of roads, health issues of local residents)
- Lack of adequate environment regulatory mechanism in the district.
- Poor post-project environment monitoring and non-compliance of environmental norms as per MoEF, GoI guidelines.
- Inadequate compliance of environment management plan suggested during environmental clearance.
- Absence of environment management cell at TPP for regular monitoring of environmental parameters related to air, water, soil, land and health (human, livestock).
- Arrogant behavior of the security staff including TPP officials with the local people
- Implication of local people in false criminal cases by local police as well as district administration
- Deliberate weakening of local institutions (gram panchayats) and Civil Society Organizations
- Reduced fish yield in the ocean, higher instances of sea shore erosion where TPP effluents are discharged (liability to the district exchequer for TPPs misdeeds)
- Inadequate and inappropriate compensation to affected families
- Cascaded environmentally hazardous activities due to TPP (proposal for cement industry, etc.)
- Forced emigration of local people due to the prevailing adverse environmental conditions

Coal feedstock - transport and storage issues: The TPP in Yellur village is a coastal Ultra Mega Power Project (UMPP) with installed capacity of 600 MW, being upgraded to 1200 (2X600) MW capacity with further proposed capacity addition in different phases. As mandated by the MoP, UMPPs must use imported coal. The TPP imports coal from Indonesia and handles it in a coal stock yard at New Mangalore Port Trust (NMPT) captive coal jetty. It is transported in open type 60 T Bottom Opening Type Box (BOBRN) wagons via Konkan Railway to the plant located nearly 37 km away from Mangalore. Coal spillages and coal dust were observed on the tracks leaching to nearby water bodies (Figure 16).

The TPP coal yard stocks coal for 45 days (Figure 17). Improper liners and coal stockyard without shelter has led to leaching during heavy monsoon, contaminating nearby land, ground water and surface water bodies. Open storage and exposure of coal to air and water (due to precipitation) leads to oxidation of pyrites (in coal) to sulphates and sulphuric acid resulting in acid mine drainage. Coal mix effluents were observed to be released (Figure 18) into nearby surface water sources at northwestern, southwestern and southern sides of TPP (Yellur village).

Coal samples were collected from the TPP complex. Based on analysis by Central Power Research Institute (CPRI) (Table 19-20), Gross Calorific Value (GCV) was reasonably good (5590-6090 kcal/kg). The expected range of ash content for Indonesian coal is ~13%.

Table 19: Proximity analysis of the coal procured from TPP

	Moisture	Volatile matter	Fixed Carbon	Gross Calorific Value (kcal/kg)
First test	17.7	44.7	36.8	5590
Second test	13.3	45	40	6090

Table 20: Ultimate analysis of the coal procured from TPP

	Carbon	Hydrogen	Nitrogen	Sulphur	Oxygen
First test	60.8	4.43	0.23	0.29	15.75
Second test	64	4.5	0.55	0.58	15.37

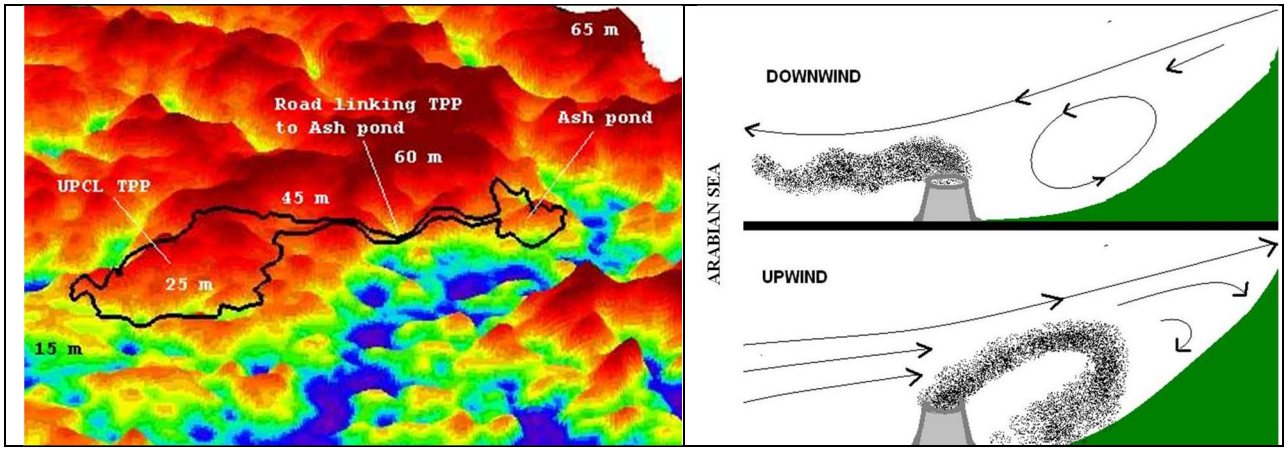
Contamination due to salt water intake: The TPP extracts water from Arabian Sea through Glass-fiber Reinforced Plastic (GRP) pipeline at the rate of 10045 m^3/hour. Indiscriminate soil contamination due to pipeline construction activities were observed during the field visit. Disposal of polymer used for outer coating of GRP (Glass-fiber Reinforced Plastic) pipeline also has a tendency to leach to water resources during high precipitation (Figure 19). Leakages from existing GRP pipelines since December 2009 were reported by local people and no effective tangible remedial action has been taken either by TPP or district administration. Discussion with local people revealed that, out of the 17 wells within 100 m of the pipeline (which are being continually monitored), 16 had higher TDS beyond permissible limits. Also, 14 wells were dewatered during March-April 2011 and 4 were reported to have higher salinity even after

cleaning and monsoon rainfall. Salt water intrusion into ground water resources apart from higher salinity level in soil has deprived local residents their fundamental right of clean water and livelihood.

Saline mist discharge from TPP cooling towers: Supersaturated saline mist released from the cooling towers of TPP was observed in the immediate surroundings and regions upto 2 km (Figure 20). Saline mist dispersion from cooling towers is localised in the valley region during upwind and downwind flows as shown by the Figure 21. This improper siting of TPP without taking into account the altitudinal gradient and wind regime of the region has resulted in deposition of saline mist over regions in the vicinity.

The saline mist deposit has resulted in chlorosis, necrosis and leaf burn (Figure 22; observed in banana, coconut, arecanut, jasmine, etc.), reduced productivity of plants (Figure 23; paddy, banana, jasmine, arecanut, beetlenut leaves, coconut, etc.), corrosion of metallic objects (Figure 24; tin sheets, dish antennas, railway tracks, transmission lines, fencing wires, vehicle chassis, well pulleys, mesh on the well, etc.), soil salinity, etc. The salt deposition on vegetation has stunted its growth. Also, deposition of dust (with salt) has altered the phenology apart from changes in the characteristics of pollens. Due to this the population of pollinators (such as bees) has drastically reduced which has affected the ecosystem services evident from reduced pollination and declined productivity of crops.

Figure 21: Altitudinal gradient of the TPP and localised dispersion of saline mist from cooling towers



***Flue gas emissions (SOx, NOx, COx, trace elements)*:** The flue gas stack has a height of 275 m which was verified using clinometer during field visit. As per the reports, about 25% of flue gas passes through FGDs (Flue Gas Desulphurisation) which has an efficiency of 85% and can lower the SO_2 emission rate. Reports also reveal that about 75% of the flue gas is let out directly without desulphurisation (apart from 85% efficiency of FGD) into the surrounding environment which has resulted in enhanced SO_x levels. There are no evidences of effort to de-NOx by TPP.

***Coal ash handling*:** Coal ash (fly ash and bottom ash) collected in different hoppers are carried to ash silos within the plant. This is transported to the ash pond site through open trucks. Improper handling of ash in open trucks and also dumping of dry ash to ash pond has contributed to the particulate dispersion and fugitive dust in the neighborhood. Mismanagement of ash is primarily responsible for degrading the environment affecting the livelihood and health of local population (Figure 25). Inadequate or absence of impervious layer in the ash pond has led to seepage of contaminated water to the surrounding water sources. Apart from this, it was observed during the field visit that, ash pond effluents were discharged to a nearby perennial stream (which is being used for domestic activities by the residents of Santhur village) that joins Shambhavi river, a tributary to Mulki river which finally reaches the Arabian Sea. This has also contaminated the agriculture and horticulture lands.

***Effluent discharges*:** Major effluent discharges from the TPP are: 1) Condensate Polishing Unit (CPU) neutralization wastewater, 2) boiler drain, 3) HVAC plant waste, 4) service waste including floor washing, 5) FGD/lime are runoff (assuming FGD is installed), 6) oily wastewater, 7) ash silo area wastewater, 8) coal stockyard drain, 9) Reverse Osmosis (RO) reject, 10) pre-treatment plant sludge, 11) cooling tower blowdown, and 12) sanitary waste. It has been observed that coal mix effluents were drained to nearby streams which eventually mixed with other perennial streams. This has also affected the nearby pond and well waters. One of the streams flowing westward of the TPP towards the sea carried effluents through the villages of Padebettu and Nadsal. This has polluted coastal agricultural lands and water bodies even at a distance of over 4 km from the TPP site (Figure 26). The hydrocarbon rich oily effluents were observed to have infiltrated to low lying areas particularly in the northwestern side of TPP. This has affected the nearby wells and agricultural fields (Figure 27).

Soil erosion from TPP complex: Large scale mud slides were observed in the northern side of TPP subsequent to monsoon due to lack of appropriate soil conservation measures in the TPP complex. Heavy rainfall eroded the soils and deposited them in nearby paddy fields (Figure 28). This had resulted in damage to crops and also decline in soil fertility affecting the dependent population's only livelihood.

Inadequate green cover around TPP and ash pond: As per the environmental policy 2006 and also EIA notification, TPP is supposed to maintain at least 33% green cover. However, poor green cover in the TPP site (Figure 29) as well as ash pond site and lack of appropriate buffer, highlight non-compliance of the environmental norms. Appropriate vegetation in the green belt as well as buffer region would have attenuated the pollution of air and noise.

Unhygienic conditions in labour colony: The housing colony constructed for migrant labourers near to the TPP was observed to have unsafe drinking water, unhygienic toilet facilities and inadequate sewage treatment (Figures 30). Open defecation and contamination of nearby streams has led to mosquito breeding resulting in higher instances of malaria and chikungunya among the residents in and nearby labour colony. Also, higher instance of crimes due to illegal drugs and liquor was reported.

Figure 16: Open wagons transporting coal to the TPP via Konkan Railway and coal spillages

Figure 17: Open coal stockyard at TPP complex

Figure 18: Coal mix effluents released into a natural stream near to coal stockyard

Figure 19: Soil contamination due to disposal of synthetic material used for outer coating of sea water intake GRP pipeline

Figure 20: Saline mist discharge from cooling tower of TPP and deposition on leaves

Figure 22: Leaf burn due to deposition of saline mist

Figure 23: Reduced productivity of jasmine, banana, coconut, areca, etc.

Figure 24: Corrosion of metallic objects (dish antenna, roof tops, transmission wire, railway track)

Figure 25: Ash pond site (open truck, non-functional ash sluicer, ash pond)

Figure 26: Effluents mixing with a perennial stream in southwestern side of TPP (Yellur village) – health impacts

Figure 27: Hydrocarbon rich oily effluents infiltrating to northwestern side of TPP affecting the nearby wells and agricultural fields (Mr. Kariya Shetty house, Yellur)

Figure 28: Soil erosion from northern side of TPP complex and deposition in nearby paddy fields, Yellur

Figure 29: Glimpse of poor vegetation cover at TPP complex

Figure 30: Unhygienic conditions in labour colony adjacent to TPP

6.2 Land use and land cover Analysis

Land cover analysis: Land cover analysis of the study region was done by computing Normalized Difference Vegetation Index (NDVI) which shows the percentage of area under vegetation and non-vegetation. NDVI is based on the principle of spectral difference based on strong vegetation absorbance in the red and strong reflectance in the near-infrared part of the spectrum. Vegetation index differencing technique was used to analyze the amount of change in vegetation (green) versus non-vegetation (non-green) with the two temporal data (considering 1973 and 1989 as base). Figure 31 illustrates the spatiotemporal change in the land cover of the study area. The vegetation cover 87.32 % (2003) has decreased to 59.76% (2011) (Table 21). Temporal change explains the degradation rates with respect to 2003 and 2011.

Figure 31: Land cover classification

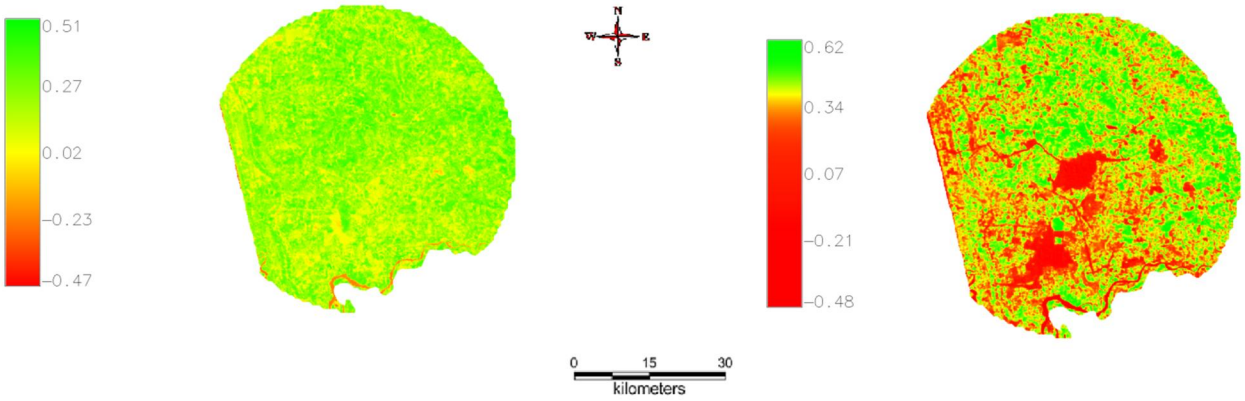


Table 21: Land cover analysis

Year	% Vegetation	% Non-vegetation
2003 (before setting up thermal power plant)	87.32	12.68
2011	59.76	40.24

Land use analysis: The spatiotemporal land use changes of the study area are shown in the Figure 32 at the whole landscape level from 2003 to 2011 carried out by using RS data. Table 22 illustrates the changes in the area of land use with respect to time. The built-up land increased from 5.26% (2003) to 8.1% (2011) and vegetation decreased from 8.1% (2003) to 4.24% (2011). The results evidence industrial and cascaded developmental activities as major driving forces for the degradation in the region.

Figure 32: Land Use classified image

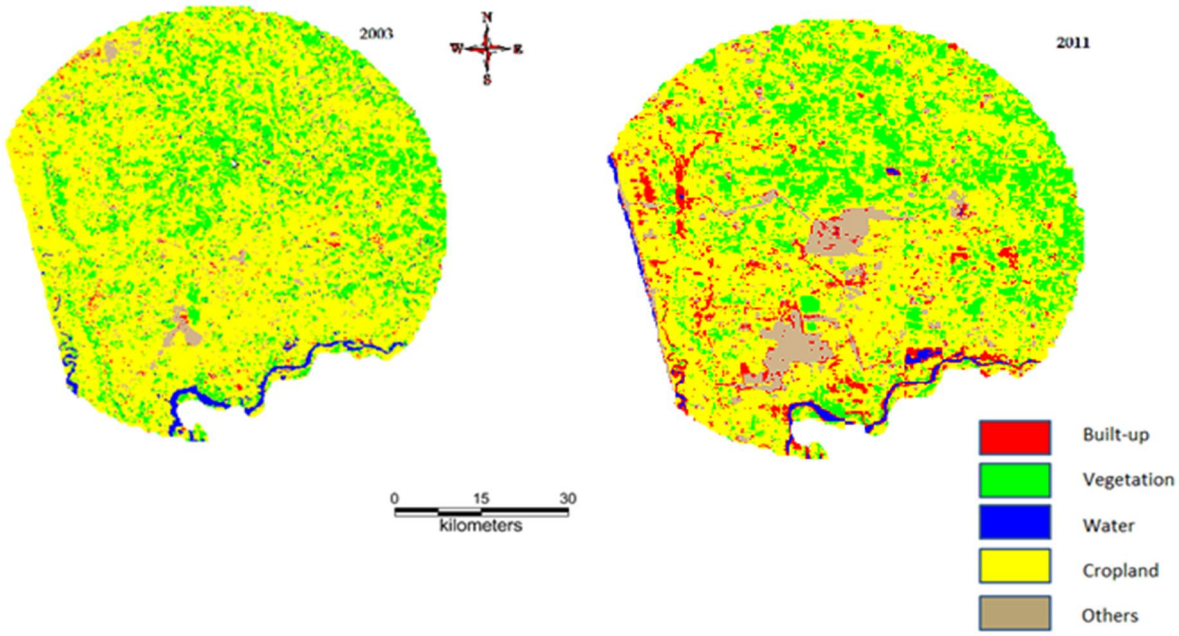


Table 22: Spatiotemporal land use dynamics

Year →	2003		2011	
Category	Ha	%	Ha	%
Built-up	691.466	6.26	1402.81	12.7
Water	117.085	1.06	104.934	0.95
Cropland	7546.47	68.32	5901.762	53.43
Vegetation	894.70	8.1	468.34	4.24
Others	1796.044	16.26	3167.93	28.68
Total area (Ha)			11045.784	

***Accuracy of land use analysis*:** Accuracy assessment and kappa statistics included in Table 23 are used to evaluate the strength of each category as well as classification as a whole. Kappa statistics summarizes the overall results and measures the difference between the actual agreements in the error matrix which is ranging from 93% to 95%.

Table 23: Kappa statistic and accuracy assessment

Year	Overall Accuracy	Kappa value
2003	93.515	0.898
2011	95.010	0.906

6.3 Field sampling and analyses

Water samples collected from the locations were analysed for physical and chemical integrity as per the standard protocol (discussed in materials and methods section). The results of water analysis are listed in tables 24, 25 and 26 corresponding to samples from buffer zone (collected in August 2011), core zone (collected in October and November 2011). Table 27 summarises parameter wise ranges of measured values.

Table 24: Water quality analysis of samples collected during August 2011 in the buffer zone (6 km) of the TPP

Sampling code →		46	47	48	50	54	56(1)	56(2)	57	58	59	60	63	BIS standard levels	WHO drinking water standards
Village →		**Nandikur**	**Yellur**	**Yellur**	**Yellur**	**Yellur**	**Yellur - Kolachur**	**Yellur - Kolachur**	**Yellur-Kolachur**	**Yellur-Kolachur**	**Yellur-Kolachur**	**Yellur-Kolachur**	**Yellur - Kolachur**		
Parameters	**Unit**	Well-Raghuram Shetty	Well-Vimal Mogerti	Well-Jayanth Bhat	Well-Christian Fernandis	Well-Brijith D'souza	Stream with coal mix effluent	Stream with mudwater	Well-Bujanga Shetty	Well-Jagannath Mulya	Coal mix effluent from TPP	Well- Varija Shetty (Keshava Shetty)	Well-Anantharam Bhat		
DO	ppm	4.24	1.73	1.06			3.9	3.3	5.01	3.24	0.74	3.04	1.18		
Water temp	°C	28.6	27.7	27.6			28	27.7	28	28.4	29.6	28.3	27.8		
pH		4.8	4.5	4.4			5.4	5.6	3.8	4.1	6.1	4.6	4.9	**6.5-8.5**	**6.5-9.2**
Turbidity	NTU	2.74	1.65	0.72			**104**	**9.81**	2.2	3.61	**176**	1.26	2.49	**5**	
TDS	ppm	53	51	465				352	**1200**	**947**	**2304**	78	167	**500**	**500**
ORP	mV	214	205	215			60	25	245	235	165	155	153		
ChlorideS(Cl-)	ppm	14.2	19.9	**258**	34.1	11.4	**1385**	193	**593**	**556.6**	**1746.6**	36.92	90.88	**250**	**200**
Sodium(Na+)	ppm	7.2	13.1	169	22.5	8.6	**595**	96	**542**	26	**1755**	31.6	60.4	**200**	**200**
Potassium(K+)	ppm	1	1.3	7	1.3	1.2	10	3	4	6	32.5	1.2	1.7		
Alkalinity	ppm	0.8	0.8	0.4	0.8	0.8	0.8	0.8	0.8	0.4	2	0.8	0.8	**200**	
Total hardness	ppm	16	20	80	28	12	**516**	76	168	132	**636**	32	44	**300**	
Ca	ppm	4.81	3.21	14.4	6.41	1.60	59.3	4.81	40.08	19.24	**81.76**	3.21	12.83	**75**	**75**
Ca Hardness	ppm	12.0	8.01	36.0	16.0	4.00	148	12.0	100.1	48.04	204.16	8.01	32.03		
Mg	ppm	0.97	0.97	10.7	2.92	1.95	**89.7**	15.6	16.57	20.47	**105.26**	5.85	2.92	**30**	**50**
COD	ppm	6	8	2	2	2	36	10	2	2	18	4	4		
Nitrates	ppm	0.18	0.09	0.06	0.08	0.16	0.10	0.07	0.11	0.10	0.13	0.05	0.11	**45**	**45**
Phosphates	ppm	0.07	0.02	0.03	0.01	0.02	0.03	0.00	0.13	0.01	0.02	0.01	0.02	**5**	

Sampling location code →		64	65	67(1)	67(2)	69	70	74	76(1)	76(2)	77(1)	77(2)	78	79	BIS standard levels	WHO drinking water standards
Village →		**Yellur-Kolachur**	**Yellur-Kolachur**	**Santhur**	**Santhur**	**Padebetu**	**Padebetu**	**Yellur**	**Yellur**	**Yellur**	**Yellur**	**Yellur**	**Yellur**	**Yellur**		
Parameters	**Unit**	Well-Ithappa Poojari	Well-Damodar Suvarna	Well-Sundari Shetty*	Borewell-Sundari Shetty *	Well-Balakrishna Shetty	Well-Kamala Mulya	Kamala V. Jogi	Well-Kariya Shetty	Effluent Discharge into stream	Well-Calestine D'souza	Borewell-Calestine D'souza	Well-Jaya Poojari	Well-Yogesh Poojari		
DO	ppm	2.96	2.68	2.96	2.94	8.81	3.4	5.38	5.88	7.6	5.58	7.4	3.93	2.83		
Water Temp	°C	28.5	27.4	27.3	26.4	26.1	27.6	27.4	27.6	26.7	28.1	27	28	28.5		
PH		4.7	5.1	4.7	6.6	5.7	5.3	5.4	3.6	6.2	4.9	5.7	4.3	3.9	**6.5-8.5**	**6.5-9.2**
Turbidity	NTU	0.89	4.69	**7.59**	**65.6**	22	0.65	0.65	**21.4**		1.12	**21.4**	0.46	0.35	**5**	
TDS	ppm	142	197	29	156	118	78	96	**1804**	**850**	43	56	43	63	**500**	**500**
ORP	mV	175	173	173	-15	105	165	177	365	65	198	140	249	282		
Chlorides(Cl-)	ppm	73.84	105.1	8.52	5.68	28.4	17.0	28.4	**766.8**	51.12	5.68	11.36	5.68	14.2	**250**	**200**
Sodium (Na+)	ppm	47.5	64.2	7.3	25	27.2	25.7	27.8	**300**	**915**	3.5	7.7	2.8	9.5	**200**	**200**
Potassium(K+)	ppm	1.7	1.4	0.9	0	18.1	1.5	1.4	10	30	0.2	1.7	0.4	1.1		
Alkalinity	ppm	0.8	1.2	0.6	3.2	1.6	1.2	0.8	0.2	0.04	0.4	0.8	0.8	0.4	**200**	
Total hardness	ppm	36	44	12	88	40	44	12	252	**392**	16	16	24	12	**300**	
Ca	ppm	8.02	9.62	3.21	3.21	14.43	8.02	3.21	36.87	57.72	1.60	4.81	1.60	3.21	**75**	**75**
Ca Hardness	ppm	20.02	24.02	8.01	8.01	36.03	20.0	8.01	92.07	144.1	4.00	12.01	4.00	8.01		

Mg	ppm	3.90	4.87	0.97	19.49	0.97	5.85	0.97	38.98	**60.42**	2.92	0.97	4.87	0.97	**30**	**50**
COD	ppm	6	4	8	4	8	6	4	4	68	4	6	2	4		
Nitrates	ppm	0.14	0.11	0.17	0.26	0.13	0.16	0.22	0.08	0.13	0.15	0.22	0.15	0.15	**45**	**45**
Phosphates	ppm	0.01	0.02	0.04	0.02	0.03	0.02	0.01	0.04	0.04	0.04	0.04	0.01	0.01	**5**	

* near Ash pond

Numerals in **Bold** indicated values exceeding permissible limits

Sampling location code →		**80**	**81**	**82**	**82**	**83**	**84**	**84**	**85**	**85**	**86**	**87**	**89**	**89**	**BIS standard levels**	**WHO drinking water standards**
Village→			**Belman**	**Santhur**		**Santhur**	**Karnire**	**Karnire**	**Kabattar**	**Kabattar**	**Nandikur**	**Nandikur**	**Nadsal (Tenka)**	**Nadsal (Tenka)**		
Parameters	**Unit**	Well-Alen D'souza	Well-Venkatramana Prabhu	Well-Hillary Fernandis	Algae sample	Well-Bhaskar Shenoy	Well-Santhosh	Shambhavi river	Well-Sundara Poojary	Paddy field	Railway track coal leachate	Dhananjay	Public well near pipeline	Paddy field near Lalitha's house, pipeline leak		
DO	ppm	5.11	4.8	2.52		3.42	3.73	7.7	3.57			2.37				
Water temp	°C	27.7	28	28.1		28.8	27.7	28.7	30			30.6				
pH		**4.8**	**4.9**	**5.3**		**4.1**	**5.9**	6.7	**4.8**			**4.8**			**6.5-8.5**	**6.5-9.2**
Turbidity	NTU	0.68	0.77	1.15		1.45	1.35	**6.62**	0.87			0.52			**5**	
TDS	ppm	58	37	51		81	145	55	35			41			**500**	**500**
ORP	mV	218	222	212		252	185	142	195			218				
Chlorides (Cl-)	ppm	8.52	8.52	14.2	31.24	11.36	28.4	8.52	11.36	8.52	8.52	17.04	167.56	31.2	**250**	**200**
Sodium(Na+)	ppm	8.5	2.2	5.3	1.7	7.6	14.8	5	3.3	4.9	7.8	7.2	92.5	25.6	**200**	**200**

Potassium (K+)	ppm	1.2	0.9	1.3	1	0.9	4.8	1	1	1.2	1.7	1.7	2.5	0.9		
Alkalinity	ppm	0.8	0.6	0.8	0.4	0.8	1.6	0.6	0.8	0.8	1.6	1.2	0.4	1	**200**	
Total Hardness	ppm	20	20	16	48	16	60	16	12	12	44	20	72	28	**300**	
Ca	ppm	4.81	6.41	4.81	4.81	3.21	19.24	4.81	3.21	3.21	9.62	6.41	17.64	3.21	**75**	**75**
Ca Hardness	ppm	12.01	16.01	12.01	12.01	8.01	48.04	12.01	8.01	8.01	24.02	16.01	44.04	8.01		
Mg	ppm	1.95	0.97	0.97	8.77	1.95	2.92	0.97	0.97	0.97	4.87	0.97	6.82	4.87	**30**	**50**
COD	ppm	4	6	6	6	4	4	2	2	4	16	18	2	2		
Nitrates	ppm	0.37	0.15	0.16	0.15	0.15	0.14	0.15	0.13		0.26	0.14	0.14		**45**	**45**
Phosphates	ppm	0.05	0.01	0.05	0.19	0.14	0.04	0.01	0.07	0.01	0.11	0.02	0.04	0.01	**5**	

Numerals in **Bold** indicated values exceeding permissible limits

Table 25: Water quality analysis of samples collected during October 2011 in the core zone (2 km) of the TPP

Sampling location code →		**58(1)**	**58(2)**	**76(3)**	**76(2)**	**76(1)**	**48**	**91**	**BIS standard levels**	**WHO drinking water standards**
Village →					**Yellur**					
Parameters	**Units**	Pond-Jagannath Mulya	Well-Jagannath Mulya	Pond-Kariya Shetty	Effluent discharge to stream-Kariya Shetty	Well-Kariya Shetty	Jayanth Bhat	Well-Siraj		
pH		**4.10**	**3.80**	**2.90**	**5.40**	**2.40**	**4.40**	**5.80**	**6.5-8.5**	**6.5-9.2**
Turbidity	NTU	3.44	3.60		**36.20**	**26.00**		4.79	**5**	
ORP	mV	58.00	168.00	305.00	34.00	278.00	230.00	145.00		
DO	ppm	4.34	2.70	4.62	2.84	2.29	2.54	3.71		
W.temp	°C	30.60	29.00	31.90	30.40	33.60	30.50	28.00		
A.temp	°C	33.00	32.00	31.00	35.00	35.00	35.00	32.00		
Total hardness	ppm	86.00	44.00	**1400.00**	**580.00**	**580.00**	58.00	60.00	**300**	
Ca	ppm	15.23	4.81	**104.21**	24.05	72.14	9.62	23.25	**75**	**75**
Ca hardness	ppm	38.03	12.01	260.21	60.05	180.13	24.02	58.06		
Mg	ppm	11.69	7.80	**277.76**	**126.69**	**97.46**	8.28	0.49	**30**	**50**
Chloride	ppm	**482.80**	**357.84**	**3294.40**	**3862.40**	**3237.60**	**266.96**	36.92	**250**	**200**
Na	ppm	**299.00**	**227.00**	**5065.00**	**2505.00**	**1940.00**	146.00	35.10	**200**	**200**
K	ppm	2.00	5.00	35.00	25.00	25.00	3.00	6.40		
Sulphate	ppm	0.00	10.00	140.00	10.00	0.00	0.00	0.00	**200**	**200**
Nitrate	ppm	0.20	0.60	4.60	3.30	5.80	0.70	4.50	**45**	**45**
Phosphates	ppm	1.77	1.69	2.40	1.69	2.37	1.27	1.70	**5**	
TSS	ppm	**376**	**334**	**574**	**688**	**460**	**184**	56	**100**	
TDS	ppm	**540**	400	**8976**	**4928**	**4120**	352	116	**500**	**500**
TS	ppm	916	734	9550	5616	4580	536	172		

Numerals in **Bold** indicated values exceeding permissible limits

Table 26: Water quality analysis of samples collected during November 2011 majorly in the core zone of the TPP

Sampling location code →		**90**	**92**	**93**	**76(1)**	**76(3)**	**BIS standard levels**	**WHO drinking water limits**
Village→		**Nadsal-Tenka**	**Santhur**	**Yellur**	**Yellur**	**Yellur**		
		Pond-Sheik Abdulla	Ash pond	Effluent discharge from TPP	Well- Kariya shetty	Pond-Kariya shetty		
Parameters	**Unit**							
Alkalinity	ppm	1.8	1.4	0.6	0	0		
Total hardness	ppm	68	108	228	**760**	**1520**	**300**	
Ca	ppm	20.04	36.87	64.13	**88.18**	**160.32**	**75**	**75**
Ca hardness	ppm	50.04	92.06	160.13	220.18	400.32		
Mg	ppm	5.36	4.87	17.54	**141.3**	**282.6**	**30**	**50**
Chlorides	ppm	93.72	51.12		**2612.8**	**4671.8**	**250**	**200**
Na	ppm	13.4	6.9	119.9	**280**	**380**	**200**	**200**
K	ppm	12.9	7.2	15.6	40	30		
Sulphates	ppm	7	100	58	5	**250**	**200**	**200**
Nitrates	ppm	0.3	0.5	0.1	7	9.3	**45**	**45**
Phosphates	ppm	2.3	1.07	0.34	1.69	1.18	**5**	

Numerals in **Bold** indicated values exceeding permissible limits

Table 27: Various parameters analysed and range of their values in the collected water samples of study region

PARAMETERS	RANGE
TEMPERATURE (ºC)	26 to 36.1
DO (ppm)	0.74 to 8.81
pH	2.4 to 6.7
TURBIDITY (NTU)	0.35 to 176
TDS (ppm)	29 to 8970
ORP	15 to 365
CHLORIDES (ppm)	5 to 4670
SODIUM (ppm)	1.7 to 5065
POTASSIUM (ppm)	0.2 to 40
ALKALINITY (ppm))	0.04 to 3.4
TOTAL HARDNESS (ppm)	12 to 1520
CALCIUM- Ca (ppm)	1.6 to 160
MAGNESIUM- Mg (ppm)	0.97 to 282
NITRATE (ppm)	0.05 to 9.3
PHOSPHATE (ppm)	0.01 to 2.4
SULPHATE (ppm)	0 to 250

Turbidity: Clarity of water is a very important aspect for human consumption. Turbidity in water is caused by suspended and colloidal matter such as clay, silt, finely divided organic and inorganic matter, plankton and other microscopic organisms, waste discharge and sediments from erosion. The maximum permissible limit of turbidity as per BIS and World Health Organization (WHO) is 5 NTU. Turbidity values ranged from 0.35 to 176 NTU in most of the samples. Among the collected samples, 8 samples mostly found in the immediate vicinity of the TPP were above the acceptable range. The sample of Mr. Kariya Shetty's well [**Sampling location code -76**] was having lower transparency and clarity. It was observed to be a finely suspended red colour solution with turbidity values of 26 NTU while the nearby stream was having a turbidity value of 36 NTU. This is due to the direct discharge of effluents to streams and subsequent leaching to ground water resources. The turbidity of well and borewell water samples of Ms. Sundari Shetty [67] near to the ash pond was about 65 and 7 respectively due to leaching of ions from ash pond and sediments from erosion caused due to improper lining of ash pond. The stream water near Mr. Jagannath Mulya's house [58] showed extremely high turbidity (176 NTU) due to direct disposal of black coal mix effluent.

Total Dissolved Solids (TDS): TDS affect the water quality in myriad of ways impacting the domestic water usage for cleaning, bathing etc as well as drinking purposes. Total dissolved solids originate from organic sources such as leaves, silt, plankton, industrial waste and sewage. Other sources come from runoff from urban areas, road salts used on street, fertilizers and

pesticides used on lawns and farms [APHA, 1995]. Surface as well as groundwater with high dissolved solids are of inferior flavor and induce an unfavorable physiological reaction to the dependent population. A limit of 500 ppm TDS is desirable for drinking waters. The TDS values in the samples analysed, ranged from 29 to 8970 ppm across all locations. Among them, 5 samples were above the BIS and WHO standards. The water sample of Mr. Kariya Shetty's [76] well and pond which is in core region has maximum values ranging from 4120 - 8976 ppm. The stream near Mr. Kariya shetty had high TDS of 4928 ppm due to effluents rich surface run off as well as salt deposits. This would eventually result in higher build up of total solids in surface and ground water making it more unpalatable and hard to be used for domestic purposes.

Chlorides: Chlorides are essentially potential anionic radical that imparts chlorosity to the waters. An excess of chlorides leads to the formation of potentially carcinogenic and chloro-organic compounds like chloroform, etc. Zafar (1964) and Kumar (1995) in their studies described chloride as a pollution indicator. Chloride values in samples ranged from 5 to 4670 ppm. Among the collected samples, 6 samples exceeded the permissible limits. Mr. Jayanth Bhat's well [47], Mr.Kariya Shetty's [76] well and pond, Mr. Jagannath Mulya's [58] well and pond and the streams nearby Mr. Kariya Shetty [76] and Mr.Jagannath Mulya [58] showed very high chloride values due to the discharge of hyper concentrated salt solutions and effluents from the TPP. High chloride content has deleterious effect on metallic pipes and agricultural crops. Certain areas within the core zone are affected by chloride contamination due to the discharge of effluents.

Sodium: Sodium (Na) is one of the essential cations that stimulates various physiological processes and functioning of nervous system, excretory system and membrane transport in animals and humans. Increase of sodium ions has a negative impact on blood circulation, nervous coordination, thence affecting the hygiene and health of the nearby localities. According to WHO guidelines the maximum admissible limit is 200 ppm. In this study the concentration of sodium ranged from 1.7 - 5065 ppm. Samples at Mr. Kariya shetty [76], Mr.Jagannath Mulya [58] and Mr.Bujanga Shetty [57] were exceeding WHO standards. Most critical values (5065 ppm) for sodium were observed in Mr.Kariya Shetty's pond [76].

Potassium: Potassium (K) is an essential element for both plant and animal nutrition, and occurs in ground waters as a result of mineral dissolution, decomposing of plant materials and also from agricultural runoff. Potassium ions in the plant root systems helps in the cation exchange capacity to transfer essential cations like Ca and Mg from the soil systems into the vascular systems in the plants in replacement with the potassium ions. Incidence of higher potassium levels in soil system affects the solute transfer (active and passive) through the vascular conducting elements to the different parts of the plants. The potassium content in the water samples ranges between 0.2-40 ppm.

Alkalinity: Alkalinity is a measure of the buffering capacity of water contributed by the dynamic equilibrium between carbonic acid, bicarbonates and carbonates in water. Sometimes excess of hydroxyl ions, phosphate, and organic acids in water causes alkalinity. High alkalinity imparts

bitter taste. The acceptable limit of alkalinity is 200 ppm. The water samples analysed were having lower alkalinities because of higher acidic environment in the soil systems.

Total hardness: Hardness is the measure of dissolved minerals that decides the utility of water for domestic purposes. Hardness is mainly due to the presence of carbonates and bicarbonates. It is also caused by variety of dissolved polyvalent metallic ions predominantly calcium and magnesium cation although, other cations like barium, iron, manganese, strontium and zinc also contribute. In the present study, the total hardness ranged between 12 to 1520 ppm. According to WHO guidelines the maximum admissible limit is 300 ppm. Throughout the analysis in the due course of the study, 8 samples were observed to have exceeded the permissible limits as given by WHO. The samples of Mr.Kariya Shetty's [76] well, pond and nearby stream consistently showed higher values across different sampling periods during the study.

Calcium: Calcium (Ca) is one amongst the major macro nutrients which are needed for the growth, development and reproduction in case of both plants and animals. The presence of Ca in water is mainly due to its passage through deposits of limestone, dolomite, gypsum and other gypsiferous materials (Manivasakam, 1989). Ca concentration in all samples analysed periodically ranged between 1.6 to 160 ppm. The stream containing coal mix effluents near Mr. Jagannath Mulya [58] together with Mr.Kariya Shetty's well [76], pond and stream samples have Ca values beyond permissible levels.

Magnesium: Magnesium (Mg) in one of the most essential macro nutrients that helps as a co-factor in the enzyme systems and in the central metal ions that constitutes the chlorophyll molecule essential for plant photosynthesis. According to WHO guidelines the maximum admissible limit is 50 ppm. In this study the concentration of Magnesium ranged from 0.97 – 282 ppm. This indicated Mg accumulation in the water systems resulting in the increase in overall hardness of water making it unpalatable and unsuitable for any domestic applications.

Dissolved Oxygen: Dissolved oxygen (DO) is the most essential feature in aquatic system that helps in aquatic respiration as well as detoxification of complex organic and inorganic mater through oxidation. The presence of organic wastes impose a very high oxygen demand on the receiving water leading to oxygen depletion with severe impacts on the water ecosystem. The effluents also constitute heavy metals, organic toxins, oils, volatile organics, nutrients and solids. Thermal Power Plant effluents cause temperature difference in the water and reduce the available oxygen. The DO of the analysed water samples varied between 0.74 to 8.81 ppm. The higher variations of DO especially lower DO values are indicative of fast oxidising chemicals in the immediate vicinity. DO in the surface waters were substantially low compared to the ground water systems, due to effluents released in natural surface streams. The impact was a reduced aquatic biodiversity in the nearby streams and ponds.

Nutrients (nitrates and phosphates): Nutrients essentially comprise of various forms of N and P which readily dissolve in solutions that are uptaken by microbes and plant root systems in the

form of inorganic mineral ions. Accumulation of N as nitrates and P as inorganic P in aquatic ecosystems causes significant water quality problems due to higher net productivity. Together with phosphorus, nitrates in excess amounts in streams and other surface waters can accelerate aquatic plant growth causing rapid oxygen depletion or eutrophication in the water. Nitrates at high concentrations (10 mg/l or higher) in surface and groundwater used for human consumption are particularly toxic to young children affecting the oxygen carrying capacity of blood cells (RBC) causing cyanosis (methemoglobinemia). In the present study, nitrate values ranged from 0.05 to 9.3 ppm and phosphate values ranged between 0.01 to 2.4 ppm.

Sulphates: The incidence of higher sulphate levels imparts an overall acidity to water that becomes unsuitable for domestic usage and cultivation. The higher levels of sulphates affects the nature of the soil under cultivation and results in drastic decline in crop productivities. The SO_x from the atmosphere gets dissolved in water and precipitates as acid rain contributing higher sulphates to the surface and running waters. In the present study sulphates ranged from 0 to 250 ppm. The samples from Mr.Kariya Shetty's pond [76] consistently exceeded the WHO permissible limit of 200 ppm.

Heavy metal analysis: Heavy metals like cadmium, chromium, copper, iron, manganese, nickel, lead and zinc were detected in the water samples of the study region, particularly core zone (Table 28). Cadmium was also observed in the soil samples contaminated by TPP effluents (Table 29).

Table 28: Heavy metal analysis of water samples collected from the study region (mg/l)

Sample	Ash pond 92	Coal mix effluent water 59	Kariya shetty stream (76(1)	Kariya shetty well 76(2)	Kariya shetty pond 76(3)	Jayanth Bhat 48	BIS standards for effluent discharge	BIS standards for drinking water
Cd	0.45	0.00	0.68	**1.00**	**5.02**	**0.03**	**2.00**	**0.01**
Co	0.00	0.01	0.02	0.06	0.09	0.00		
Cr	0.13	0.08	0.09	**0.19**	**0.28**	**0.09**	**2.00**	**0.05**
Cu	0.04	0.15	0.03	**0.12**	**0.12**	**0.19**	**3.00**	**0.05**
Fe	2.89	**4.39**	**11.86**	**14.85**	**94.14**	**1.22**	**3.00**	**0.3**
Mn	0.06	0.27	**3.53**	**3.73**	**8.49**	**0.20**	**2.00**	**0.1**
Ni	-0.02	0.01	0.13	**0.14**	0.01	0.01	**3.00**	**0.02**
Pb	0.02	0.07	0.06	**0.10**	**0.16**	**0.83**	**0.10**	**0.05**
Zn	0.53	**7.42**	0.37	0.26	0.15	4.27	**5.00**	**5**

Numerals in **Bold** indicated values exceeding permissible limits

Table 29: Heavy metal analysis of soil samples collected from the study region (mg/kg)

Sample	Kariya Shetty stream 76(2)	Kariya Shetty field 76(3)	Cristian Fernandis 50	Sheik Abdulla	89	Fly ash	Bottom ash	IS Permissible limits
Cd	**8.03**	0.04	0.02	0.51	0.44	0.05	0.03	**3-6**
Co	0.01	0.05	0.46	2.71	0.82	1.34	0.61	
Cr	4.34	-0.12	0.50	32.98	39.85	0.47	-0.03	**n/a**
Cu	2.09	0.78	5.34	8.60	9.23	11.41	13.61	**135-270**
Fe	10.43	158.20	80.05	6427.50	6180.00	56.03	102.73	
Mn	0.20	6.43	15.01	42.75	16.12	49.10	46.18	**n/a**
Ni	1.32	1.09	1.30	12.76	7.65	1.93	2.38	**75-150**
Pb	-4.17	2.47	15.03	4.83	21.92	2.37	1.46	**250-500**
Zn	0.44	4.42	7.18	103.63	101.48	10.14	5.37	**300-600**

Numerals in **Bold** indicated values exceeding permissible limits

Water analysis reports collected from PCB: Our study shows that the ground as well as surface waters in the 2 km core zone considered around the TPP have deteriorated in quality. These are comparable with other water quality analyses during December 2010 to June 2011 as well as in February, May and October, 2011 collected from PCB. Table 30 shows the sampling locations with time of collection.

Table 30: Time periods and locations of water analyses by PCB (Pollution Control Board)

Time period	Sampling locations
21/3/2011, 18/5/2011	1-open well water of Mr.Kishor kumar Ulloru west side of TPP premises, 2-Open well water of Mr.Bhoja poojari near Garadi South side of premises, 3-Open well water of Mr.Vittal Shetty near ash pond , 4- Open well water of Panduranga Bhajana Mandali Kermundelu Tadamaru, 5-Open well water of Mr.Sundar Bangera Hejamadi, 6-River water sample at Karnire, 7-Open well water of Ms.Kamala near Shambhavi river at Karnire, 8-Open well water of backside of universal brothers Nandikur, 9- Open well water of Mr.Sundar backside of Bappanadu temple Mulki, 10-open well water of Ms.Srilakshmi Simanthooru, Kinnigoli
3/5/2011	1-Open well near Resma nursery Nadsal village, 2-Open well collected back side of universal brothers Nandikur, 3-Open well of Mr.Narendra near Mahaganapathi temple Nandikur, 4- Mulki river about 1.25 km east of sampling 5- Mulki river 2.5 km from confluence with sea
21/4/2011, 12/4/2011, 3/10/2011, 21/10/2011	1-Open well water of Mr.Damodar Suvarna Yellur (Kolachur), 2-Open well water of Mr.Ithappa poojari Yellur (Kolachur), 3-Open well water of Mr.Anantharam Bhat Yellur (Kolachur), 4-Open well water of Mr.Jayanth Bhat Yellur (Kolachur) 5- Open well water Mr.Vimal Mogerthi near Yellur (Kolachur)
29/4/2011	1-Open well water of Mr.Janardhana Acharya Nadsal (Yermal), 2- Open well water of Mr.Gopa Bhandary Nadsal (Yermal), 3-Open well water of Mr.Kishor Poojary Nadsal (Yermal), 4- Pond water of Mr.Kishor Poojary Nadsal (Yermal)

13/4/2010	1- Yellur Kuner Moolastan, 2- Ms.Mary Pinto residence openwell 3-Mr.Janmardhan Acharya residence open well , 4-Open drain near Mr.Shantharam shetty, 5- Mr.Kariya Shetty open well, 6- Inside TPP premises borewell
18/2/2011, 25/2/2011,	1-Open well water of Mazzid E Nirma Trust, Nadsal (Yermal) , 2-Open well water of Ms.Kamala Tenka Moilthi, Nadsal (Tenka) 3-Borewell water of Ms. Sunidhi Moilthi Nadsal (Tenka), 4-Open well water of Ms. Radha Poojari Lachil house Nadsal (Tenka), 5- Openwell water of Mr.Anand Hegde Nadsal (Tenka), 6- Openwell water of Mr.Kishor Poojari Nadsal (Tenka)

Source: PCB

Yellur village

Location 1 – Openwell water of Mr.Jayanth Bhat Yellur [47]
Location 2 – Openwell water of Mr.Vimal Mogerthi near yellur
Location 3 – Openwell water of Mr.Kariya shetty Yellur [76]
Location 4 – Openwell water of Mr.Madhubala J.Shetty, Yellur
Location 5 – Openwell water of Mr.Karim Saheb,Yellur
Location 6 – Openwell water of Mr.Sunanda Tantri Mane,Yellur

TDS was above the permissible limits in all the samples. Well water samples at Mr.Kariya Shetty [76] and Ms.Madhubala Shetty residences had higher TDS during October. Samples were acidic and the value of pH ranged between 2.9- 5.6. Total hardness in well water samples of Mr.Jayanth Bhat [47], Mr.Kariya Shetty [76] and Ms.Madhubala Shetty were above the permissible limits. Calcium of well water samples at Ms.Madhubala Shetty and Mr.Jayanth Bhat [47] exceeded the WHO Limits. Magnesium ranged between 4-1090 ppm. Openwell water of Ms.Madhubala shetty had high magnesium value. Iron content in the samples of Mr.Jayanth Bhat and Mr.Kariya shetty were above the permissible limits. Total hardness and Chloride values of Mr.Jayanth Bhat, Ms.Madhubala Shetty and Mr.Kariya shetty exceeded the permissible limits. Thus in Yellur village, out of 6 samples 3 water samples exceeded WHO limits according to analyses conducted by PCB, due to effluents and leaching.

Table 31: Water quality analysis in Yellur village

Sampling location→		location 1		location2		location3	location 4	location 5	location 6
Paramaters	**unit**	**21-Apr-11**		**3-Oct-11**		**21-Apr-11**	**3-Oct-11**	**21-Oct-11**	**3-Oct-11**
TDS	**mg/l**	**5972**	**590**	422	**752**	**7400**	**12000**	90	**620**
pH		**4.9**	**5.4**	**5.6**	**5.6**	**2.9**	**3.5**	**5.6**	**4.7**
Total hardness	**mg/l**	**900**	70	32	32	**700**	**1400**	18	142
Calcium as Ca	**mg/l**	**132**	6	6	2	44	**124**	1	6
Magnesium as Mg	**mg/l**	**139**	14	4	7	**143**	**1090**	4	25
Iron as Fe	**mg/l**	**0.36**	BDL	BDL	BDL	**0.67**	0.19	BDL	BDL
Sulphate as SO_4	**mg/l**	12	2	3	2	2	7	2	2
Chloride as Cl	**mg/l**	**2300**	212	150	36	**2800**	**4100**	26	170
Nitrate as NO_3	**mg/l**	2	0.2	3	2	0.7	4	0.1	BDL
Fluoride as F	**mg/l**	0.08	BDL	0.08	BDL	0.02	0.04	BDL	BDL
DO	**mg/l**	7.3	7	7.5	7	5.7	5.5	7.1	6.8

Numerals in **Bold** indicated values exceeding permissible limits

Yellur (Kolachur) – Southern side of TPP

Location 1-Open well water of Mr.Damodar Suvarna Yellur (Kolachur)
Location 2- Open well water of Mr.Ithappa Poojari Yellur (Kolachur)
Location 3- Open well water of Mr.Anantharam Bhat Yellur (Kolachur)
Location 4- Openwell water of Mr.Subramanya Bhat, Yellur (Kolachur)
Location 5-Open well water of Mr.Vishwanath, Yellur (Kolachur)

Table 32: Water quality analysis in Yellur (Kolachur) village

Sampling locations→		1		2		3	4	5	
Paramaters	**unit**	21-Apr-11	30-Sep-11	21-Apr-11	30-Sep-11	21-Apr-11	3-Oct-11		**WHO Limits**
TDS	**mg/l**	418	318	**1970**	276	**660**	**812**	456	**500**
pH		**4.9**	**6.2**	**4.4**	6.8	**4.9**	**6.3**	**5.4**	**6.5-8.5**
Total hardness	**mg/l**	66	52	192	56	18	118	48	**300**
Calcium as Ca	**mg/l**	10	2	26	4	12	19	2	**75**
Magnesium as Mg	**mg/l**	10	12	**31**	11	10	17	9	**30**
Iron as Fe	**mg/l**	BDL	BDL	BDL	BDL	0.13	0.1	0.2	**0.3**
Sulphate as SO_4	**mg/l**	2	2	4	2	35	15	2	**200**
Chloride as Cl	**mg/l**	180	96	**760**	80	220	**348**	168	**250**
Nitrate as NO_3	**mg/l**	2	BDL	2	0.9	2	7	BDL	**45**
Fluoride as F	**mg/l**	0.06	BDL	0.06	BDL	0.05	BDL	BDL	**1**
DO		6.8	6.8	6.5	6.9	6.5	6.9	7	

Numerals in **Bold** indicated values exceeding permissible limits

Location 1-Openwell water of Mr.Jaganath Mulya, Yellur (Kolachur)
Location 2-Openwell water of Ms.Girija, Yellur (Kolachur)
Location 3-Openwell water of Mr.Hussian Sahib, Yellur (Kolachur)
Location 4-Openwell water of Mr.Subramanya Bhat, Yellur (Kolachur)

Table 33: Water quality analysis Yellur (Kolachur) village

Locations	Units	1	2	3	4	
Parameters		3-Oct-11		21-Oct-11		**WHO limits**
pH		**5.8**	**2.1**	**6**	**5.9**	**6.5-8.5**
Hardness as CaCO3	**mg/l**	64	32	168	140	**300**
Calcium as Ca	**mg/l**	10	3	18	20	**75**
Magnesium as Mg	**mg/l**	9	6	30	22	**30**
Chloride	**mg/l**	232	32	**600**	**498**	**250**
Sulphate	**mg/l**	11	**330**	11	18	**200**
Flouride	**mg/l**	BDL	BDL	0.06	0.05	**1**
TDS	**mg/l**	**612**	400	**1500**	**1180**	**500**
DO	**mg/l**	6.9	7	6.4	5.7	
Nitrate	**mg/l**	BDL	BDL	**5**	0.5	**45**

The results of analysis of Yellur (Kolachur) showed TDS values in openwell water samples collected from Mr.Ithappa poojari, Mr.Anantharam Bhat, Mr.Subramanya Bhat, Mr.Jaganath Mulya, Mr.Hussian Sahib above the permissible limits as per WHO. The chlorides of water samples from Mr.Ithappa Poojari, Mr.Subramanya Bhat, Mr.Hussian Sahib exceeded the WHO limits. The pH was also not within range in all the samples. Thus the ground water of Yellur (Kolachur) village is contaminated. The high TDS and chloride values indicate exceeding salt content due to release of salt water or effluents.

Santhur village

Table 34: Water quality analysis in Santhur village

Numerals in **Bold** indicated values exceeding permissible limits

Sampling location→		1		2	3	4	WHO Limits
Paramaters	**unit**	21-Mar-11	18-May-11	4-Mar-11	21-Oct-11	21-Oct-11	
TDS	**mg/l**	116	142	86	368	272	**500**
pH		6.8	7.4	**5.9**	**6.3**	6.5	**6.5-8.5**
Total hardness	**mg/l**	20	28	20	120	76	**300**
Calcium as Ca	**mg/l**	4	6	4	11	11	**75**
Magnesium as Mg	**mg/l**	2	3	2	22	12	**30**
Iron as Fe	**mg/l**	**0.38**	**0.41**	BDL	0.11	0.04	**0.3**
Sulphate as SO_4	**mg/l**	2	2	4	2	1	**200**
Chloride as Cl	**mg/l**	30	20	20	20	24	**250**
Nitrate as NO_3	**mg/l**	5	5	0.9	BDL	10	**45**
Fluoride as F	**mg/l**	0.02	0.02	BDL	0.2	0.06	**1**

Location 1 – openwell water of Mr.Vittal Shetty near ash pond
Location 2 – openwell water of Mr.Bhaskar Shetty south side of ash pond
Location 3 – Test borewell water collected at chemical dosing area near ash pond
Location 4 – Test borewell water collected at south side near ash pond

Water samples of March and May 2011, showed higher iron content in openwell of Mr.Vittal Shetty near the ash pond exceeding the permissible limits. The pH of water samples at openwell of Mr.Bhaskar Shetty (at south side of ash pond) was acidic.

Karnire village

Table 35: Water quality analysis in Karnire village

Sampling location→		Site- 1		Site-2		WHO Limits
Paramaters	**unit**	21-Mar-11	18-May-11	21-Mar-11	18-May-11	
TDS	**mg/l**	**48420**	**964**	102	162	**500**
pH		7.9	7.5	7.8	6.9	**6.5-8.5**
Total hardness	**mg/l**	**6250**	230	36	36	**300**
Calcium as Ca	**mg/l**	**460**	44	10	8	**75**
Magnesium as Mg	**mg/l**	**1239**	29	2	4	**30**
Iron as Fe	**mg/l**	**0.35**	**0.38**	**0.77**	**0.78**	**0.3**
Sulphate as SO_4	**mg/l**	**1960**	26	13	12	**200**
Chloride as Cl	**mg/l**	**18500**	150	28	30	**250**
Nitrate as NO_3	**mg/l**	90	10	5	6	**45**
Fluoride as F	**mg/l**	0.1	0.1	0.2	0.1	**1**

Numerals in **Bold** indicated values exceeding permissible limits

In Karnire village the analysis of water samples of river Shambhavi showed that TDS, calcium, magnesium, hardness, iron, sulphate and chlorides were above the WHO permissible limits.

Nadsal (Tenka Yermal) village

Table 36: Water quality analysis in Nadsal (Tenka Yermal) village

Sampling location→		1	2	3	4	5	6	7	WHO limits
Paramaters	**unit**	25-Feb-2011					21-Oct-11		
TDS	**mg/l**	**15424**	**22828**	**1334**	**3056**	**5988**	**920**	500	**500**
pH		7.1	7.1	**4.3**	**4.3**	**3.1**	**6.3**	**6.4**	**6.5-8.5**
Total hardness	**mg/l**	**3050**	**3400**	250	**360**	**920**	162	170	**300**
Calcium as Ca	**mg/l**	**568**	**520**	52	56	**148**	**128**	47	**75**
Magnesium as Mg	**mg/l**	**396**	**510**	29	**53**	**134**	8	13	**30**
Iron as Fe	**mg/l**	0.06	BDL	**0.32**	BDL	**1.17**	**0.69**	**0.97**	**0.3**
Sulphate as SO_4	**mg/l**	**820**	**940**	3	2	3	2	7	**200**
Chloride as Cl	**mg/l**	**5780**	**10000**	**600**	**1450**	**3350**	182	32	**250**
Nitrate as NO_3	**mg/l**	18	26	2	4	8	20	30	**45**
Fluoride as F	**mg/l**	0.08	0.07	0.05	0.04	0.06	0.06	0.05	**1**
DO		6.5	5.8	7	7	6.5	5.2	6.2	

Numerals in **Bold** indicated values exceeding permissible limits

Location1 – Openwell water of Ms.Kamala Tenka Moilthi, Nadsal (Tenka,Yermal)
Location 2 – Borewell water of Ms.Sunidhi Moilthi Nadsal (Tenka,Yermal)
Location 3 – Openwell water of Ms.Radha poojari Lachil house Nadsal (Tenka,Yermal)
Location 4 – Openwell water of Mr.Anand Hegde Nadsal (Tenka,Yermal)
Location 5 – Openwell water of Mr.Kishor Poojari Nadsal (Tenka,Yermal)
Location 6 – Pond water of Mr.Seetharama Shetty, Nadsal (Tenka,Yermal)
Location 7 – Openwell water of Mr.Sheikh Abdulla, Nadsal (Tenka,Yermal)

The results of water analysis of Nadsal (Tenka Yermal) village showed high values for TDS, total hardness, chlorides, calcium and magnesium for all samples, exceeded permissible limits as per WHO. The sulphates in the open well water of Ms.Kamala and Ms.Sunidhi were above the limits. Thus there is a serious contamination in surface and ground water samples. The stream passing near these sites contains the effluents and salt water from the TPP. This is the reason for the contamination of surface and ground water samples nearby this stream.

Admar village

Table 37: Water quality analysis in Admar village

Sampling location→		**1**	**2**	**WHO Limits**
Parameters	**unit**	21-Oct-11		
pH		6.9	6.9	**6.5-8.5**
Hardness as$CaCO_3$	**mg/l**	96	70	**300**
Calcium as Ca	**mg/l**	10	12	**75**
Magnesium as Mg	**mg/l**	17	10	**30**
Chloride	**mg/l**	18	22	**250**
Sulphate	**mg/l**	1	2	**200**
Flouride	**mg/l**	0.04	0.1	**1**
TDS	**mg/l**	280	260	**500**
DO	**mg/l**	5.2	5.6	
Nitrate	**mg/l**	7	20	**45**
Iron	**mg/l**	0.05	0.09	**0.3**

Location 1-Test borewell water collected at R&R near Pipeline corridor, Admar village
Location 2- Test borewell water collected near Shrinivas Bhat , Admar village

The analysis of Admar village reported good quality of water during December 2010 to June 2011. The physical and chemical parameters were within permissible limits as per WHO.

Nandikur village

Table 38: Water quality analysis in Nandikur village

Sampling location→		1			2	
Paramaters	**unit**	21-Mar-11	3-May-11	18-May-11	3-May-11	WHO limits
TDS	**mg/l**	346	264	310	192	**500**
pH		7.6	**6**	7.7	6.9	**6.5-8.5**
Total hardness	**mg/l**	130	50	100	50	**300**
Calcium as Ca	**mg/l**	18	15	20	14	**75**
Magnesium as Mg	**mg/l**	20	3	12	3	**30**
Iron as Fe	**mg/l**	**0.98**	BDL	**0.9**	**0.83**	**0.3**
Sulphate as SO_4	**mg/l**	7	1	2	2	**200**
Chloride as Cl	**mg/l**	26	100	40	30	**250**
Nitrate as NO_3	**mg/l**	10	6	9	10	**45**
Fluoride as F	**mg/l**	0.06	0.02	0.07	0.1	**1**

Numerals in **Bold** indicated values exceeding permissible limits

Location 1-Open well water of backside of Universal brothers Nandikur
Location 2-Open well water of Mr.Narendra near Mahaganapathi temple Nandikur

The results of analysis of water samples from Nandikur village are within permissible limits as per WHO standards except for the iron content.

Inferences from water quality studies

1. Throughout the course of study it was observed that, the TDS levels in the samples were far above the permissible limits of WHO or BIS standards.

2. The streams in the vicinity of the TPP were contaminated with coal mixed effluents, resulting in the increase of ionic concentrations of surface water (nearby water bodies). This has resulted in the decline of crop yield and higher instances of human and livestock health issues.

3. It was observed that the residents near TPP were affected by higher levels of salinity, fly ash dust and vaporized heavy metals has affected health, infrastructures (metallic fixtures, T&D lines, fencing, etc.), plants, reduced crop productivity (agriculture, horticulture, etc.). Plants with phyto deformations and mottling of leaves. The chlorophyll content of the leaves near TPP in affected areas has reduced drastically resulting in poor photosynthesis and biomass accumulations. Apart from this, the dust deposition in floral parts has reduced the pollinators population. The reduced pollination has also added to the reduction in crop yield.

4. Heavy metals leached from the plant complex have contaminated the nearby water and land resources rendering the people around the area with critical health implications.

5. During the dryer periods (post monsoon), hydrocarbons (oil spills and thin oil films) rich effluents were directly diverted to the nearby natural streams. This causes local asphyxia and choking of water bodies, at the same time affecting the aquatic biodiversity in a great way. The nearby well and pond waters were also observed to be heavily contaminated.

   The synthesis of data from PCB records as well as outcome of our field experiments reveal that water is contaminated at Yellur (including Kolachur), Nadsal and Santhur villages mainly due to untreated effluent discharge from TPP, combustion of coal without proper pollution control mechanisms, improper ash handling and ash containment pond, etc.

6.4 Socioeconomic survey – Impact of the TPP on land, water, air, crops, livestock, biodiversity and human health

Residents of Yellur, Nadsal, Nandikur, Santhur, Padebetu and other villages within the study region were selected randomly to elicit the information corresponding to ecology, environmental status, crop productivity, socio-economic and health aspects. Contingency evaluation technique through a structured questionnaire was adopted to compile data from 30 households within 6 km buffer zone (20 households within 2 km core zone). In addition to this, four medical practitioners were interviewed mainly focusing on health related issues due to pollution or contamination of air, water and soil. Results of the survey reveal:

Impacts due to contamination of water

- Higher salinity in the wells in core zone (within 2 km)
- Saltiness, greenish coloration and oily layer in well waters near to streams (carrying effluents discharged by TPP) at Nadsal (Tenka, western side of TPP)
- Skin rashes, lesions, nail deformation (Onychodystrophy),
- Skin itching in northern, southern and western sides due to contamination of stream water (consequent to effluent discharge)
- Changes in groundwater table (due to excess drawl of groundwater at TPP site)

Impacts due to contamination of air environment

- Transport (in open trucks) and dumping of dry coal ash
- Blackish particles settle on leaves, clothes kept for drying, objects inside home, food kept open, etc. in the core zone
- Salt deposits on leaves and roofing tiles in the core zone (deposits tasted salty)
- Corrosion of tin roofing sheets, agriculture implements, dish antennas, iron fencing, vehicle chassis, etc. in the core zone
- Drying of leaves and leaf burn associated with necrosis, chlorosis, etc
- Respiratory ailments like asthma, alveolar infections, bronchitis, etc
- Eye irritation and skin itching in southeastern side closer to silos (where fly ash is stored).

Impact on people's livelihood

- Reduced paddy yield in the core zone (in the 2 km radius) – reduction by 57 to 66%
- Premature falling and reduced yield of areca and coconut
- Reduction in banana yield
- Livelihood of weaker section of the society is threatened with poor or no flowering of jasmine, etc.
- Scarcity of water suitable for drinking and other domestic activities

- Forced displacement without appropriate rehabilitation of native forest dwellers
- Improper valuation of ecosystem goods and services while compensating the loss
- Harassment (of the affected residents complaining/agitating against pollution) by the district administration (police and civil)

Impact on livestock

- Ailments related to skin, respiratory tract, etc
- Miscarriages and decline in milk yield
- Fodder – due to uptake of heavy metal has become non-palatable
- Fodder – reduced grass productivity due to salt as well as ash dust deposition
- Non-palatable grasses, and other herbs due to contamination
- Poultry death due to consumption of effluent mixed stream water

Impact on biodiversity

- Reduced population of peafowl, foxes, wild boar, etc. within core zone.
- Disturbance in food chain due to reduced primary productivity and subsequent decline in species of fishes, crabs and frogs.
- Loss of snake habitat
- Removal of sacred groves and dilapidated state of existing groves
- Presence of pollution tolerant lichen species in the barks of vegetation closer to TPP further confirms pollution of air environment.
- Displacement of native human population

Water: Residents of the region depend mostly on nearby streams, wells/borewells for domestic water requirements. Indiscriminate discharge of coal mix effluents clandestinely by TPP into natural drains is reported at southern, southwestern and northwestern sides of TPP. Respondents in core zone of 2 km radius in the eastern (Santhur), northern (Yellur) and southern (Kolachur) sides reported salinity in well water during all seasons and higher levels during summer. Mr.Kariya Shetty [76] reported and showed yellowish/reddish coloration and oily layer in the well waters and pond on northern side. Also, respondents in southern side complained of similar problems. Respondents also reported of leakages from pipes, leaching and also overflow from fly ash pond (to groundwater sources), movement of contaminated surface water (to groundwater sources) due to direct discharge of effluents to nearby natural drains. This has increased salinity in well water. Respondent near the fly ash pond in Santhur reported of higher turbidity (change in appearance of well water) in addition to salinity. Respondent from western side (Nadsal-Tenka Yermal) also complained of non-potability of well and stream water. During the field investigations we noticed reddish coloration in stream water due to irresponsible action of sustained effluent discharge. Reddish colouration of well waters is also observed in open wells within 200 m of TPP. Nadsal (Tenka Yermal) village in the Western side of the TPP also reported saltiness, greenish coloration and oily layer in well waters near to streams which carried

effluents. Fluctuations in ground water table were also reported by residents Yellur (including Kolachur), Nandikur, Nadsal due to over-extraction of ground water by TPP.

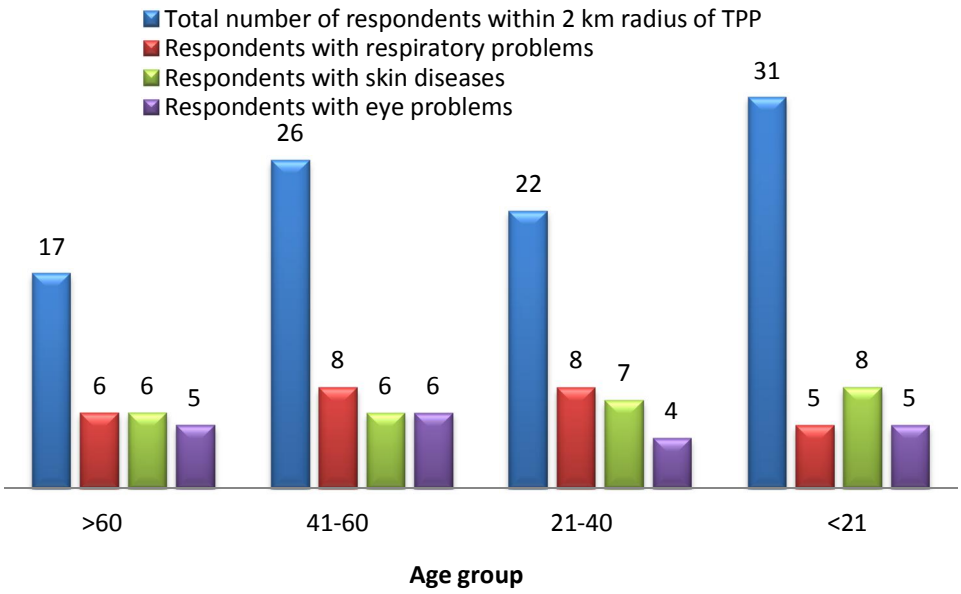
Air: Respondents in the core zone reported of blackish particle deposition on leaves, clothes kept for drying, objects inside home, food kept open etc. and salt deposits on leaves and roofing tiles. This was reported to be intense prior to monsoon, although similar instances were observed even during monsoon. Higher levels of salt content in the environment (higher than similar regions in the coastal Karnataka) has resulted in corrosion of tin roofing sheets, dish antennas, iron fencing, vehicle chassis, mirror frame, well pulleys, mesh cover for wells, etc. Higher levels of ash dust was reported and observed in the localities closer to fly ash pond due to dumping of dry ash. Salt deposits as well as ash dust has enhanced the pollution of air environment evident from drying of leaves, leaf burn, etc. in the core zone.

Crops: Economy of Yellur, Nandikur, Santhur, Nadsal (Tenka Yermal) and Padebetu villages are mainly agrarian and these villages grow paddy and horticultural crops like coconut, areca, sapota, banana and jasmine. Vegetables are also grown near houses to meet the respective family's requirement. Interaction with local farmers reveals that paddy yield has declined drastically by 57-66%. Majority of respondents in the core zone as well as within the 4 km radius of TPP reported decrease in crop yield. Single women who were dependant on floriculture reported of jasmine famine consequent to changes in the air environment with dust and salt. Premature falling of arecanut and coconut, drying of leaves, leaf burn, are very common in the core zone. Instances of premature drop of arecanut and coconut is reported even beyond 2 km and upto 4 km.

Livestock: Livestock owners in the core zone reported of ailments related to skin, respiratory tract, and in some cases miscarriages. Respondents reported of decreased milk yield, less fodder availability, contaminated fodder (due to uptake of heavy metals), reduced fodder yield (due to salt and dust deposition), etc. Majority of respondents indicated non-palatability of fodder (grass and herbs) due to contamination. Also, they reported of poultry death due to consumption of stream water contaminated with effluents discharged by TPP.

Health: All respondents in the core zone complained of serious health problems due to the contaminated air, water and land environment. Ailments reported by the residents in this zone include respiratory (asthma, alveolar infection in superior and inferior concha, bronchitis), skin rashes, lesions, eye irritations, onychodystrophy (nail deformation), etc. Respiratory problems are very common and higher compared to skin and eye diseases among all age groups. Eye irritation and skin itching is reported by the respondents in eastern side of the plant closer to silos (where fly ash is stored), northern, southern and western sides due to contaminated domestic water from streams (Figure 33 and 34).

Figure 33: Health problems of respondents



Biodiversity: The region is a haven for peacocks, foxes, wild boars (Figure 35). etc. Interviews with residents reveal the decline in their numbers in the recent past especially in the core zone. Due to changes in the environment with higher levels of dust and other pollutants there has been reduction in the population of peafoul, foxes, wild boars, etc. Disturbance in the food chain is evident with the reduced primary productivity (grasses on land, algae in water bodies) and this has led to the reduced population of native fishes, crabs and frogs. Reptiles have also lost their habitat due to removal of vegetation, rocky areas, etc. Discussion with elderly people in the locality revealed that the core zone had many sacred groves (patch of forests with native species worshipped by local people). Now, these sacred groves were either removed or in dilapidated state. Presence of pollution tolerant lichen species in the barks of vegetation closer to TPP further confirms pollution of air environment. During public consultations, the discussions with the local people revealed that there has been a large scale displacement of native human population.

Figure 34: Skin lesions, nail deformations, etc observed in people

Figure 35: Biodiversity observed in the study area








Table 39 summarises the environmental impacts due to TPP

Table 39: Impact matrix of UPCL

Parameter	Negative Impact	No Impact	Positive Impact	Short Term	Long Term
A. Impacts due to Project Location.					
a) Changes in land use/land cover	●				●
b) Forced displacement of people				●	
c) Loss of trees/forests	●			●	●
d) Impact on wild fauna	●				●
e) Animal movement paths	●			●	
f) Drainage problems	●				●
g) Risks due to landslides, mudslides	●			●	
h) Contamination of land and water	●			●	●
i) Contamination of air	●			●	●
B. Impacts due to Project Construction					
a) Workforce colonies – without basic amenities (sanitation, fuel, education of children)	●			●	●
b) Pollution at construction sites	●			●	●
c) Soil removal (tunnels, etc.), erosion and sedimentation of streams and river, alterations in topography due to soil disposal	●			●	●
d) Soil disposal problem	●			●	
e) Problems due to geological faults		●			
f) Health risk	●			●	
g) Loss of habitat of wild animals	●			●	
h) Blasting – impact on wild fauna	●			●	
i) Loss of carbon sequestration ability – removal of tree vegetation	●			●	●
j) Groundwater over exploitation	●			●	●
C. Impacts due to Project Operation					
a) Transport of coal (open containers)	●			●	●
b) Storage of coal	●			●	●
c) Solid wastes (fly ash transport and disposal)	●			●	●
d) Contamination of water due to liquid waste	●			●	●

e) Super saturated saline mist	●			●	●
f) Oil pollution	●			●	●
g) Biodiversity loss (sacred groves)	●			●	●
h) Labour colonies with inadequate amenities and sanitation	●			●	●
i) Health (skin, respiratory, etc.)					
j) Landslides, mudslides	●			●	●
a) Economic viability due to reduced horticultural and agriculture crop productivity	●			●	●
k) Accident hazards (poor road conditions)	●			●	

7.0 MITIGATION MEASURES

Table 40 summarises the environmental impacts due to mismanagement of TPP and the required mitigation measures.

1. Salinity intrusion into the groundwater due to high porosity of soil (lateritic) has rendered drinking water non palatable and unfit for different types of domestic usages.
2. Hydrocarbons leaching from the plant sites can be detrimental for the soil and aquatic microflora. The presence of the persistent oil spills will block the air water interface, consequently leading to anoxia and death of aquatic life.
3. Heavy metals in effluents which are discharged directly to surface water bodies or leached has lead to water (surface and also ground water) and soil contamination. The heavy metal pollution would ultimately lead to serious health impacts the occurrences of which are already noticeable in the health of local inhabitants.
4. Higher accumulation of heavy metals results in the uptake of the Heavy metals into the plant systems by the cation exchange capacity of the plants where they exchange the K+ present in the roots with essential cations present in the soil systems. Higher abundance of heavy metals in the soils systems would eventually lead to the trapping of the ions into plants. This again possesses serious threats to the crop yields as well as bio accumulation related health problems. This biogenic effect has a long term impact on the soil systems and the productivity of the local crops.
5. The heavy metals bio accumulate in the aquatic food chain as the polluted waters are openly let to the nearby streams and water bodies. This leads to hyper accumulation of Heavy metals in fish and causes toxicity to human health on consumption (based on heavy metal analysis)
6. The consumption of water with high salinities or TDS would eventually lead to sickness, severe dehydration, brain damage and ultimately death. High salt content in the drinking water affects the metabolism of the body largely. With higher salt influx the metabolism tries to balance the same effect by hydrating the body with every water molecules present in the

body. This eventually leads to breakdown of the organ systems and the body stops functioning. The acute dehydration might lead to coma or permanent brain damage. The ability of the kidneys to send excess salt out of the body also collapses due to consistent usage of saline waters leading to renal failures.

7. The release of supersaturated saline mist due to insufficient desalination has led to the deposition of the salt in the immediate vicinity on plant parts, infrastructure, etc. This affects the morphology and the strength of the plants. **The deposition of the saline particles on the foliar parts results in the plasmolysis of the cells thence killing the soft tissues which are directly exposed. The reduction in the foliar cell densities would in turn result in the decrease in the densities of the chloroplasts leading to reduced photosynthetic activities and lower crop yield. This is evident from the observation of chlorosis and necrotic spots on the vegetative parts of the flora in close proximities.** The salt deposition also affects to large extent the reproductive parts as the male and the female reproductory organs of the flora, obstructing fertilisation. Also due to deposition of particulate matters with contaminants on the pollen of the flower has resulted in impairing pollination services. This is evident from reduced pollinators even in peak phonological season. The phyto-toxicity due to this has affected the crop yield. Also, due to deposition of dust the flower has lost their ability to attract pollinators which has affected the fertilisation and embryo formation.
8. It has been observed that the fly ash waste mismanagement have led to the increase in the PM in the environment. This especially leads to life threatening respiratory syndromes. Bronchitis, lung infection, alveolar stiffness and nasal mucosal infection. Higher instances in the occurrence of asthma are the pointer about air pollution. Improper handling of fly ash (transport) as well as mismanagement of the fly ash pond has seen the traces of fly ash in the surrounding vegetation, land, etc. The vegetation around have a phenomenon loss of their photosynthetic yield because of the lesser exposure of the sunlight to the leaves due to fly ash deposition. The fly ash deposits also close the stomatal opening of the leaves where in the plants completely losses the conduction/transport of the ions from the ground as a result of decrease in the rates of evapo-transpiration and thus transpiration pull. The closure of the guard cells leads to decrease in the exchange of gases which directly affects photosynthetic yield and eventually leads to plant death.
9. The pollutants from the emission during the coal burning as NOx and SOx also have a profound impact on the local people. The atmospheric SO2 might solubilise in the rain and enter the ground waters as sulphurous acid (H3SO4) or sulphuric acid (H_2SO_4).
10. The alterations in the soil pH and ionic regimes have impacted the soil microflora, impairing its ability to mineralize organic matter, resulting in reduced soil fertility or soil nutrients. Apart from these, high variation of pH has lead to a decreased crop yield.

Table 40: the environmental impacts due to mismanagement of TPP and the required mitigation measures

Observations	Causal factors	Required mitigation measures (to be implemented by TPP with the regular monitoring of post project monitoring task force (appointed by the district administration involving all stakeholders' representatives))
WATER		
• Contamination of stream water	• Leakage from coal storage yard • Direct discharge of effluents • Discharge of coal mix water • Sustained seepage and frequent overflow from ash pond • Microbial contamination - Sewage from labour colony, open defecation in the vicinity of labour colony (the presence of feacal coliform bacteria in higher proportions further substantiates, mismanagement of sewage at TPP and also at labour colony). • Dumping of organic solid wastes	• Appropriate containment of coal and coal mix water by redesign of storage yard with drains and rainproof shelter • Proper impervious liner for ash pond • Treatment of effluents and only treated water to be let into surface water bodies (after passing through wetlands with native species of grass etc.) • Installation of sewage treatment • Segregation and treatment of solid wastes • Strengthen the regulatory mechanism at local levels with adequate and trained professionals
• Contamination of ground water	• Salinity intrusion ❖Leakage from pipe ❖Leakage of saline water due to improper storage • Deposition of salt on vegetation and subsequent discharge to soil with precipitation • Hydrocarbon inflow • Acidic salts like sulphates • Heavy metal leaching • Sewage from labour colony, open defecation in the vicinity of labour colony	• Avoiding supersaturated saline mist discharge from cooling towers • Leakproof salt tolerant pipe (water intake system) Proper storage of salt water, Remove salinity from water before use • Bioremediation of hydrocarbon based waste • FGDs and other desulphurization techniques (sulphur scrubber) for arresting sulphur • Treatment of coal mix water containing sulphates and heavy metals (bioremediation, ion exchange resins)
• Ground water table fluctuation	• Over exploitation of ground water	• Rainwater harvesting through surface water harvesting and reduced dependence on ground water at TPP • Implementation of Sujala Dhara programme to provide drinking water to the villages through the construction water storage tanks (with adequate safety and catchment conservation measures)
AIR		
• Salt deposition on leaves	• Supersaturated saline mist discharge from cooling towers	• Avoiding supersaturated saline mist discharge from cooling towers
• Ash dust	• Particulate matter dispersion • Transport of fly ash in open trucks	• Install functional ESPs • Ash transport through closed conveyor belts

	• Dumping of dry ash in ash pond	• Alternate use of fly ash • Wet dumping of fly ash
• Unburnt carbon particles	• Incomplete combustion of coal	• Improved thermal efficiency
• SOx, NOx emissions	• Improper air pollution control	• Install efficient FGDs and mechanism for deNOx
LAND		
• Mudslides, soil erosion	• Inappropriate land stabilization, soil management (exposed slopes) at TPP site	• Remediation through vegetation (grasses and shrubs as soil binders) • Slope stabilization through embankments
• Soil microbial contamination	• Open defecation (labour colony) • Discharge of effluents to streams • Discharge of labour colony sewage	• Provide appropriate sanitation facility • Treatment of effluents and sewage
• Salinity in soil	• Supersaturated saline mist discharge from cooling towers • Leakage from pipes – degradation of land, enhanced salinity has made soil unproductive and unfit for agriculture • Leakage of saline water due to improper storage • Deposition of salt on vegetation and subsequent discharge to soil with precipitation	• Avoiding supersaturated saline mist discharge from cooling towers • Leakproof salt tolerant pipe (water intake system) • Proper storage of salt water • Remove salinity from water before use • Scientific assessment of lands affected by salinity for restoring the land (fit for agriculture and sustain livelihood of people) • Beside the compensation for loss of crop for the particular year, it has to be extended till the salinity affected cropland are restored •
• Degraded land	• Insufficient green cover	• Atleast 33% vegetation cover at the project site as per the environment norms of GoI and also as per the stipulations of environment clearance
VEGETATION		
• Leaf burning, drying of leaves	• Salt deposition on leaves • Salinity in subsoil root systems	• Avoiding supersaturated saline mist discharge from cooling towers • Leakproof salt tolerant pipe (water intake system) • Proper storage of salt water • Remove salinity from water before use
• Chlorosis and necrosis • Mottling and dwarfing • premature fall of coconut • non-flowering of jasmine • loss of Thulasi (*Ocimum sanctum*) • decrease in yield of paddy, banana, areca	• Phyto-toxicity due to salinity, SOx, NOx and heavy metals	• FGDs and other desulphurization techniques (sulphur scrubber) for arresting sulphur • Treatment of coal mix water containing sulphates and heavy metals (bioremediation, ion exchange resins)

• reduced productivity of fodder crops (local grass, herbs)		
• Particulate deposition on leaves	• Absence of multitier vegetation	• Plant appropriate saplings to mitigate dust and noise
INFRASTRUCTURE		
• Degradation of tin sheets, vehicle chassis, dish antenna, well pulleys, wire mesh of wells, transmission lines, railway tracks, fencing, roof tiles, • Flake formation in distemper for walls	• Salt deposition and consequent corrosion • SOx	• Avoiding supersaturated saline mist discharge from cooling towers • FGDs and other desulphurization techniques (sulphur scrubber) for arresting sulphur
HUMAN HEALTH AND LIVELIHOOD		
• respiratory ailments like asthma, alveolar infections, bronchitis, etc. • eye irritation and skin itching Skin rashes, lesions, nail deformation **(**Onychodystrophy), • Digestive disorder	• Respirable suspended particulates • Leakage/discharge of hydrocarbon based substances • Contamination of surface/ground water bodies and soil from coal mix water due to fugitive dust suppression or rainfall run-off. Exposure of coal to air and water results in the oxidation of the pyrite to sulphate and sulphuric acid, causing acid mine drainage**.** • Contamination of water – SOx, heavy metals, • Fecal contamination • Allergenic responses	• Functional ESPs • FGDs and other desulphurization techniques (sulphur scrubber) for arresting sulphur • Avoiding supersaturated saline mist discharge from cooling towers • Bioremediation for heavy metals • Treatment of effluents and sewage • Using closed conveyor belts for transfer of fly ash • Wet disposal of ash • Multitier and well maintained green belt around the TPP as well as ash pond
• Conversion of water tanks (constructed under Sujaladhara programme for supplying drinking water to nearby villages – Santhur). • Livelihood of weaker section of the society is threatened with poor or no flowering of jasmine, plantain leaves, thulasi, etc. • Reduced yield of agricultural (paddy, etc.) and horticultural (Areca, coconut, cashew, tamarind, Guava, etc.) crops • Scarcity of water suitable for drinking and other domestic activities • Forced displacement without appropriate rehabilitation of native forest dwellers • Improper valuation of ecosystem goods and services while compensating the loss	• Conversion of water tank/pond to ash pond, depriving local people of their basic need – clean drinking water • Phyto-toxicity • Effluent contaminating water sources • Indifferent attitude/apathy of TPP officials towards local people • Inhuman district authorities (forced eviction of local inhabitants during high monsoon at midnight) and insensitive to environment contamination complaints.	• Restore/ construct water pond/tank with adequate safety measures to provide drinking water to the villages • FGDs and other desulphurization techniques (sulphur scrubber) for arresting sulphur • Treatment of coal mix water containing sulphates and heavy metals (bioremediation, ion exchange resins) • Avoiding supersaturated saline mist discharge from cooling towers • Sensitise district authorities (including DC) of environmental ethics, valuation of ecosystem services and goods • Issue of CFO (Consent for continued operation) by regulatory authorities only on compliance of environmental norms • Environmental Management Cell (EMC) with qualified environmental professionals for regular monitoring and

		environmental auditing • Capacity building of the district administration of India's environmental legislations pertaining to air, water, environment, forest dwellers rights, fundamental rights of the citizens, Biodiversity act, MSW rule, etc. • Strengthen the regulatory mechanism at local levels with adequate and trained professionals
LIVESTOCK		
• Ailments related to skin, respiratory tract, etc. • Miscarriages and decline in milk yield • Fodder – due to uptake of heavy metal has become non-palatable • Fodder – reduced grass productivity due to salt as well as ash dust deposition • Non-palatable grasses, and other herbs due to contamination • poultry death due to consumption of effluent mixed stream waters	• Respirable suspended particulates • Leakage/discharge of hydrocarbon based substances • Contamination of surface/ground water bodies and soil from coal mix water due to fugitive dust suppression or rainfall run-off. Exposure of coal to air and water results in the oxidation of the pyrite to sulphate and sulphuric acid, causing acid mine drainage. • Contamination of water – SOx, heavy metals, • Phyto-toxicity • Effluent contaminating water sources	• Avoiding supersaturated saline mist discharge from cooling towers • Bioremediation for heavy metals • Treatment of effluents and sewage • Functional ESPs • FGDs and other desulphurization techniques (sulphur scrubber) for arresting sulphur • Using closed conveyor belts for transfer of fly ash • Wet disposal of ash • Multitier and well maintained green belt around the TPP as well as ash pond

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ANNEXURE I

Fly ash and its impacts

Fly ash is a particulate matter ranging in size from 0.01 to 100 μm released into the flue stream during combustion of coal in power generating stations. The mineralogical, physical and chemical properties of fly ash depend on the type of coal, combustion conditions, emission control devices and handling methods. Chemically it is a mixture of oxides, hydroxides, carbonates, silicates and sulphates of calcium, iron, aluminum and other metals in trace amount. It is grey to black in color, abrasive, alkaline and refractory in nature. Fly ash is regarded as a pollutant due to its negative impact on the ecosystem, although it has alternate, safe and viable utilities **[1]**.

Formation of fly ash: Coal is a sedimentary rock formed millions of years ago from plant materials containing combustible organic matter in the form of dehydrogenated plant fragments as well as inorganic matter in the form of minerals like alumino-silicate clays, silica, carbonates of calcium, magnesium or iron and sulphides among other traces. On combustion at high temperatures, all elements in coal excluding carbon, hydrogen, nitrogen, oxygen and sulphur undergo physical and chemical transformation to form ash **[2]**. The mechanism of ash formation involves several particles that originate from a single coal particle through the initial process of fragmentation. As the combustible carbon matter surrounding the mineral components burnout, finely distributed ash components reach the particle surface. The molten ash components merge into larger particles and some part of the ash vapourise at high temperature, condense and coagulate. Vaporous pollutants and heavy metals accumulate over the ash particles. Coarse ash particles known as bottom ash (or slag), fall to the bottom of the combustion chamber, while the lighter fine ash particles called fly ash, remain suspended in the flue gas. In pulverized fuel firing systems, 70-90% is released as fly ash while 10-30% is removed as coarse-grained bottom ash **[3].** Enrichment of components is found to be higher in fly ash when compared to bottom ash **[4]**

Constituents of fly ash: Apart from high percentage of silica (SiO_2), alumina (Al_2O_3) and magnetite (Fe_2O_3), listed in Table 1, fly ash also contains oxides, hydroxides, carbonates, silicates and sulphates of different elements like phosphorous, potassium, calcium, magnesium, iron, manganese etc. The chemical composition of fly ash enables its use for the synthesis of

zeolite, alum and precipitated silica **[5]**. Based on the nature of coal and combustion conditions, fly ash may contain various levels of heavy metals such as antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, and zinc **[6]**.

Table 1: Chemical composition for fly ash produced from different coal types **[5]**.

Component (wt.%)	**Bituminous**	**Sub-bituminous**	**Lignite**
SiO_2	20–60	40–60	15–45
Al_2O_3	5–35	20–30	10–25
Fe_2O_3	10–40	4–10	4–15
CaO	1–12	5–30	15–40
MgO	0–5	1–6	3–10
SO_3	0–4	0–2	0–10
Na_2O	0–4	0–2	0–6
K_2O	0–3	0–4	0–4

Heavy metals in fly ash: Indian coal has very high ash content in the range of 35-40%. A study of 3 coal thermal plants based in and around Delhi reveals the amount of heavy metals in the fly ash generated (Table 2) [7]. According to an analysis on fly ash samples collected from 5 thermal plants (ranging from 90-3000 MW capacities) in India, concentrations of toxic heavy metals such as arsenic, mercury, lead and cadmium were in the range as given in Table 3 **[4]**. Analysis of heavy metals in groundwater near an ash disposal site in Orissa, India showed high concentrations of iron, barium, copper, manganese, sulphur, lead, vanadium and zinc. According to the study, the zone of attenuation for barium, iron, copper, manganese, sulphur and zinc in groundwater was about 600 – 900 m from the ash pond, while lead did not show any significant attenuation even at a distance of 1200 m **[8].**

Table 2: Heavy metals in fly ash samples of 3 coal thermal plants

Sample	**Cr**	**Mn**	**Pb**	**Zn**	**Cu**	**Ni**	**Co**
Fly ash (mg/kg)	87-103	47-139	20-56	60-124	56-83	28-63	8-18

Table 3: Heavy metals in fly ash samples of 5 coal thermal plants

Sample	As	Hg	Pb	Cd
Fly ash (µg/g)	0.19–0.35	0.51–2.13	7.6–35.3	0.6–0.93

Impact of heavy metals on natural ecosystem: Heavy metals like arsenic, lead, nickel, cobalt, chromium, boron and antimony found in fly ash are hazardous for living organisms. These elements can potentially be released to the soil, surface water, and groundwater by leaching processes also affecting the vegetation.

The leaching potential of ash ponds is higher due to diurnal and seasonal variations in temperature, moisture and other parameters **[9]**. Leaching of soluble ions from ash ponds into the ground water was observed in studies near Vijayawada Thermal Power Station **[10].** Studies indicate that leachability of cationic metals such as cadmium, chromium, zinc, lead, mercury, and silver increases with decreasing pH or acidic conditions **[11]**.

Bio-accumulation of heavy metals in plants lead to increased elemental composition eventually entering the food chain. An investigation of fly ash contaminated areas in Uttar Pradesh, India showed the bio-accumulation of heavy metals like Fe, Zn, Cu, Mo, B, Si, Al, Cr, Pb, Cd, Hg and As in native aquatic, terrestrial and algal species in the vicinity **[12]**.

Leachate from fly ash dumpsites has genotoxic potential and may lead to adverse effects on vegetation and on the health of exposed human populations. A study on the mutagenicity and genotoxicity effects of fly ash leachate showed predominance of the metals like sodium, silicon, potassium, calcium, magnesium, iron, manganese, zinc, and sulphate. The Ames Salmonella mutagenicity assay conducted on two-tester strains and genotoxicity assay on fly ash leachate carried in vitro on human blood cells and in vivo on Nicotiana plants indicated that the leachate was directly mutagenic and resulted in DNA damage in whole blood cells, lymphocytes, and in Nicotiana plants **[12]**.

Other pollutants in fly ash: Certain organic constituents contained in coal, during combustion results in formation of organic pollutants (mutagens and carcinogens) like Polycyclic Aromatic Hydrocarbons (PAH) and Polycholorinated biphenyls (PCB) which are adsorbed to the fly ash.

The impact of organic pollutants adsorbed to fly ash also reflects on water, soil and vegetation. Based on the fly ash generated from 5 thermal plants in India, the concentration of Benzo(a)Pyrene which is the most potent carcinogenic and mutagenic Polycyclic Aromatic Hydrocarbons (PAH) varied as 0.82- 18.14 ng/g. The total PAHs and PCBs in the fly ash samples were found to be in the range of 43.61-936.14 ng/g and 7.34-178.69 ng/g respectively **[13]**. Studies on fly ash also reveal the increased threat of radioactivity and its impact on the ecosystem including humans. According to a study based on 30 power plants in India, natural radionuclides like Ra-226, Th-228 and K-40 gets enriched by 2-5 times in the resulting fly ash compared to the parent coal.

Utilization of fly ash: Fly ash generated from coal based thermal power plants are usually stored in ash ponds which contaminate the top soil and water resources while also affecting the biodiversity. However, utilization of fly ash for alternative purposes has the following benefits **[5]**:

1. minimizing environmental impact of direct disposal,
2. minimizing disposal costs,
3. enabling other uses of the land since less area is reserved for fly ash disposal,
4. procuring financial returns from the sale of the by-product
5. replacing scarce or expensive natural resources.

In India, one of the major areas for fly ash utilization is in construction (cement production, brick manufacturing and road embankments) **[1]**. Typical highway engineering applications include fly ash for encapsulated purposes and unencapsulated purposes **[4]**:

Encapsulated purposes

1) Pozzolan in Portland Cement Concrete (PCC): Fly ash generated during pulverized coal combustion is categorized as pozzolan which are siliceous and/or aluminous materials that together with water and calcium hydroxide form cementitious products at ambient temperatures. The pozzolanic properties of the ash, including its lime binding capacity and

fineness makes it useful for the manufacture of cement, building materials concrete and concrete-admixed products.

2) Asphalt filler: The spherical shape and particle size distribution of fly ash makes it good mineral filler in Hot Mix Asphalt (HMA) applications which improves the fluidity of flowable fill and grout.

Unencapsulated purposes

3) Soil and road base stabilization: The geotechnical properties of fly ash like specific gravity, permeability, internal angular friction and consolidation characteristics make it suitable for use in construction of roads, embankments, structural fill etc. Fly ash also has important physicochemical characteristics such as bulk density, particle size, porosity, water holding capacity, and surface area. Roadways have high potential for large volume use of high carbon fly ash (HCFA) which can be activated with lime kiln dust (LKD) and used as a base layer for newly paved roads.

4) Flowable fills, grouts, structural fill/embankment: Flowable fill is a mixture of fly ash, water, and portland cement that flows like a liquid, sets up like a solid, is self-leveling, and requires no compaction to achieve maximum density.

Technical constraints: There are certain technical constraints to usage of fly ash for road construction. Loss on Ignition (LOI) is a measure of unburned carbon in the fly ash and is a critical parameter for concrete applications. Fly ash that contains significant amounts of unburned carbon due to the use of low nitrogen-oxide and sulphur-oxide burners cannot be reused in concrete production due to its reactivity with air entrainment admixtures. Fly ash which contains sulphur in excess of 5.0 percent as SO_3 or contain scrubber residue, should be carefully evaluated with specific project soils to evaluate the expansion potential of the materials combination **[14]**.

Minimizing the environmental impact of fly ash usage in road construction [Water contamination] [4,5].

- While using fly ash for road construction, potential impacts to ground water and soil must be considered and studied.
- While determining the possible degree of leaching, it is necessary to have an understanding of the hydrological conditions and the permeability of materials and soil.
- The pavement structure and its designed thickness is an important parameter when evaluating harmful effects of fly ash on the environment.
- Take care when using or disposing off any construction material in a hydro-geologically vulnerable area.
- Follow proper engineering requirements when using unencapsulated fly ash.
- Dust control and erosion prevention measures are essential during construction phase.
- Scientific proportion of fly ash in the construction materials should be practiced.
- The amount of leachate produced should be controlled by assuring adequate compaction, grading to promote surface runoff, and daily proof-rolling of the finished subgrade to impede infiltration.
- When construction is finished, a properly seeded soil cover will reduce infiltration. For highway embankments, the pavement may be an effective barrier to infiltration
- Occupational issues include the handling of dry ash prior to or during its inclusion in a concrete mix or exposures during demolition of concrete structures. In such cases, work inhalation and skin contact precautions should be observed

Environmental impact of fly ash utilization in road construction: Fly ash is a waste material with variable chemical and mineralogical composition. Its unrestrained application could affect the environment adversely if proper and scientific methodologies are not adopted.

***During road construction phase*:** When large quantities of fly ash are used, the quantities of toxic elements that can leach into the waters and soil become significant. Particularly, if the drainage from fly ash storage near the construction site is directly released into the watercourse, the aquatic living organisms in it are affected. These waters supplied to the people also threaten

their health **[15]**. Before embarking on construction activities involving fly ash, potential impact of water and soil must be studied.

i. ***Encapsulated purposes*:** Fly ash used for encapsulated purposes like PCC, asphalt filler etc have shown minimal heavy metal leaching impact **[16]**. Since fly ash is bonded with asphalt or cement, significantly lower leaching abilities are observed for the following reasons: 1) ash particles are surrounded by asphalt or cement layer preventing water seepage, 2) bonded materials are mainly used for upper base courses that are thinner compared with the lower base courses. These materials when well compacted have a very low permeability and there is no significant influence of heavy metals on the surrounding waters and soil due to leaching **[15]**.

ii. ***Unencapsulated purposes*:** Studies on fly ash used for unencapsulated fly ash purposes like soil-road base stabilization, fill/embankments etc show leaching potential of heavy metals into the environment under certain conditions.

- According to a case study on fly ash based fill in United States, the shallowness of the drinking water wells, **the porosity of the overlying sands, the location of the landfill, and the improper use of fly ash all contributed to the contamination of a town's drinking water with high levels of boron, manganese, and molybdenum [16]**.
- If the soil-road base stabilization layer is of average thickness and has reduced exposure to moist or damp conditions, leaching of heavy metals may be negligible **[16].** Hence, it could be inferred that usage of fly ash in coastal regions with high moisture content might induce leaching of heavy metals.
- It is not advisable to use flyash in high rainfall regions with laterite soil as the chances of contamination of groundwater sources and soil is higher due to leachate from fly ash, which gets transported faster in laterite media due to higher infiltration rate leading to contamination and hence affects the dependent population in the region.
- The leaching potential of unpaved road materials (URM) mixed with lime activated high carbon fly ash and evaluation of groundwater (impacts of barium, boron, copper, and zinc leaching) indicate that an increase in fly ash and lime content has significant effects on

leaching behavior of heavy metals from URM–fly ash mixture. An increase in fly ash content and a decrease in lime content promoted leaching of Ba, B and Cu whereas Zn leaching was primarily affected by the fly ash content. The metal concentrations decreased with time and distance due to dispersion in soil vadose zone (top soil to water table section) **[17]**

- A study investigated the leaching potential of six metals, Al, Cr, Fe, Mn, Sb and V, from the fly ash-lime kiln dust (LKD) stabilized soils based on a series of batch water leach test and column leach test. The results indicated that an increase in LKD amount, pH, and fly ash content have significant effects on leaching behavior of heavy metals from soil–fly ash–LKD mixtures. The addition of fly ash caused an increase in pH values and in concentrations of Sb, V, Cr, Al and Mn **[18]**
- The potential for leaching of metals from fly ash stabilized subgrade soils used in highway construction was evaluated based on (1) water leach testing (WLT), (2) laboratory column testing, (3) field lysimeter testing, and (4) numerical modeling on soil-fly ash mixtures. The tests showed that 1) concentrations of metals in the leachate from soil-fly ash mixtures tend to be lower (1.5 to 2.5 times) than those from fly ash alone and the concentration increases non-linearly with increasing fly ash content, 2) the pH of the effluent and initial effluent concentration from soil-fly ash mixtures increases with increasing fly ash content, 3) the release pattern for metals from the soil-fly ash mixtures appears to be adsorption-controlled, 4) concentrations of most of the metals of concern are higher in leachate collected from the fly ash stabilized pavement section and decreased slightly over time, 5) the maximum concentration decreases by about 5 times within the first meter below a fly ash stabilized layer, and then decreases more gradually at deeper depths, 6) the maximum concentration at a given depth decreases with increasing dispersion coefficient and decreasing thickness of the stabilized layer, 7) the time to reach the maximum concentration at a particular depth is independent of the thickness of the stabilized layer, and increases as the dispersion coefficient decreases and the retardation factor increases **[19]**

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Coal Ash Is More Radioactive than Nuclear Waste

By burning away all the pesky carbon and other impurities, coal power plants produce heaps of radiation

By Mara Hvistendahl | December 13, 2007 |

CONCENTRATED RADIATION: By burning coal into ash, power plants concentrate the trace amounts of radioactive elements within the black rock. Image: ©ISTOCKPHOTO.COM

The popular conception of nuclear power is straight out of *The Simpsons*: Springfield abounds with signs of radioactivity, from the strange glow surrounding Mr. Burn's nuclear power plant workers to Homer's low sperm count. Then there's the local superhero, Radioactive Man, who fires beams of "nuclear heat" from his eyes. Nuclear power, many people think, is inseparable from a volatile, invariably lime-green, mutant-making radioactivity.

Coal, meanwhile, is believed responsible for a host of more quotidian problems, such as mining accidents, acid rain and greenhouse gas emissions. But it isn't supposed to spawn three-eyed fish like Blinky.

Over the past few decades, however, a series of studies has called these stereotypes into question. Among the surprising conclusions: the waste produced by coal plants is actually more radioactive than that generated by their nuclear counterparts. In fact, the fly ash emitted by a power plant—a by-product from burning coal for electricity—carries into the surrounding

environment 100 times more radiation than a nuclear power plant producing the same amount of energy. * [*See Editor's Note at end of page 2]*

At issue is coal's content of uranium and thorium, both radioactive elements. They occur in such trace amounts in natural, or "whole," coal that they aren't a problem. But when coal is burned into fly ash, uranium and thorium are concentrated at up to 10 times their original levels.

Fly ash uranium sometimes leaches into the soil and water surrounding a coal plant, affecting cropland and, in turn, food. People living within a "stack shadow"—the area within a half- to one-mile (0.8- to 1.6-kilometer) radius of a coal plant's smokestacks—might then ingest small amounts of radiation. Fly ash is also disposed of in landfills and abandoned mines and quarries, posing a potential risk to people living around those areas.

In a 1978 paper for *Science,* J. P. McBride at Oak Ridge National Laboratory (ORNL) and his colleagues looked at the uranium and thorium content of fly ash from coal-fired power plants in Tennessee and Alabama. To answer the question of just how harmful leaching could be, the scientists estimated radiation exposure around the coal plants and compared it with exposure levels around boiling-water reactor and pressurized-water nuclear power plants.

The result: estimated radiation doses ingested by people living near the coal plants were equal to or higher than doses for people living around the nuclear facilities. At one extreme, the scientists estimated fly ash radiation in individuals' bones at around 18 millirems (thousandths of a rem, a unit for measuring doses of ionizing radiation) a year. Doses for the two nuclear plants, by contrast, ranged from between three and six millirems for the same period. And when all food was grown in the area, radiation doses were 50 to 200 percent higher around the coal plants.

McBride and his co-authors estimated that individuals living near coal-fired installations are exposed to a maximum of 1.9 millirems of fly ash radiation yearly. To put these numbers in perspective, the average person encounters 360 millirems of annual "background radiation" from natural and man-made sources, including substances in Earth's crust, cosmic rays, residue from nuclear tests and smoke detectors.

Dana Christensen, associate lab director for energy and engineering at ORNL, says that health risks from radiation in coal by-products are low. "Other risks like being hit by lightning," he adds, "are three or four times greater than radiation-induced health effects from coal plants." And McBride and his co-authors emphasize that other products of coal power, like emissions of acid rain–producing sulphur dioxide and smog-forming nitrous oxide, pose greater health risks than radiation.

The U.S. Geological Survey (USGS) maintains an online database of fly ash–based uranium content for sites across the U.S. In most areas, the ash contains less uranium than some common rocks. In Tennessee's Chattanooga shale, for example, there is more uranium in phosphate rock.

Robert Finkelman, a former USGS coordinator of coal quality who oversaw research on uranium in fly ash in the 1990s, says that for the average person the by-product accounts for a miniscule amount of background radiation, probably less than 0.1 percent of total background radiation

exposure. According to USGS calculations, buying a house in a stack shadow—in this case within 0.6 mile [one kilometer] of a coal plant—increases the annual amount of radiation you're exposed to by a maximum of 5 percent. But that's still less than the radiation encountered in normal yearly exposure to X-rays.

So why does coal waste appear so radioactive? It's a matter of comparison: The chances of experiencing adverse health effects from radiation are slim for both nuclear and coal-fired power plants—they're just somewhat higher for the coal ones. "You're talking about one chance in a billion for nuclear power plants," Christensen says. "And it's one in 10 million to one in a hundred million for coal plants."

Radiation from uranium and other elements in coal might only form a genuine health risk to miners, Finkelman explains. "It's more of an occupational hazard than a general environmental hazard," he says. "The miners are surrounded by rocks and sloshing through ground water that is exuding radon."

Developing countries like India and China continue to unveil new coal-fired plants—at the rate of one every seven to 10 days in the latter nation. And the U.S. still draws around half of its electricity from coal. But coal plants have an additional strike against them: they emit harmful greenhouse gases.

With the world now focused on addressing climate change, nuclear power is gaining favor in some circles. China aims to quadruple nuclear capacity to 40,000 megawatts by 2020, and the U.S. may build as many as 30 new reactors in the next several decades. But, although the risk of a nuclear core meltdown is very low, the impact of such an event creates a stigma around the non carbon power source.

The question boils down to the accumulating impacts of daily incremental pollution from burning coal or the small risk but catastrophic consequences of even one nuclear meltdown. "I suspect we'll hear more about this rivalry," Finkelman says. "More coal will be mined in the future. And those ignorant of the issues, or those who have a vested interest in other forms of energy, may be tempted to raise these issues again."

**Editor's Note (posted 12/30/08): In response to some concerns raised by readers, a change has been made to this story. The sentence marked with an asterisk was changed from "In fact, fly ash—a by-product from burning coal for power—and other coal waste contains up to 100 times more radiation than nuclear waste" to "In fact, the fly ash emitted by a power plant—a by-product from burning coal for electricity—carries into the surrounding environment 100 times more radiation than a nuclear power plant producing the same amount of energy." Our source for this statistic is Dana Christensen, an associate lab director for energy and engineering at Oak Ridge National Laboratory as well as 1978 paper in Science authored by J.P. McBride and colleagues, also of ORNL.*

As a general clarification, ounce for ounce, coal ash released from a power plant delivers more radiation than nuclear waste shielded via water or dry cask storage.

Annexure II

Survey Questionnaire

ENVIRONMENTAL SURVEY IN VILLAGES

Name (Head of the family) **Address:** **Telephone:** **Profession:** **Annual Income:**	**Data collected by:** **Date:** **Signature:**
Number of persons at home **Total:** **Age >60:** **Age 40-60:** **Age 21-40:** **Age <21:**	
Ownership of the house: Own/Rent **Area of residence:** **Number of years of stay:**	
Person responding to questions **Name:** **Age:** **Sex:** **Relationship to the family head:**	

1. **What is your opinion on the environment of your community?**
   Very clean and healthy Clean Dirty Very unhealthy

   If dirty or very unhealthy, what are the possible reasons?
   Improper management of household waste
   Irresponsibility of in the community
   Improper management of industrial waste
   Irresponsibility of administrators
   Others:

2. **Do you or your family members have any of the following health issues specifically?**

Disease	Age group	Possible reasons	Period
Respiratory problems	**>60 40-60 21-40 <21**		

Skin diseases	**>60**	**40-60**	**21-40**	**<21**		
Eye problems	**>60**	**40-60**	**21-40**	**<21**		
Others	**>60**	**40-60**	**21-40**	**<21**		

3. **Any recent epidemics/common diseases diagnosed within your community?** Yes/No

Type	Period

4. Do you have availability of health care facilities nearby?

Facility	Distance

5. What are the sources and uses of water in your home?

Sources	Uses

6. What changes have you noticed in the quality of water being used?

Colour Taste Odour Appearance None Others:

If any, why do you think it has happened?

7. What changes have you observed in the level of water in your well/bore-well/pond ?

Increase Decrease More or less same Others:

If any, why do you think it has happened?

8. **What have you noticed about the air you breathe?**

   Dust particles Odour None Others:

9. **Whether dust settles inside (over objects) or outside the house (garden) quite often?** Yes/No

   If yes, remarks:

10. **Do you own agricultural/horticultural land?** Yes/No

    If yes:

Crops	Area	Expected yield per annum

What changes have you observed in the annual yield of crops?

Increase Decrease More of less same Others:

11. **Do you own livestock?** Yes/No

Livestock type	Purpose	Remark on health
	Consumption/ Sale/Others:	
	Consumption/ Sale/Others:	
	Consumption/ Sale/Others:	

12. **Any changes observed in living organisms around?** Yes/No

Organism	Remark
Birds	
Earthworms/other soil organisms	
Fishes/crabs/frogs	
Others:	

13. **Are you prone to noise disturbances from the surroundings?** **Yes/No**

If yes,

Source	Frequency of occurrence	Impact

14. **Any previous environmental surveys performed in the community?** Yes/No

Organization	Period

15. **Any previous analyses of soil/water/air performed in the community?** Yes/No

Material	Organization responsible

16. Any significant problems faced by the family in the past few years?

Annexure III

Proceedings of the expert committee meeting constituted for Udupi Power Corporation Ltd. held on 26th September 2011 at Office of the Deputy Commissioner, Udupi.

Dr. M.T. Reju, Deputy Commissioner, Udupi welcomed the all the members of the committee and the representatives of M/s UPCL for the meeting and briefed about the objective of the meeting. He requested the UPCL representatives to give presentations about the action taken on the issues raised in the interim report of committee. Sri. Ravindran, CEO & Sri. Murali Plant In charge of UPCL have presented the progress made on the recommendations made in the interim report of the Expert Committee.

- **Fly ash management:** ACC is putting its full efforts to establish blending plant by March-2012 in first phase and to acquire land for second phase to setup grinding unit. Presently ACC is lifting fly ash to their cement unit located at Chikkaballapur and already lifted about 18000 Tonnes i.e. about 60% of produced. Further Vintech has established 1000 TPM fly ash bagging plant nearby ash pond area and discussions are in progress with Sharcstar Ventures to put up fly ash bagging plant of 5000 TPM capacity.
- **Setting up of continuos ambient air quality management system** (CAAQMS): CAAQMS unit is commenced near ash pond.
- **Gypsum Management:** Mangalore Chemicals & Fertilizer Ltd and Vintech are regularly lifting the gypsum on continuos basis.
- **Research on utilisation of bottom ash**: Contacted MIT and CPRI Bangalore.
- **Green belt development**: About 110000 saplings are planted for entire plant including around ash pond & corridor leading to ash pond.
- **Storm Water Management**: Garland drains around ash pond been provided for storm water management.
- **Ground water monitoring**: regularly collecting specified ground water & submitting reports to KSPCB.
- **Speed up civil works like roads, stormwater drains, etc:** more than 95% of work completed.
- **To conduct awareness programmes & support organisations working for environment protection:** Agreed & informed that local public are visiting the plant.
- **Conduct studies to demarcate impact zone of ground water & soil contamination due to accidental leaks in pipeline:** proposed to submit the report by end of September-2011.
- **Take action to restore the salt water affected area:** already dewatering & cleaning of wells have made.
- **Providing of test bore wells at pipeline**: 5 test bore wells completed in pipe line corridor.
- **Detection of pipeline leakage**: Approached Taisei International, Secundarabad.

Further informed that, they have commissioned new MS pipeline in May 2011 to draw sea water and no leakage detected till date. As regards to drift from the cooling tower placed the purchase order for installation of drift eliminator for cooling tower-I & expected to be commissioned before 31-12-2011.

Prof. Sriniketan explained the main issues with which the expert committee looked in namely (i) fly ash and bottom ash handling, management & final disposal (ii) salt water pipeline leakage and (iii) salt deposition due to drift from the cooling tower. Further he suggested the UPCL to conduct following studies & work:

- Keep records for Tracking of fly ash movement from generation to the final disposal point.
- Health impact studies in the area.
- Scientific assessment of zone of impact along the corridor.
- Impact on soil from discharge of salt water, coal yard effluent, etc by the Agriculture University at Brahmmavar.
- Establish a committee comprising of local public, NGOs, gram panchayath members & zilla panchayath members & UPCL officials to address the social concerns of local.

Responding to the queries and apprehensions raised by the committee members Sri. Ravindran, CEO of UPCL has submitted as follows:

- ACC is establishing blending plant by March-2012 & also acquiring land to setup grinding unit nearby. Presently ACC is lifting fly ash from Feb-11 onwards to their cement unit located at Chikkaballapur. Vintech has established 1000 TPM fly ash bagging plant & discussions are in progress with Sharcstar Ventures to set up bagging plant of 5000 TPM capacity.
- They have contacted Ultra Tech at NMPT, Mangalore to blend fly ash with cement. Also they are planning to set up bagging plant to export the flay ash to Dubai as an alternative.
- They regularly conducting ground water and ambient air quality monitoring & submitting reports to KSPCB.
- They placed the purchase order for installation of drift eliminator for cooling tower-I & will be installed before 31-12-2011.
- They have established continuos monitoring equipment for the parameters like PH, TDS, Temperature & DO at guard pond out let to sea and they are not discharging hot water in to sea. They received feedback from fishermen that, fish growth & catch is increased in the discharging area.
- They have established Environmental Cell & monitoring the ambient air quality in 10 Km radius & submitting the reports. Also the results are available on UPCL Website.

- It is an accepted fact that some of the machineries failed & accidental discharge of sea water & coal bearing water discharge happened in transition period & they have taken remedial measures immediately.
- Revenue Dept has assessed the loss & they paid the compensation for the damage.
- They will constitute a local committee as suggested to address the local issues immediately.

They further assured the committee that, they will take the responsibility for any damages and will take remedial measures besides compensation.

Shri. T. Balachandra, Regional Director (Environment) asked details about the quantity of fly ash generated & disposes since inception and also the details of "bagging" unit proposed by VINTECH along with documents. The representatives of M/s UPCL have agreed to provide full details of ash management immediately.

The Chief Executive Officer, Zilla Panchayath, Udupi informed that, ZP members & Gram Panchayath members have visited the site & prepared the report mainly comprising of expenditure incurred on maintenance of street light, corroding of metal sheets, roof top etc due to fly ash & cooling tower salt vapour drift in the area. The report will be submitted shortly to the District Administration.

Shri. C.D. Kumar, Senior Environmental Officer, KSPCB briefed about the issues mentioned in the written complaints received by the DC from the public residing around the industry. The issues are shown below,

- The blasting activity at ash pond is causing vibration & dust nuisance.
- The fast corrosion of MS sheets, insulators & electrical cables in the area.
- Fishing is affected due to hot water discharge in to sea.
- Increase in Health related problems in the area due to fly ash nuisance.

Also informed that due to non-compliances to the conditions of consent KSPCB has not permitted M/s UPCL to commission the second unit. Recently the KSPCB has received oral complaints from Hon'ble MP, Hon'ble MLA and members of ZP, Udupi and from public due to the discharge of the black colour waste water into nearby streams and agricultural fields. This incident happened due storage of huge quantity of coal without providing adequate protection. Due to storage of coal in heaps of substantial height complaints received alleging about dust nuisance during wind breeze from the residential establishments located on the southern side of plant. Further he informed that recently consolidated Environmental Clearance has been issued by MoEF relaxing ash content of the coal from 4.75% to 12% an average basis as a result the quantity of ash generation will increase.

The Deputy Commissioner, Udupi opined that, setting up of cement grinding & bagging plant by ACC is doubt and instructed the UPCL to identify alternatives for fly ash management. He requested KSPCB to monitor ambient air quality & ground water around the area. He further informed that, UPCL is not taking proactive steps in rapid manner to the local problems considering health & livelihood of local public. He instructed M/sUPCL to set up a local committee immediately comprising of local public, NGOs, GP & ZP members to address the local issues like fly ash, pipeline leakage & salt drift from cooling tower.

Sri. Y.B Ramakrishna briefed about the effects of thermal power plants as well as fly ash on the surrounding environment including health of the people residing around. The concern enforcing agencies should ensure strict compliance to the environmental norms. He opined that the committee should also address the social issues viz effect on agriculture, damage to flora & fauna, health of the people etc. Further he stated that there is a need for short term and long term actions to address the issues raised by the public.

Dr. T V Ramachandra opined that the approaches to mitigate the impacts or management of the environment are rather "ad-hoc" or "reactionary", evident from the measures taken by the company in controlling the leakage, etc. and also from the presentation and justification given by the company representatives to the queries posed by the committee members. The preliminary investigations conducted in this region during the first week of August 2011 (high monsoon period) show that water, soil, land environment are contaminated due to mismanagement of the environment by the company. He emphasised the need for the company to demonstrate the compliance of environment norms as per EIA 2006 (and subsequent amendments), GOI. In this regard, Dr. Ramachandra suggested **the closure of the company operation due to non-compliance of the environment norms, stipulated by the Ministry of Environment and Forests, Government of India while according the environment clearance**.

Deliberating further, he advocated for a stern action against the company for polluting the environment as per "Polluter Pays Principle" water (prevention and control of pollution) act, 1974, The Air (Prevention and Control of Pollution) Act 1981, amended 1987, The Environment (Protection) Act, 1986, amended 1991, etc.. Major impacts in the region due to environment mismanagement by the company are:

1. Contamination of drinking water sources (analysis of chemical parameters, indicate that the water in the wells within 1 km radius is contaminated evident from high TDS, etc. Even the wells in 2-3 km also show signs of contamination, even during monsoon period.

2. Reduction in crop productivity/yield – evident from reduced productions in areca, coconut plantations and also agriculture. This is mainly due to contamination of soil and also due to phyto-toxicants which affect the phenology of the plants
3. Corrosion of fixtures, even though the company claims as common "Coastal Phenomenon", but not noticed in other coastal districts and hence mainly due to contamination of air environment
4. Inappropriate storage of coal and mismanagement of fly ash have aggravated the situation.
5. Quality of the coal seems poor as there are heavy metal contaminations in the soil and water environment. It is surprising to see the company has not done either proximate, ultimate, calorific value and were unable to provide the data in this regard. Poor quality of fuel and inappropriate machineries apart from mishandling of coal and wastes (fly ash, etc.) are the principal causes of pollution in the region.
6. Absence of "Environment Management Cell" as per EIA 2006 and Environment Act in the industry for regular monitoring of environmental parameters
7. Insensitive to the problems encountered by the local people (health, livelihood – reduction in crop yield, fish productivity, etc.). The company need to compensate all local inhabitants whose livelihood is affected (fishermen, agriculture and horticulture land owners).
8. The company has been arrogant and ruthless while handling local people problems.
9. The company has not done the afforestation in the region for removing trees while setting up the industry. The Industry has come up in "sacred groves" or "Devara Kadu". This emphasises the company's indifferent attitude towards local environment and also local biotic community including humans.

Considering all these aspects, UPCL needs to be penalised for the violations of air, water and environment acts. Consent for continued operation be kept in abeyance till the company fulfils all criteria for protecting the environment.

He also highlighted the need to strengthen local regulatory authority considering the number of industries that are come up in the district, through adequate qualified staff for regular monitoring and to ensure environment safeguards. He also suggested to constitute the post project monitoring task force / committee (involving all local stakeholders) to aid in managing the environment.

Further he opined that M/s UPCL is ignoring the nearby public to compensate suitably for the damages and not taking holistic approach to the problems in the area. The industry should be penalised as per GOI 1974 environment pollution prevention act - Polluters pay principle. He requested the Deputy Commissioner to take stern action against UPCL to stop production until

the company implements environment safeguards, compensation of the affected local people, verification of the compliance of environment safeguards by the committee

Dr. Y.B Ramakrishna of committee informed that

- Public in the area are suffering. Presence of methyl mercury due to coal burning will create lung problem and nervous disorder.
- UPCL should anticipate the problems and to take suitable preventive and remedial measures immediately.
- Thermal power plants emit radioactive nuclei emissions like uranium, thorium, etc more than nuclear power plants.
- UPCL is lethargic in responding to the issues raised by the public of the area.

Both Dr. Y.B.Ramakrishna and Dr. T.V. Ramachandra expressed their intention for surprise visit to the plant for which the M/s UPCL representatives have agreed.

Responding to the above the Deputy Commissioner, Udupi informed that, regular complaints from the local public shows that, there are lacunas in implementation of environmental laws by UPCL and company is very slow in taking remedial measures. He assured that suggestions and recommendations of the committee will be communicated to the State Government to take further appropriate action.

The Committee advised the Deputy Commissioner to conduct public consultation with the local public including Ryta Sangh, Nandikur Environment Association, etc. The proposed public consultation is scheduled for 17th October 2011. It was suggested to give wide publicity through appropriately worded announcement in the local press highlighting the brief background and purpose of the meeting. This would help in eliciting the problems faced by the stakeholders. It was also suggested to do the digital recording (video) of the public consultation meeting proceedings. This would further help the Deputy Commissioner in formulating appropriate strategies to address the environmental problems apart from communicating to the State government.

The meeting was concluded with vote of thanks by the Deputy Commissioner, Udupi.

Annexure IV

Letter to the Chief Minister of Karnataka

From

Dr. Y B Ramakrsihna

ಸಂಖ್ಯೆ: ಕೆ.ಎಸ್.ಬಿ.ಡಿ.ಬಿ / ಎಂ.ಐ.ಎನ್ / ಸಿ.ಆರ್ –೧೫/೨೦೧೦–೧೧/೩೧೩ ದಿ.೨೧.೧೧.೨೦೧೧

ಗೆ,

ಶ್ರೀ ಡಿ.ವಿ. ಸದಾನಂದ ಗೌಡ,
ಸನ್ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಗಳು,
ವಿಧಾನ ಸೌಧ,
ಬೆಂಗಳೂರು.

ಮಾನ್ಯರೇ,

ವಿಷಯ: ಯು.ಪಿ.ಸಿ.ಎಲ್. ಕಂಪನಿಯಿಂದ ಪರಿಸರದ ಮೇಲೆ ಉಂಟಾಗುತ್ತಿರುವ ಹಾನಿಯನ್ನು ಪರಿಶೀಲಿಸಿ ವರದಿ ಸಲ್ಲಿಸಲು ರಚಿಸಲಾಗಿರುವ ಸಮೀತಿಯಿಂದ ಸ್ಥಳೀಯ ಗ್ರಾಮಸ್ಥರ ಅಹವಾಲುಗಳನ್ನು ಆಲಿಸಲು ದಿ.೧೯.೧೧.೨೦೧೧ರಂದು ಉಡುಪಿ ಡಿ.ಸಿ. ಕಚೇರಿಯಲ್ಲಿ ಕರೆದ ಸಭೆಯ ಮತ್ತು ನಂತರದಲ್ಲಿ ಕಂಪನಿಯ ಸುತ್ತಮುತ್ತ ಗ್ರಾಮಗಳಿಗೆ ಭೇಟಿಕೊಟ್ಟ ಕುರಿತು – ಸಂಕ್ಷಿಪ್ತ ವರದಿ.

ಈ ದಿನ ಬೆಳಿಗ್ಗೆ ತಮ್ಮೊಂದಿಗೆ ಚರ್ಚಿಸಿದಂತೆ ಸರಕಾರದಿಂದ ತಕ್ಷಣಕ್ಕೆ ತೆಗೆದುಕೊಳ್ಳಬಹುದಾದ ಕ್ರಮಗಳ ಬಗ್ಗೆ ಈ ಕೆಳಗಿನ ವರದಿಯನ್ನು ಸಲ್ಲಿಸುತ್ತಿದ್ದೇನೆ.

ದಿ.೧೯.೧೧.೨೦೧೧ರಂದು ಉಡುಪಿ ಜಿಲ್ಲಾಧಿಕಾರಿಗಳ ಕಚೇರಿಯಲ್ಲಿ ಜರುಗಿದ ಸಭೆಯಲ್ಲಿ ೩೦೦ಕ್ಕೂ ಹೆಚ್ಚು ಗ್ರಾಮಸ್ಥರು ಭಾಗವಹಿಸಿ ಸುಮಾರು ೯೦೦ಕ್ಕೂ ಹೆಚ್ಚು ಲಿಖಿತ ಅರ್ಜಿ ಸಲ್ಲಿಸಿದ್ದಾರೆ. ಸುಮಾರು ೫೬ ಜನ ಗ್ರಾಮಸ್ಥರು ತಮ್ಮ ಅಹವಾಲುಗಳನ್ನು ಸಭೆಯಲ್ಲಿ ಮಂಡಿಸಿದ್ದಾರೆ. ಸಭೆಯು ಶಾಂತಯುತವಾಗಿ ನಡೆದು ಆನಂತರದಲ್ಲಿ ಹಲವು ಸದಸ್ಯರು ಕಂಪನಿಯ ಸುತ್ತಮುತ್ತಲಿನ ಗ್ರಾಮಗಳಿಗೆ ಭೇಟಿನೀಡಿರುತ್ತಾರೆ. ಆ ಪ್ರದೇಶದ ಪರಿಸರ ಹಾಗೂ ಜನಜೀವನದ ಮೇಲೆ ಆಗಿರತಕ್ಕಂತಹ ದುಷ್ಪರಿಣಾಮಗಳನ್ನು ವಿಭಾಗೀಕರಿಸಿ ಇನ್ನು ಕೆಲವೇ ವಾರಗಳಲ್ಲಿ ತಜ್ಞರ ಸಮೀತಿ ತನ್ನ ವರದಿಯನ್ನು ಸಲ್ಲಿಸಲಿದೆ. ಈ ಮಧ್ಯ ಈ ಗ್ರಾಮಗಳಿಗೆ ಭೇಟಿಕೊಟ್ಟ ಸಂದರ್ಭದಲ್ಲಿ ಗಮನಕ್ಕೆ ಬಂದ ಕೆಲವು ಮುಖ್ಯ ಅಂಶಗಳನ್ನು ತಮ್ಮ ಗಮನಕ್ಕೆ ತರಲು ಇಚ್ಚಿಸುತ್ತೇನೆ.

ಈ ಗ್ರಾಮ ಪ್ರದೇಶಗಳಲ್ಲಿ ಉಂಟಾಗಿರುವ ಉದ್ವಿಗ್ನ ಪರಿಸ್ಥಿತಿಯನ್ನು ಈ ಕೆಳಗಿನ ಈ ಕ್ರಮಗಳಿಂದ ತಿಳಿಗೊಳಿಸಬಹುದಾಗಿದೆ.

೧. ಕುಡಿಯುವ ನೀರಿನ ಸಮಸ್ಯೆ:

ಕಂಪನಿಯಿಂದ ಹೊರ ಬರುತ್ತಿರುವ ಕಲುಷಿತ ನೀರು ಹಾಗೂ ಅದರಿಂದ ಅಲ್ಲಿನ ಅಂತರ್ಜಲದ ಗುಣಮಟ್ಟದಲ್ಲಿ ಆಗಿರುವ ಬದಲಾವಣೆ ತಮಗೀಗಾಲೇ ತಿಳಿದಿದೆ. ಕಂಪನಿಯ ಸುತ್ತಮುತ್ತಲಿನ ಗ್ರಾಮಗಳಲ್ಲಿ ಹಾಗೂ ಕಂಪನಿಯಿಂದ ಹೊರಬರುತ್ತಿರುವ ಹಾರುಬೂದಿಯನ್ನು ಸಂಗ್ರಹಣಾ ಟ್ಯಾಂಕ್‌ನಲ್ಲಿ ಸಂಗ್ರಹಿಸುತ್ತಿದ್ದು, ಇದರ ಸುತ್ತಮುತ್ತಲಿನ ಗ್ರಾಮಗಳಲ್ಲಿ ಉಂಟಾಗಿರುವ ಹಾನಿಯನ್ನು ಕೆಳಗೆ ತೋರಿಸಿದೆ.

ಕ್ರ. ಸಂ.	ಕಂಪನಿಯ ಸುತ್ತಮುತ್ತ ಹಾನಿಗೊಳಗಾದ ಗ್ರಾಮಗಳು		ಹಾರುಬೂದಿ ಸಂಗ್ರಹಣಾ ಹೊಂಡದ ಸುತ್ತಮುತ್ತ ಹಾನಿಗೊಳಗಾದ ಗ್ರಾಮಗಳು	
	ಗ್ರಾಮ	ಗ್ರಾಮ ಪಂಚಾಯತ್	ಗ್ರಾಮ	ಗ್ರಾಮ ಪಂಚಾಯತ್
೧.	ನಂದಿಕೂರ್	ಪಾಲಿಮಾರ್	ಅಡವೆ, ಪಾಲಿಮಾರ್	ಪಾಲಿಮಾರ್
೨.	ಪಾದಬೆಟ್ಟು	ಪಡುಬಿದ್ರಿ	ಇನ್ನಾ, ಕಂಜರಕಟ್ಟೆ	ಇನ್ನಾ
೩.	ಥೇಂಕಾ	ಥೇಂಕಾ ಏರ್ಮಾಳ್	ಸಂಥೂರ್ ಕೊಪ್ಪಾಳ	ಮುದರಂಗಡಿ ಮತ್ತು ಇನ್ನಾ
೪	ಸಂಥೂರ್	ಮುದರಂಗಡಿ	ಸಂಥೂರ್, ಮುದರಂಗಡಿ	ಮುದರಂಗಡಿ
೫.	ಕೊಳಚೂರ್, ಸಜೆ, ಉಲ್ಲೂರು, ಸಂಕೇಸ, ಕೆಮ್ಮುಂಡೆಲ್, ಕುಕ್ಕಿಕಟ್ಟೆ	ಏಲ್ಲೂರ್	–	–

ಈ ಎಲ್ಲಾ ಪ್ರದೇಶದಲ್ಲಿ ಅಂತರ್ಜಲ ಕಲುಷಿತಗೊಂಡಿದ್ದು, ಗಂಭೀರವಾದ ಕುಡಿಯುವ ನೀರಿನ ಸಮಸ್ಯೆ ಇಲ್ಲಿದೆ. ಅನೇಕ ಗ್ರಾಮಗಳಲ್ಲಿ ಈ ಕಲುಷಿತ ನೀರನ್ನು ಸಂಗ್ರಹಿಸಿ ಪರೀಕ್ಷೆ ಮಾಡುವ ಕೆಲಸ ಸಹ ನಡೆದಿಲ್ಲ. ಏಲ್ಲೂರ್ ಗ್ರಾಮ ಪಂಚಾಯತ್‌ನ ಹಲವು ಗ್ರಾಮಗಳಲ್ಲಿ ಕುಡಿಯುವ ನೀರಿನ ಪರಿಸ್ಥಿತಿ ಗಂಭೀರವಾಗಿದ್ದು, ಆ ಪ್ರದೇಶಕ್ಕೆ ಒಂದು ಕುಡಿಯುವ ನೀರಿನ ಯೋಜನೆಯನ್ನು ಜಿಲ್ಲಾಡಳಿತ ರೂಪಿಸಿದ್ದರೂ, ಅದರ ಅನುಷ್ಠಾನದ ಜವಾಬ್ದಾರಿಯನ್ನು ಗ್ರಾಮ ಪಂಚಾಯತ್‌ಗೆ ವಹಿಸಿದೆ. ಆದರೆ ಗ್ರಾಮ ಪಂಚಾಯತ್‌ಗೆ ಈ ಕಾರ್ಯಕ್ರಮ ಅನುಷ್ಠಾನಗೊಳಿಸಲು ಯಾವುದೇ ಹಣಕಾಸಿನ ವ್ಯವಸ್ಥೆ ಮಾಡಿರುವುದಿಲ್ಲ.

ಈ ಪ್ರದೇಶದ ಜನರ ಆಕ್ರೋಶಕ್ಕೆ ಮೊದಲನೇ ಕಾರಣ ಕುಡಿಯುವ ನೀರಿನ ವ್ಯವಸ್ಥೆ ಮಾಡುವಲ್ಲಿ ಸರಕಾರ ವಿಫಲಗೊಂಡಿರುವುದು. ರಾಜ್ಯ ಸರ್ಕಾರದಿಂದ ತಕ್ಷಣದಲ್ಲಿ ಜಿಲ್ಲಾಡಳಿತದಿಂದ ಸೂಚನೆಕೊಟ್ಟು, ಈ ಎಲ್ಲಾ ಪ್ರದೇಶಕ್ಕೆ ಸರ್ಕಾರದಿಂದಲೇ ಬದಲೀ ಕುಡಿಯುವ ನೀರಿನ ವ್ಯವಸ್ಥೆ ಮಾಡಲು ಜಿಲ್ಲಾಡಳಿತಕ್ಕೆ ಸೂಚಿಸುವುದು ಹಾಗೂ ಅದಕ್ಕೆ ಬೇಕಾದ ಹಣಕಾಸಿನ ವ್ಯವಸ್ಥೆಯನ್ನು ಸಹ ಸರ್ಕಾರದಿಂದ ಮಾಡಿಕೊಡಬೇಕಾಗಿದೆ. ಈ ವಿಷಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ಅತ್ಯಂತ ವೇಗದಲ್ಲಿ ಕುಡಿಯುವ ನೀರಿನ ವ್ಯವಸ್ಥೆ ಮಾಡುವಲ್ಲಿ ತಾವು ಸೂಕ್ತ ಆದೇಶ ಹೊರಡಿಸಬೇಕೆಂದು ತಮ್ಮಲ್ಲಿ ಕೋರುತ್ತೇನೆ. ಈ ಕಾರ್ಯಕ್ರಮಕ್ಕೆ ತಗಲುವ ವೆಚ್ಚವನ್ನು ಕಂಪನಿಯಿಂದ ''ಹುಟಣಾಜಿ ಹಿಥಿ'' ಛಿಟಚಿಣಜಿ ನ ಅಡಿಯಲ್ಲಿ ಭರಿಸಲು ಅವಕಾಶವಿದೆ. ಕಂಪನಿಯಿಂದ ಈ ಹಣ ಭರಿಸುವತ್ತವೂ ಕ್ರಮಗಳನ್ನು ಜರುಗಿಸಬಹುದು.

೨. ರಸ್ತೆ ರಿಪೇರಿ ಕಾಮಗಾರಿಗಳು:

ಈ ಕಂಪನಿಯ ಸುತ್ತಮುತ್ತಲಿನ ಎಲ್ಲಾ ಗ್ರಾಮಗಳಿಗೆ ಇರುವ ಸಂಪರ್ಕ ರಸ್ತೆಗಳು ಹಾಳಾಗಿದ್ದು, ತಕ್ಷಣದಲ್ಲಿ ದುರಸ್ತಿಯ ಅವಶ್ಯಕತೆಯಿದೆ. ಸ್ಥಳೀಯ ಜನರ ಆಕ್ರೋಶಕ್ಕೆ ಇದೂ ಒಂದು ಕಾರಣ. ಈ ಎಲ್ಲಾ ಗ್ರಾಮಗಳಲ್ಲಿನ ರಸ್ತೆಗಳನ್ನು ರಿಪೇರಿ ಪಡಿಸುವುದಲ್ಲದೆ ಹಲವು ಗ್ರಾಮಗಳ ಸಂಪರ್ಕವನ್ನು ಕಂಪನಿಯವರು ತಮ್ಮ ಅನುಕೂಲಕ್ಕಾಗಿ ಕಡಿದಿರುತ್ತಾರೆ. ಈ ಎಲ್ಲಾ ಸಂಪರ್ಕಗಳನ್ನು ಪುನರ್ ನಿರ್ಮಿಸಿ ಕೊಡಬೇಕಾಗಿದೆ. ಈ ವಿಷಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ಜಿಲ್ಲಾಡಳಿತಕ್ಕೆ ನಿರ್ದೇಶನವನ್ನು ನೀಡುವಂತೆ ತಮ್ಮಲ್ಲಿ ಕೋರುತ್ತೇನೆ.

೩. ಗ್ರಾಮಸ್ಥರ ವಿರುದ್ಧ ದಾಖಲಾಗಿರುವ ಸುಳ್ಳು ಕೇಸುಗಳನ್ನು ರದ್ದು ಪಡಿಸುವಿಕೆ.

ಕಂಪನಿಯಿಂದ ತಮಗಾಗಿರುವ ಜೀವನಾಧರಕ್ಕೆ ಸಂಬಂಧಪಟ್ಟಂತ ತೊಂದರೆಗಳನ್ನು ಹೇಳಿಕೊಂಡ ಸಂದರ್ಭದಲ್ಲಿ ಜಿಲ್ಲಾಡಳಿತ ಮತ್ತು ಸರ್ಕಾರದಿಂದ ಸರಿಯಾದ ಸ್ಪಂದನೆ ಸಿಗದಿರುವ ಹಿನ್ನೆಲೆಯಲ್ಲಿ ಪ್ರತಿಭಟಿಸಿದ ಗ್ರಾಮಸ್ಥರ ಮೇಲೆ ಅನೇಕ ಕೇಸುಗಳನ್ನು ದಾಖಲಿಸಲಾಗಿದೆ. ಈ ಎಲ್ಲಾ ಕೇಸುಗಳನ್ನು ಪುನರ್ ಪರಿಶೀಲಿಸಿ ಅವರ ಮೇಲೆ ದಾಖಲಾಗಿರುವ ಸುಳ್ಳು ಅಥವಾ ನಿಕೃಷ್ಟ ಅಪರಾಧಗಳ ಕೇಸುಗಳನ್ನು ಹಿಂದಕ್ಕೆ ಪಡೆಯಲು ಕ್ರಮ ಜರುಗಿಸಬೇಕೆಂದು ತಮ್ಮಲ್ಲಿ ಕೋರುತ್ತೇನೆ.

ಈ ಮೇಲಿನ ಮೂರು ವಿಷಯಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಸರ್ಕಾರದಿಂದ ಕ್ರಮಗಳು ಜಾರಿಯಾದಲ್ಲಿ ಈಗಿರುವ ಉದ್ವಿಗ್ನ ವಾತಾವರಣ ತಿಳಿಯಾಗಿ ಆ ಪ್ರದೇಶದಲ್ಲಿನ ಎಲ್ಲಾ ಸಮಸ್ಯೆಗಳಿಗೆ ವೈಜ್ಞಾನಿಕವಾಗಿ ಹಾಗೂ ಎಲ್ಲರಿಗೂ ಸಮಾಧಾನಕರವಾಗಿ ಪರಿಹಾರಗಳನ್ನು ಕಂಡುಕೊಳ್ಳಲು ಬೇಕಾಗುವ ವಾತಾವರಣ ನಿರ್ಮಿಸಬಹುದಾಗಿದೆ. ಪ್ರಸ್ತುತ ಕಂಪನಿಯ ನಿರ್ವಹಣೆ ವ್ಯವಸ್ಥೆಗಾಗಿ ಸ್ಥಗಿತಗೊಳಿಸಲಾಗಿದ್ದು, ನಿರ್ವಹಣೆಯ ನಂತರ ಕಂಪನಿ ದಿ.೨೧.೧೧.೨೦೧೧ರಂದು ಪುನಾರಂಭಗೊಂಡಿದೆ. ಸರ್ಕಾರದಿಂದ ತ್ವರಿತ ಕ್ರಮ ಜರುಗಿಸದಿದ್ದಲ್ಲಿ ಸಮಸ್ಯೆ ಉಲ್ಬಣಗೊಳ್ಳುವ ಸಾಧ್ಯತೆಯಿದೆ. ಈ ಎಲ್ಲಾ ಸಮಸ್ಯೆಗಳಿಗೆ ಶೀಘ್ರ ಪರಿಹಾರವನ್ನು ಕಂಡುಕೊಳ್ಳುವತ್ತ ತಾವು ಸೂಕ್ತ ಆದೇಶವನ್ನು ನೀಡುತ್ತೀರೆಂದು ಆಶಿಸುತ್ತಾ, ಸಮಸ್ಯೆಯ ಪರಿಹಾರಕ್ಕೆ ನನ್ನ ಸಂಪೂರ್ಣ ಸಹಕಾರವನ್ನು ವ್ಯಕ್ತಪಡಿಸುತ್ತಿದ್ದೇನೆ.

ಆದರಗಳೊಂದಿಗೆ,

ತಮ್ಮ ವಿಶ್ವಾಸಿ,

(ವೈ.ಬಿ. ರಾಮಕೃಷ್ಣ)

Annexure V

Date: Mon, 19 Dec 2011 12:57:39 +0530 (IST)
From: Ramachandra T.V. <cestvr@ces.iisc.ernet.in>
To: rejuempty@rediffmail.com***, deo.udupi@gmail.com***
Subject: Letter regarding UPCL EXPERT COMMETTE METTING ON 21.12.2011 AT 11.00 AM

Dr. T V Ramachandra
Member, Expert Committee

CES/TVR/UPCL/8458/2011 ***19th Dec 2011***

Dear Dr.Reju

Thank you for the intimation regarding 21st December Expert committee meeting at your office regarding UPCL. Please note my email – cestvr@ces.iisc.ernet.in as I did not receive the meeting notices (due to typo error in email ID) and Dr. Y B Ramakrishna forwarded your mail to me.

It is not possible for me to take part in the meeting as I am preoccupied with the regular academic activities (19-21st Class), 22nd Dec – meeting at Delhi arranged by the Ministry of Science and Technology, GOI. However, I wish to place on record the following for discussion and appropriate action.

1. I learnt the company has been given CFO (Consent for Operation) by KSPCB (Annexure X, letter dated 9th Dec 2011), which is inappropriate, as the Government constituted Expert Committee is yet to submit the report. CFO should be kept in abeyance till the expert committee submit the report and the company fulfills all norms to maintain environment safeguard. As per the norm, regulatory agency can issue CFO, if and only company/ industry has fulfilled all environment criteria. The consent clearance committee (CCC) and TAC at regulatory agency has to ensure that. I do not understand how these members (CCC and TAC) have ignored the problems faced at local level despite media reports, etc. There is no point in the committee spending time while allowing the pollution of land, water, air and biotic elements. It appears a stringent action from the district administration is required to ensure UPCL respect the law of the land (by implementing environment safeguards)
2. As you are aware, the team (members of expert committee) visited the project site and also surrounding villages (19-20th Nov 2011). It is evident that company's act has led to the pollution/contamination of air, water, land including biotic elements. Samples collected by our team further substantiate these aspects. The regulatory agency should have initiated the stern action against UPCL as per Environment Policy, 2006, Air (Prevention and Control of Pollution) Act, The Water (Prevention and Control of Pollution) Act. The abatement of pollution, 1992 stresses the prevention of pollution at

the source based on the "polluter pays" principle. I have appended the relevant environment provisions applicable to all parts of India (including Udupi!)

3. Dr. Y B Ramakrishna, Member, Expert Committee had written a letter to all responsible authorities (including people elected representatives) highlighting the need for i) supplying drinking water to affected villages ii) medical support to villagers and livestock who have been affected due to irresponsible act of UPCL iii) repair of roads and iv) need to withdraw false cases against innocent villagers. It appears that neither regulatory agency (KSPCB) nor the district administration has taken any initiative in addressing local people's genuine woes. Instead the regulatory agency has taken haste decision to issue CFO to reward the polluters. Despite having stringent norms, our country has failed in maintaining the desired environment levels due to lack of adequate and sensible capability at regulatory agencies or irresponsible behavior. I do not understand the purpose of constituting expert committee when the system wants to support the polluter against the interest of local people.
4. The State and District administration needs to intervene and address the local people problem than being considerate to UPCL. Please initiate action on priority to address the issues raised in YBR's letter at the earliest. Also, regulatory agency needs to be advised/told to initiate action against the firm (while keeping in abeyance CFO).
5. We strongly feel the expert committee needs to prepare unbiased scientific report. In this regard constituting a sub-group (experts and regional MoEF representative) would help.

With best regards *Yours Sincerely*

Dr. T.V. Ramachandra

Details regarding Air, Water legislation applicable to all part of India (http://moef.nic.in/modules/rules-and-regulations/water-pollution/)

The Air (Prevention and Control of Pollution) Act was enacted in 1981 and amended in 1987 to provide for the prevention, control and abatement of air pollution in India.

Water Pollution

- *The Water (Prevention and Control of Pollution) Act* was enacted in 1974 to provide for the prevention and control of water pollution, and for the maintaining or restoring of wholesomeness of water in the country. The Act was amended in 1988.
- *The Water (Prevention and Control of Pollution) Cess Act* was enacted in 1977, to provide for the levy and collection of a cess on water consumed by persons operating and carrying on certain types of industrial activities. This cess is collected with a view to augment the resources of the Central Board and the State Boards for the prevention and control of water pollution constituted under the Water (Prevention and Control of Pollution) Act, 1974. The Act was last amended in 2003.

PROHIBITION ON USE OF STREAM OR WELL FOR DISPOSAL OF POLLUTING MATTER, ETC.

(1) Subject to the provisions of this section --

(a) no person shall knowingly cause or permit any poisonous, noxious or polluting matter determined in accordance with such standards as may be laid down by the State Board to enter (whether directly or indirectly) into any [5][stream or well or sewer or on land]; or

(b) no person shall knowingly cause or permit to enter into any stream any other matter which may tend, either directly or in combination with similar matters, to impede the proper flow of the water of the stream in a manner leading or likely to lead to a substantial aggravation of pollution due to other causes or of its consequences.

RESTRICTIONS ON NEW OUTLETS AND NEW DISCHARGES

[6][(1) Subject to the provisions of this section, no person shall, without the previous consent of the State Board,--

(a) establish or take any steps to establish any industry, operation or process, or any treatment and disposal system or an extension or addition thereto, which is likely to discharge sewage or trade effluent into a stream or well or sewer or on land (such discharge being hereafter in this section referred to as discharge of sewage); or
(b) bring into use any new or altered outlets for the discharge of sewage; or
(c) begin to make any new discharge of sewage;

Provided that a person in the process of taking any steps to establish any industry, operation or process immediately before the commencement of the Water (Prevention and Control of Pollution) Amendment Act, 1988, for which no consent was necessary prior to such commencement or, if he has made an application for such consent, within the said period of three months, till the disposal of such application.

41. Failure to comply with directions under sub-section (2) or sub-section (3) of section of 20, or orders issued under clause (c) of sub-section (1) of 32 or directions issued under sub-section (2) of section 33 or section 33A.

(1) Whoever fails to comply with any direction given under sub-section (2) or sub-section (3) of section 20 within such time as may be specified in the direction shall, or conviction, be punishable with imprisonment for a term which may extend to three months or with fine which may extend to ten thousand rupees or with both and in case the failure continues, with an additional fine which may extend to five thousand rupees for every day during which such failure continues after the conviction for the first such failure.

(2) Whoever fails to comply with any order issued under clause (c) of sub-section (1) of section 32 or any direction issued by a court under sub-section (2) of section 33 or any direction issued under section 33A shall, in respect of each such failure and on conviction, be punishable with imprisonment for a term which shall not be less than one year and six months but which may

extend to six years and with fine, and case the failure continues, with an additional fine which may extend to five thousand rupees for every day during which such failure continues after the conviction for the first such failure.

(3) If the failure referred to in sub-section (2) continues beyond a period of one year after the date of conviction, the offender shall, on conviction, be punishable with imprisonment for a term which shall not be less than two years but which may extend to seven years and with fine]

Date: Tue, 20 Dec 2011 20:53:54 +0530 (IST)
From: Ramachandra T.V. <cestvr@ces.iisc.ernet.in>
To: deo.udupi@gmail.com, rejuempty@rediffmail.com
Subject: Re: Letter regarding UPCL EXPERT COMMETTE METTING ON 21.12.2011 AT 11.00 AM

Dear Dr.Reju

In continuation to my y'day's mail, I wish to bring to your kind notice the following.

At the end of 19th meeting, when the committee left the venue of public consultation meeting, we were told that there were about 900+ representations. Now I understand that the number has reached 2000+. I strongly feel that the representations received after the meeting should not be included along with the ones received during the meeting.

Also, you may note that when we visited the field on 20th Nov, we were told that some of them got free lunch and also about Rs 250-300 cash from the company for signing the memorandum generated by a local contractor. It is inappropriate to include the bulk representations submitted by these contractors after the expert committee left the venue. Instead of such tactics, the company should have addressed drinking water, health and road problems in the region.

We should go strictly by the local conditions (state of the air, water, land and biotic elements) and the company has to take appropriate restoration measures to maintain the environment integrity on priority.

with best regards

TVR

Annexure VI

Public consultation meeting at DC's office, Udupi district, Karnataka on 19th November 2011 between 9.30 am and 2.30 pm

A public hearing was held at the District Collector's office on 19th November 2011 convened by Dr. Reju, DC, Udupi district. The expert committee members (the committee appointed by the Government of Karnataka) interacted with the participants at public consultation meeting.

Residents in the vicinity of the TPP participated in the public hearing and about 55 people were heard by the committee. Certain issues raised by the people are listed below.

- Violation of human rights
- Public hearing was not done prior to the setting of TPP
- Environmental Monitoring Committee was not constituted prior to the setting of TPP
- Disinterest of TPP officials/district administration to visit the affected sites.
- Land with good crop yield was crushed down overnight during heavy rain by the company officials without giving any prior notification. The case was pending before the court.
- Fertile agricultural land was destroyed to set up the TPP
- Amount paid for acquiring 420 acres (consisting of forest and agricultural lands) is not as per NPV.
- Appropriate compensation was not provided to displaced families or inadequate rehabilitation of displaced families
- Lack of environmental surveillance and regular environmental monitoring
- Used equipments from China were deployed instead of high performing efficient equipments.
- 8villages were affected by TPP and residents are exposed to polluted air and contaminated water
- Tin sheets of houses were corroded due to deposition of saline mist
- High tension electric lines (11KV) were corroded due to saline mist deposition.
- Mixing of ash pond water into the nearby streams
- Discharge of coal mix and salt water to the streams at night time was frequent
- Drinking water sources (well water, etc.) were contaminated
- Paddy, jasmine, banana, cashew yield has drastically declined
- Since the TPP has been operational, nearly 50 plantain trees and 20-25 acres of jasmine plants have become unproductive, which are the only source of livelihood
- Sacred grove (nagabana) was destroyed during construction of the TPP and speculated to have nagadosha on the family
- Reduced natural fodder for cattle (fooder cops have declined and also the one grown are hardy and non-palatable)

- Increase in number of respiratory and skin problems - allergy, bronchitis, dermatitis and asthma were common among the residents near TPP (Medical practitioners).
- Decrease in number of fishes in the effluent discharge area
- School children, on their way to schools have to close their nose while travelling
- Muslim madrassa students who attend the early morning sessions are exposed to increased black dust in the vicinity of TPP and observed to blacken their white clothes
- Over250persons haddied inside the UPCL complex
- High speed and hot flue gas emissions from TPP speculated to have influenced the Bajpe Airport crash.
- Panchayatpresidents complained they were not able to solve the problems of people
- Arrogant and irresponsible company officials harassing affected families who complain to district administration about the problems
- Insensitive to public woes and pro-company district administration

Dr. Reju, DC Udupi addressing the public after introducing the committee members

Committee Members conducting the sessions in the presence of DC


Public gathering (including media presence)

Affected peoples presenting their views to the committee

	
Corrosion of tin sheets	Skin infection
	

ಪರಿಸರ ಪರಿಣಿತರ ಸಮಿತಿಯ ಮುಂದೆ ಯು.ಪಿ.ಸಿ.ಎಲ್.
ಪೀಡಿತರು ನೀಡುವ ಹೇಳಿಕೆ ಪತ್ರ..

ಗೆ,
ಪರಿಸರ ಪರಿಣಿತರ ಸಮಿತಿ.....
ಜಿಲ್ಲಾಧಿಕಾರಿ ಕಛೇರಿ ಉಡುಪಿ.

ಇಂದ,
ಹೆಸರು: ಗುಲಾಬಿ ಶೆಟ್ಟಿ
ತಂದೆ / ಹೆಂಡತಿ / ಗಂಡ.
ವಯಸ್ಸು -
ಮನೆ ನಂಬ್ರ -
ಸರ್ವೆ ನಂ -
ಒಟ್ಟು ಜಾಗದ ವಿಸ್ತೀರ್ಣ -
ವಿಳಾಸ - ಎಲ್ಲೂರು ಮನೆ
ಗ್ರಾಮ - ಸಾಂತೂರು.
ಜಿಲ್ಲೆ ಮತ್ತು ತಾಲೂಕು. ಉಡುಪಿ

ಮಾನ್ಯರೆ,
ಉಡುಪಿ ತಾಲೂಕಿನ ಸಾಂತೂರು ಗ್ರಾಮದಲ್ಲಿ ಮೇಲ್ಕಂಡ ವಿಳಾಸದಲ್ಲಿ ___ 6 ಸದಸ್ಯರೊಡಗೂಡಿ ಮೇಲಿನ ವಿಳಾಸದಲ್ಲಿ ವಾಸಿಸುತ್ತಿದ್ದೇನೆ. ಯು.ಪಿ.ಸಿ.ಎಲ್. ಪವರ್ ಕಂಪೆನಿಯು ಇಲ್ಲಿಗೆ ಬರುವ ಮೊದಲು ಇಲ್ಲಿಯ ಪರಿಸ್ಥಿತಿಯ ವಿವರಣೆ.

ನಮ್ಮ ಮನೆಯ ಸುತ್ತಮುತ್ತಲು ಹಸಿರಿನಿಂದ ಕೂಡಿದ ವಿವಿಧ ಜಾತಿಯ ಮರಗಳಿಂದ ಕೂಡಿದ ಪರಿಸರದಲ್ಲಿ ಇದ್ದು ನಮ್ಮ ಜಾಗದಲ್ಲಿ 20 ತೆಂಗಿನ ಮರಗಳು, 15 ಅಡಿಕೆ ಮರಗಳು 40 ಬಾಳೆಗಿಡಗಳು, 15 ಇತರ ತೋಟಗಾರಿಕಾ ಮತ್ತು ಹೂವಿನ ಗಿಡಗಳಾದ 5 ಮಲ್ಲಿಗೆಗಿಡಗಳು 5 ಅಬ್ಬಲಿಗೆ ಗಿಡಗಳು ___ ಗುಲಾಬಿ ಗಿಡಗಳು ___ ಆಯುರ್ವೇದದ ಗಿಡ ಮೂಲಿಕೆಗಳು ___ ಪಪ್ಪಾಯಿ ಗಿಡಗಳು ___ ಪೇರಳೆಗಿಡಗಳು ___ ಅನಾನಸ್ ಗಿಡಗಳು ___ ಸೀತಾಫಲ ಗಿಡಗಳು, 4 ಹಲಸಿನ ಮರಗಳು 5 ಮಾವಿನ ಮರಗಳು ಇದ್ದು ಅದರಿಂದ ಲಾಭದಾಯಕ ಉತ್ಪತ್ತಿಯನ್ನು ಪಡೆಯುತ್ತಿದ್ದೆವು. ಅಲ್ಲದೆ 2 ಎಕರೆಯಷ್ಟು ಗದ್ದೆ (ಜಮೀನಿನ) ದಲ್ಲಿ

ಶಾಸಕ, ಕಾರ್ಖಾನೆ [illegible] [illegible] [illegible] [illegible] [illegible]
4 ಕ್ವಿಂಟಾಲ್ ಕೆ.ಜಿ. ಯಷ್ಟು ಭತ್ತ ಬೆಳೆಯುತ್ತಿದ್ದೆವು. ನಮ್ಮ ಭಾಗದಲ್ಲಿ ತೆರೆದ ಬಾವಿಗಳಿದ್ದು ಪಕ್ಕದ [illegible] ಶುದ್ಧ ನೀರು ಕುಡಿಯಲು ಮತ್ತು ವ್ಯವಸಾಯಕ್ಕೆ ಉಪಯೋಗಿಸುತ್ತಿದ್ದೆವು. ಆರೋಗ್ಯದಲ್ಲಿ ಯಾವುದೇ ತೊಂದರೆಗಳು ಕಂಡು ಬರುತ್ತಿರಲಿಲ್ಲ, ~~ಈಗ~~

ಯು.ಪಿ.ಸಿ.ಎಲ್ (ವಿದ್ಯುತ್) ಸ್ಥಾವರ ಬಂದ ನಂತರ ಆದ ಅನಾಹುತ:

ನಮ್ಮ ಮನೆಯ ಸುತ್ತಮುತ್ತಲಿನ ಪ್ರದೇಶಗಳಲ್ಲಿದ್ದ ಹಸಿರಿನಿಂದ ಕೂಡಿದ ಮರಗಳ ಜೊತೆ ಯು.ಪಿ.ಸಿ.ಎಲ್ ಕಂಪೆನಿ ಹೊರಸೂಸುವ ಹಾರುಬೂದಿಯುಕ್ತವಾದ ಉಪ್ಪು ನೀರು ಬಿದ್ದು ಎಲ್ಲಾ ಮರಗಳು ಸತ್ತು ನಮ್ಮ ಪ್ರದೇಶವು ಸ್ಮಶಾನ ಸದೃಶವಾಗಿದೆ. ವಾತಾವರಣದ ಉಷ್ಣತೆಯು ಏರಿದ್ದು ಬದುಕಲು ಅಸಾಧ್ಯವಾಗಿದೆ.

ಯು.ಪಿ.ಸಿ.ಎಲ್ ಕಂಪೆನಿಯು ಅವೈಜ್ಞಾನಿಕವಾಗಿ ಸ್ಥಾವರದ ಬಳಿ ಶೇಖರಿಸಿದ ಕಲ್ಲಿದ್ದಲಿನ ಜೊತೆ ಬಿದ್ದ ಮಳೆಯ ನೀರು, ಮತ್ತು ಸ್ಥಾವರ ಹೊರಸೂಸುವ ಉಪ್ಪು ನೀರು ಮಣ್ಣಿನಲ್ಲಿ ಇಂಗಿ ನಮ್ಮ ತೆರೆದ ಬಾವಿಗೆ ಪ್ರವೇಶಿಸಿದರಿಂದ ನಮ್ಮ ತೆರೆದ ಬಾವಿ ನೀರು ಕಲುಷಿತಗೊಂಡು ನಮಗೆ ಉಪಯೋಗಕ್ಕೆ ಹಾಗೂ ಕೃಷಿಗೆ ಅಯೋಗ್ಯವಾಗಿದ್ದು ಕೃಷಿಯನ್ನು ಸಂಪೂರ್ಣ ನಿಲ್ಲಿಸಿದ್ದೇವೆ

ಅಲ್ಲದೆ ಸ್ಥಾವರವು ಹೊರಸೂಸುವ ಹಾರುಬೂದಿಯುಕ್ತ ಉಪ್ಪಿನಾಂಶದಿಂದ ನಮ್ಮ ವಾಹನಗಳು, ಮನೆ ಛಾವಣಿಗೆ ಹಾಕಿದ ತಗಡಿನ ಶೀಟು, ಬಾವಿಗಳಿಗೆ ಹಾಕಿದ ಪಂಪ್ ~~ಸೆಟ್~~ ಮೋಟಾರುಗಳು, ಮನೆಗೆ ಹಾಕಿದ ವಿದ್ಯುತ್ ಸಂಪರ್ಕ ಉಪಕರಣಗಳು [illegible] ಟಿ.ವಿ.ಯ ಡಿಶ್‌ಗಳು ತುಕ್ಕು ಹಿಡಿದು ನಮಗೆ ತುಂಬಲಾರದ ನಷ್ಟ ಸಂಭವಿಸಿರುತ್ತದೆ.

ಸ್ಥಾವರ ಹೊರಸೂಸುವ ಹಾರುಬೂದಿಯುಕ್ತವಾದ ಉಪ್ಪು ನೀರು ಭತ್ತದ ಪೈರಿನ ಜೊತೆ ಬಿದ್ದು ಹೋದಂತಾಗಿ ~~[illegible]~~ 1/10 ರಷ್ಟು ಉತ್ಪತ್ತಿ ಸಿಗದೆ ಭತ್ತದ ಕೃಷಿಯನ್ನು ಸಂಪೂರ್ಣವಾಗಿ ನಿಲ್ಲಿಸಿದ್ದೇವೆ. ಅಲ್ಲದೆ ಯು.ಪಿ.ಸಿ.ಎಲ್‌ನ ಕಲುಷಿತ ನೀರು ತೋಟಗಾರಿಕಾ ಬೆಳೆಗಳಾದ ತೆಂಗು, ಅಡಿಕೆ, ಮಲ್ಲಿಗೆ, ಇತರ ಫಲ ವೃಕ್ಷಗಳ ಗಿಡಗಳ ಜೊತೆ ಬಿದ್ದು ಸರ್ವನಾಶವಾಗಿದೆ

ಹಾರುಬೂದಿಯುಕ್ತವಾದ ಉಪ್ಪು ನೀರು ದನ ಕರುಗಳು ಮೇಯುವ ಹುಲ್ಲುಗಾವಲಿನ ಜೊತೆ ಬಿದ್ದು ~~ಅದನ್ನು~~ ಆ ಹುಲ್ಲುಗಳನ್ನು ದನಗಳು ತಿಂದರೆ ~~[illegible]~~ [illegible] ಕಲುಷಿತ ನೀರನ್ನು ದನಗಳು ಕುಡಿಯುವುದರಿಂದ ~~[illegible]~~ ಅವುಗಳ ಆರೋಗ್ಯವು ಕೆಟ್ಟಿದ್ದು ಅವುಗಳ [illegible] ಪರಿಸ್ಥಿತಿ ಉಂಟಾಗಿದೆ

(5) ಶ್ವಾಸ ಕೋಶದ ತೊಂದರೆ. (6) ಕಣ್ಣಿನ ಉರಿ ಊತ (7) ಕಜ್ಜಿ ಮುಂದ
ಮುಂತಾದ ಕಾಯಿಲೆಯಿಂದ ನರಳುತ್ತಿದ್ದೇವೆ.

ವಾರ್ಷಿಕವಾಗಿ ಈ ಮೇಲೆ ತಿಳಿಸಿದ ಎಲ್ಲಾ ಕಾಯಿಲೆಗಳಿಂದ ಸುಮಾರು 1 ರಿಂದ 1.5 ಲಕ್ಷ ನಷ್ಟವನ್ನು ಅನುಭವಿಸುತ್ತಿದ್ದೇವೆ.

ದಯಾಳುಗಳಾದ ತಾವು ಈ ನಮ್ಮ ಎಲ್ಲಾ ನಷ್ಟವನ್ನು ಕಂಪೆನಿಯು ನೇರ ಹೊಣೆಯಾಗಿರುವುದರಿಂದ ಕಂಪೆನಿಯಿಂದ ನಷ್ಟ ಭರಿಸಿ ಕೊಡಲು ಮತ್ತು ಇನ್ನು ಮುಂದೆ ಈ ಕಂಪೆನಿಯಿಂದ ಅನಾಹುತಗಳು ಆಗದ ರೀತಿಗಾಗಿ ಈ ಕಂಪೆನಿಯನ್ನು ಜನ ವಸತಿ ಇಲ್ಲದ ಪ್ರದೇಶಕ್ಕೆ ಸ್ಥಳಾಂತರಿಸಲು ಘನ ಕರ್ನಾಟಕ ಸರ್ಕಾರಕ್ಕೆ ಮಾಹಿತಿಯನ್ನು ನೀಡಬೇಕಾಗಿ ಕಳಕಳಿಯ ವಿನಂತಿ.

ಇಂತಿ ತಮ್ಮ ವಿಶ್ವಾಸಿ

[signature]

(ಹೆಸರು.)

Annexure VII

ದಿನಾಂಕ
19.11.2011

ಗೆ:
ಅಧ್ಯಕ್ಷರು,
[illegible]
[illegible]
[illegible]
[illegible]

ಇಂದ:
ಡಾ|| [illegible]
[illegible]
[illegible]

ವಿಷಯ: [illegible]

[illegible]

[illegible] Alergic Bronchitis, Alergic Dermatitis, Bronchial Asthma, [illegible]

[illegible] IMA [illegible]

[illegible]

Health and health related problems observed at and around UPCL imported coal based thermal power plant during fact finding visit on 27/03/2011.

Purpose of visit
To identify health related issues arising due to faulty functioning of UPCL plant by onsite inspection by experts in response to public outcry.

Team members
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Family Doctor,
State Working Committee Member,
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Ex-President IMA, Mangaluru Branch.
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Background: The imported coal based thermal power plant of Udupi Power Corporation Limited (UPCL) is situated at Kolachuru, Yelluru village, Nandikur Post in Udupi district. The location of this plant is at a distance of 35 km north of Mangalore. This plant started functioning on 3rd June, 2010. The plant produces 600 Mega Watts of power much needed to support the ever needing energy requirements of people this region. However due to commissioning first out of four phases local residents have already reported serious contamination of the environment following the functioning of this plant. The black smoke(Fly ash) coming out of the UPCL power plant chimney is causing air pollution. The by products of this thermal plant containing coal dusts are first mixed with sea water possibly after desalination to minimize pollution before disposal into a fly ash pond situated at Santhur, Padebettu situated 1.4 km from the plant. But the water from this pond containing salt, coal dust and chemicals has been reported to contaminate well water in the vicinity of 3-4 km radius of the power plant and has also been detected in the nearby field of Yelluru, Kolachuru, Padebettu, Nandikur, Yermal. People residing up to 20 km radius from the plant have reported a number of health ailments mainly respiratory problems causing cough , wheeze and breathlessness since the functioning of this plant. Floriculture has also been reported to be severely affected in 12 km radius from the plant.

Following are the **observations** made by the investigating team members comprising of IMA Doctors and Public Health Specialists.

Ash storage, transportation and disposal.

The daily byproduct comprising of ash coming from this plant is possibly partly sent to Chennai and substantial rest is dumped at the fly ash pond. This ash is ferried to the pond by means of tankers. No pipeline, So far has been laid down by UPCL for this purpose. The pond is poorly constructed without any impervious lining. This could be the likely cause behind water seepage into the surrounding areas causing extensive soil and water contamination. People residing here have reported salinity of drinking water.

There also every chance that this pond containing contaminated water can get flooded during rainy season. Once this happens the toxic waste can easily contaminate the paddy fields situated in the low lying areas nearby on a large scale and the houses at these areas could easily get flooded.
The team also observed that the escape routes (leading to existing natural canal) of slurry laid down by UPCL to ease out pressure is used by local residents for storing water meant for personal and agricultural purposes .hence this cannot be used by the Public.

2. Issues related to emission of fly ash.

The team observed fly ash particles and salt over the roof top sheets and vegetation in house premises situated close to the plant. This has resulted in corrosion of tin sheets covering the roofs of these houses and of electrical cable covers as well. People also reported a decline in arecanut yield, destruction of banana plantation, destruction of flowers, poor growth of grass and hence minimal fodder for cows following the functioning of this plant. The environmental and health hazards are mainly due to inadequate supervision and monitoring of fly ash transportation.

3. The people residing here also reported health ailments like breathlessness including asthma and a number of skin ailments, which may at a later date may result in skin and respiratory cancers.

4. It appears that sea water used for cooling and other purpose is also problematic as a desalination plant is functioning inadequately, moreover it is absolutely. Also the used heated water is being lead in to the sea through underground pipeline with inadequate cooling are addition of coolant. This is resulting leakage at many places contaminating water and soil.

5. This further reiterated that possibly deficiencies and problems inherent in coal based thermal plant at Raichur, the required lesions have not be learnt so far.

Conclusion

The thermal based power plant is outdated, poorly managed and hence a serious threat to the ecosystem of Western Ghats and eco sensitive coastal belt. In such circumstances constant external monitoring by responsible citizens of all walks of life with impeccable track record. (as per recommended guidelines)is essential in order to protect the health of the people residing near the plant. It is high time that all the available technologies need to be utilized to control the health hazards at all levels.

Dr. K. Mohandas Bhandary
Chairman of the team

--sd-- --sd-- --sd-- --sd--

Dr. (Col) S. Jayarama Dr.Sanjeev Badiger Dr. M. A. Kulal Dr. Nitin Joseph

TEAM MEMBERS

DECCAN Chronicle

THE LARGEST CIRCULATED ENGLISH DAILY IN SOUTH INDIA
BENGALURU | FRIDAY 25 | NOVEMBER 2011

Weather

Max: 28.5°C Min: 16.8°C RH: 79% Rainfall: Nil

INTERNATIONAL Jimi Hendrix greatest guitar player: poll 11

SPORT 15 Sachin needs 33 runs for 100th intl ton

Inside

CITY: Police raid 72 rowdies ■ P3

CITY: MCI to checkmate states in SC ■ P4

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Windows

ASTROGUIDE:
Khara: Dakshinayana
Tithi: Kartika Krishna Amavasya till 11.40 am
Star: Anuradha till 24.44
Yoga: Atiganda till 3.56 pm
Rahukalam: 10.30 am to 12 pm

PRAYERS (JAMIA MASJID)
Fajar: 5.35 am Zohar: 1.30 pm
Asar: 4.45 pm Maghrib: 6.00 pm
Isha: 8.00 pm

Jasmine country ravaged by power plant

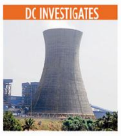
AMIT S. UPADHYE | DC
YELLUR, UDUPI DISTRICT, NOV. 24

An expert committee appointed by the state government to study the environment and the impact of a power plant on the health of villages in Padubidri taluk has found a serious threat to the environment and people's health at Yellur village. Located some 25 kms from Udupi, it sits in the shadow of the Udupi Power Corporation Ltd.

The matter has been brought to the notice of Chief Minister D.V. Sadananda Gowda and other officials but villagers say they are running out of time and hope.

On Wednesday, the committee met in Yellur and to no-one's surprise the majority of the villagers complained about eye irritation and skin allergies. Some 300 villagers have signed a petition requesting the power plant to cut pollution levels, as salt levels in rain has gone up, affecting the villagers' main source of income — horticulture as well as their health and drinking water.

DC INVESTIGATES



The committee has found serious lapses on the part of UPCL which is discharging contaminated water into the small streams, rivers and into the ground. To make matters worse several water wells in the region are now contaminated with ash and salt water. Villagers have no source for clean, drinking water.

One of the Committee members Y.B. Ramakrishna told *Deccan Chronicle* that there have been serious lapses from the UPCL's side and the government as well as the local administration has been made aware about the problems faced by the public but little has been done.

"You don't need an expert committee opinion to know that the water in the land that surrounds UPCL is now contaminated," Mr Ramakrishna said.

Last month the Gram Panchayat and the Karnataka Pollution Control Board conducted a survey in Yellur village which stated that nine out of 13 water wells in the village are not sutiable for drinking water. "The restoration works taken up by the company are simply not good enough," said Vidhya Dinkar, an environmentalist from Mangalore.

DECCAN Chronicle
BENGALURU
FRIDAY 25 | NOVEMBER 2011

Sample okroshka, ukha, shashlyk kebab, fish with lemon and saffron sauce and other dishes at Touche's European Food Festival

From the wonton noodle soup to the sea food cilantro broth and the curry laksa with chicken and prawn — all of this at The Tasty Tangles.

QUOTE OF THE DAY

"He who waits for a chance may wait for a long time."
— Nigerian Proverb

CityScape

POWER OF THREE

The *Connecting 3 Worlds* concert will feature Fazal Qureshi (tabla), from India, son of the great, late Ustad Alla Rakha, Anders Hagberg from Sweden (saxophone, flute) and Ahmad Al-Khatib from Palestine (oud).
When: November 26, 8.30 pm
Where: BFlat, Indiranagar

OF GEMS AND STONES

Here is your chance to look at some fabulous emeralds set in gold, at this jewellery exhibition. Set in 22-carat gold, diamonds and furnished with pearls to finish off the classic look, this is a must-see collection.
When: November 24 to 26
Where: Amrapali, Mitra Tower, Kasturba Road

ART ATTACK

In this latest exhibition of paintings and photos, latest works of artists are on display. Paintings by Nalla Tambi from Bengaluru, Tilly Clifford from UK and collections by Somaansh will be exhibited.
When: Till November 30
Where: Renaissance Gallerie, Cunningham Road

A COMEDY PLAY

The Kannada play, *Runavemba Suthakavu* is directed by MC Anand. The troupe is Sinchana from Bengaluru. This thought provoking hilarious play revolves around a middle class couple caught in the web of global recession.
When: November 25
Where: Ranga Shankara, 2nd Phase, JP Nagar

SOLO SHOW

Recollections, Reconnections, is an exhibition of copper reliefs by artist SG Vasudev.
When: Till December 3
Where: Kynkyny Art, 104 Embassy Square, 148 Infantry Road

A FILM SCREENING

Salt in the earth, and pouring rain

If it wasn't for the towering Udupi Power Corporation that looms over it, few would be able to pick out Yellur village amidst the lush green forests and crop fields of Padubidri taluk. Except, the village, a byword for the fragrant jasmine 'attie' is now an arid wasteland, its residents at risk from a multitude of ailments, their livelihood all but destroyed. **Amit Upadhye** reports from Ground Zero.

Life and means of livelihood changed drastically, as the hard-working residents of Yellur struggle to survive the after-effects. (Below) R. Madhu, a land-loser, shows rusting farm equipment and Mamata Poojari points to the damaged roof. -Satish B.

AMIT S. UPADHYE | DC
YELLUR, UDUPI DISTRICT

The hottest selling item in the village of Yellur isn't the jasmine attie that it was once known for. But helmets! Everyone, young and old, sports them. It's their only protection against the saline, toxic rain that corrodes everything it touches - man, animal, plant, automobile.

The toxic rain, is reported to be behind the rise in the number of cases of irritation in the eyes, rashes on the limbs and respiratory problems. More than 4,000 people have complained of these problems since the Udupi Power Corporation Limited (UPCL) went on stream, triggered by the burning of large quantities of coal at the plant, and the subsequent pumping of salt water as a coolant.

Dr Ratnakar Shetty, a local physician, says he has attended on more patients complaining of allergy and respiratory problems than in the past. "I am not sure if one can attribute this sudden increase in patients to the thermal plant. But two days ago, a lady said rashes on her skin disappeared when the power plant suspended its operations for a month for maintenance," Dr Shetty added.

Jayanth Kumar, a member of Yellur gram panchayat said: "We are unable to cope. Ever since the power plant became operational, my son can't walk as he has allergic rashes on his feet due to salt in the rain and fly ash. No medicine seems to work."

The saline rain has turned the land barren. Trees and flowering plants have withered and died. Structures made of iron have corroded - Pumpsets, roofs, tractors, automobiles. Villagers, moving out to get work are selling them off.

It will take at least a month for the committee to submit the final report. We shall submit separate recommendations to the state, central government and to UPCL. There are several lapses as far as environmental degradation is concerned.
— Y.B. Ramakrishna
Member of the expert committee

Coal-based power generation is the best way to provide power to commercial establishments. UPCL is taking all measures after environmentalists and residents complained about fly-ash and salt rain problems to the authorities. There are issues, but they are being addressed.
— Dr V.S. Acharya
Minister for higher education

We have adopted a wait and watch policy until the expert committee report is out. The local people are unhappy with environmental degradation. My support to people living around UPCL will continue.
— Pejawar Seer

Fragrance of jasmine washed away in Yellur

Not long ago, these farmers were content with earnings from fragrant jasmine flowers, which made their way from their backyard to markets in Mangalore and Bengaluru and were much sought after during festivities, fetching up to Rs 1,000 a for a bunch of garlands! The 'attie' or special garland of jasmine from Padubidri often made it to markets in many cities in Karnataka during festivals. Today, the salinity in the soil and atmosphere has deprived farmers of their remuneration from the sweet-smelling jasmine. The upshot: the yield has dropped to such an extent that farmers cannot gather even a kilo of jasmine buds at the end of two seasons.

"The salt in the rain hampers growth. Be it arecanut or coconut, the yield has decreased from the time power plant became operational. We can't water the fields as most of the water in the wells in have high levels of salt," Manohar J, of Yellur village, told DC.

Polluted water is the other problem

- The polluted waste water from the power plant is the other killer. Mamata Poojari, a housewife says her children complain about itching limbs, whenever they visit their farm.
- Even death ceremonies have to wait as clean water is now a two hour trek away.

J-13011/23/1996 - IA. II (T)
Government of India
Ministry of Environment & Forests

Paryavaran Bhavan, C.G.O. Complex,
Lodi Road, New Delhi -110003.
Dated: 01.09.2011

To,

M/s Udupi Power Corpn. Ltd.
2nd Floor, 'Le-Parc Richmonde'
No. 51, Richmond Road
Bangalore- 560 025.

Sub: 2x600 MW Imported Coal Based TPP at Udupi Distt, in Karnataka – reg. Amendment of Environmental Clearance.

Sir,

This has reference to your letters dated 13.10.2010, 21.03.2011, 14.04.2011 and 06.06.2011 requesting for amendment in the environmental clearance accorded by this Ministry vide its letter of even no. dated 20.03.1997 and others.

2. Environmental clearance was accorded for 2x500 MW for the power project by the Ministry on 20.03.1997. Thereafter an amendments were issued after due diligence on 25.01.1999 and 09.09.2009 respectively permitting enhancement of capacity to 2x507.5 MW and subsequently to 2x600 MW. It has been noted that CRZ clearance for permissible activities has been obtained on 18.05.2010.

3. The request for amendment of condition nos. (vi), (ix) under para no.2 of the Ministry's letter of even no., dated 20.03.1997 and observations made in the amendment issued vide the Ministry's letter of even no., dated 09.09.2009 has been examined. It has been noted that the environmental clearance and its amendments issued need to be merged into a comprehensive environmental clearance for clarity. The proposal regarding amendment was also deliberated in 12th, 15th, 17th, 20th, 22nd and 26th Meetings of the Expert Appraisal Committee (Thermal Power) held during December, 2010, January 2011, February, 2011, March, 2011, April, 2011 and June, 2011 respectively.

4. Based on the information submitted by you in the Ministry and the presentations made before the Expert Appraisal Committee (Thermal Power) in its meetings mentioned at para no. 3 above, the Ministry of Environment and Forests hereby informs that the environmental clearance for the 2x600 MW Imported Coal Based Thermal Power Plant near Padubidri, in Udupi Distt., in Karnataka is accorded vide this Ministry's letter of even no., dated 20.03.1997 and its amendments dated 25.01.1999 and 09.09.2009 shall be

now substituted by this final comprehensive clearance subject to the compliance of the following Specific and General conditions:

A. Specific Conditions:

(i) All the conditions stipulated by the Karnataka State Pollution Control Board issued from time to time should be strictly implemented including the installation of Flue Gas Desulphurisation (FGD) Plant. The status of implementation of FGD shall be submitted to the Regional Office of the Ministry at Bangalore.

(ii) Sulphur and ash contents in the coal to be used in the project shall not exceed 0.8 % and 12 % (average) respectively at any given time. In case of variation of coal quality at any point of time, fresh reference shall be made to the Ministry.

(iii) A single bi-flue stack of 275 m height shall be provided with continuous online monitoring equipments for SO_x, NO_x and Particulate Matter ($PM_{2.5}$ & PM_{10}). Exit velocity of flue gases shall not be less than 22 m/sec. Mercury emissions from stack shall also be monitored on periodic basis.

(iv) An instrumented meteorological tower shall be set up for collecting on-site meteorological data.

(v) High Efficiency Electrostatic Precipitators (ESPs) shall be installed to ensure that particulate emission from the proposed plant does not exceed 50 mg/Nm^3. Low NO_x Burners shall be installed.

(vi) Adequate dust extraction system such as cyclones/ bag filters and water spray system in dusty areas such as in coal handling and ash handling points, transfer areas and other vulnerable dusty areas shall be provided.

(vii) Transportation of coal from Mangalore Port to the project site shall be undertaken by rail with adequate provisions to prevent fugitive emissions.

(viii) Fly ash shall be collected in dry form and storage facility (silos) shall be provided. Unutilized fly ash shall be disposed off in the ash pond in the form of slurry. Mercury and other heavy metals (As,Hg, Cr, Pb etc.) will be monitored in the bottom ash as also in the effluents emanating from the existing ash pond. No ash shall be disposed off in low lying area. To prevent ground water contamination, the ash pond area should be lined with impervious layer.

(ix) The transportation of dry fly ash to the ash disposal area through closed bulkers shall be allowed till 30.03.2012 till the Cement

Grinding unit of M/s ACC Ltd. is set up. Monitoring of particulate emissions along the route of transportation shall be carried out.

(x) Extensive monitoring of air quality in and around the power plant and extending up to Western Ghat should be carried out and records should be scientifically maintained The monitoring Programme should cover the key stone species for any potential acid deposition effects.

(xi) No leachate shall takes place at any point of time from the Coal storage area and Ash Pond and adequate safety measures such a lining with impermeable membrane / liner shall be adopted. Precautionary measure shall be taken to protect the ash dyke from getting breached and in-built monitoring mechanism shall be formulated.

(xii) Fugitive emission of fly ash (dry or wet) shall be controlled so that no agricultural or non-agricultural land is affected. Damage to any land shall be mitigated and suitable compensation provided in consultation with the local Panchayat.

(xiii) COC of atleast 1.25 shall be adopted.

(xiv) Closed Circuit Cooling Tower shall be installed and sea water shall be used for cooling purpose. The sweet water requirement shall be met from the desalination plant.

(xv) No effluent will be discharged into the Mulki River. The treated effluents shall be discharged through a pipeline in the Arabian Sea ensuring that the differential temperature is maintained at 5^0 C. The area and location of the intake and discharge point shall be finalised in consultation with the National institute of Oceanography (NIO), Goa/Central Water and Power Research Station, Pune.

(xvi) Brine management from desalination plant, its disposal mechanism and status of implementation shall be submitted to the Regional Office of the Ministry from time to time.

(xvii) Possibility for setting up transit storage within plant site for temperature control of effluent before discharge to the sea shall be examined and details submitted to the Ministry **within six months**.

(xviii) Monitoring of ground and surface water quality nearby shall be regularly conducted and records maintained. The monitored data shall be submitted to the Ministry regularly. Further, monitoring points shall be located between the plant and drainage in the direction of flow of ground water and or advised by the State Pollution Control Board and records maintained. Monitoring for heavy metals in ground water shall be undertaken.

(xix) A well designed rain water harvesting system shall be put in place which shall comprise of rain water collection from the built up and open area in the plant premises. Action plan and road map for implementation shall be submitted to the Regional Office of Ministry.

(xx) The project proponent shall not hamper the vocation of the fishing community in the area (if any) and it shall be ensured that local fishing community shall be allowed to carry out their vocation. Clearance from the Department of Fisheries in the State Govt. shall be obtained.

(xxi) Acquisition of land should be restricted to 550 ha as per the following breakup:

Plant area	180 ha
Ash disposal area	150 ha
Colony area	45 ha
Intake pipe route	25 ha
Other requirement	50 ha
Rehabilitation, green belts, Ash utilisations etc.	100 ha

(xxii) Green belt of adequate width and density with suitably selected native species should be developed all around the plant area and the ash disposal site. Density of tress shall not be less than 2000 per ha and survival rate not less than 80%. It shall be ensures that at least 1/3rd of the total area is utilised for creation of green belt. Adequate financial provision should be made for this purpose.

(xxiii) Local employable youth from Project Affected Family shall be trained in skills relevant to the project for eventual employment in the project itself. The action taken report and details thereof to this effect shall be submitted to the Regional Office of the Ministry and the State Govt. Dept. concerned from time to time.

(xxiv) The project affected people should be rehabilitated and resettled in consultation with the State Govt. of Karnataka. A Rehabilitation Committee should be constituted with representatives from the state Govt of Karnataka, affected people, local recognised NGOs, technical institutions, experts etc.

(xxv) Status of implementation of R&R including its financial component spent and action pending shall be submitted to the regional Office of the Ministry from time to time.

(xxvi) Financial requirements for implementation of the environmental mitigative measures should be earmarked and shall not be diverted for

the other purposes. Adequate provision should be ensured for enhancement of funds required, if any, in future.

(xxvii) The project proponent shall also adequately contribute in the development of the neighbouring villages. Special package with implementation schedule for free potable drinking water supply in the nearby villages and schools shall be undertaken in a time bound manner.

(xxviii) The project proponent shall formulate sustainable livelihood scheme for landless and maginalised section of society (such as landless farmers) in the area who are directly or indirectly affected due to power project.

(xxix) Atleast three nearest village shall be examined for possible adoption and basic amenities like development of roads, drinking water supply, primary health centre, primary school etc shall be developed in co-ordination with the district administration.

(xxx) An amount of Rs 5.0 Crores shall be earmarked as one time capital cost for CSR programme. Subsequently a recurring expenditure of Rs 1.0 Crores per annum till the life of the plant shall be earmarked as recurring expenditure for CSR activities. Details of the activities to be undertaken shall be submitted **within one month** along with road map for implementation.

(xxxi) CSR scheme shall be identified based on need based assessment in and around the villages within 5.0 km of the site and in constant consultation with the village Panchayat and the District Administration. As part of CSR prior identification of local employable youth and eventual employment in the project as required after imparting relevant training shall be also undertaken as necessary.

(xxxii) It shall be ensured that in-built monitoring mechanism for the schemes identified is in place and annual social audit shall be got done from the nearest government institute of repute in the region. The project proponent shall also submit the status of implementation of the scheme from time to time.

(xxxiii) A Monitoring Committee should be constituted for reviewing the compliance to various safeguard measures by involving recognised local NGOs. Pollution Control Board, Institutions, Experts etc.

B. General Conditions:

(i) A Corporate Environmental Policy shall be formulated and after due approval of the Board of Directors of the Company shall be submitted to the Ministry **within six months**. The policy shall specifically address issues of adherence to environmental policy so formulated

and environmental clearance conditions stipulated for the power project and also others including matters related to violations of stipulated conditions (if any) to the Board.

(ii) The treated effluents conforming to the prescribed standards only shall be re-circulated and reused within the plant. Arrangements shall be made that effluents and storm water do not do not get mixed.

(iii) A sewage treatment plant shall be provided (as applicable) and the treated sewage shall be used for raising greenbelt/plantation.

(iv) A well designed rainwater harvesting shall be constructed. Central Groundwater Authority/ Board shall be consulted for finalization of appropriate rainwater harvesting technology within **a period of three months** from the date of issue of clearance and details shall be furnished to the Regional Office of the Ministry.

(v) Adequate safety measures shall be provided in the plant area to check/minimize spontaneous fires in coal yard, especially during summer season. Copy of these measures with full details along with location plant layout shall be submitted to the Ministry as well as to the Regional Office of the Ministry.

(vi) Storage facilities for auxiliary liquid fuel such as LDO and/ HFO/LSHS shall be made in the plant area in consultation with Department of Explosives, Nagpur. Sulphur content in the liquid fuel will not exceed 0.5%. Disaster Management Plan shall be prepared to meet any eventuality in case of an accident taking place due to storage of oil.

(vii) Regular monitoring of ground water level shall be carried out by establishing a network of existing wells and constructing new piezometers. Monitoring around the ash pond area shall be carried out particularly for heavy metals (Hg,Cr,As,Pb) and records maintained and submitted to the Regional Office of this Ministry. The data so obtained should be compared with the baseline data so as to ensure that the ground water quality is not adversely affected due to the project.

(viii) Monitoring surface water quantity and quality shall also be regularly conducted and records maintained. The monitored data shall be submitted to the Ministry regularly. Further, monitoring points shall be located between the plant and drainage in the direction of flow of ground water and records maintained. Monitoring for heavy metals in ground water shall be undertaken.

(ix) First Aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.

(x) Noise levels emanating from turbines shall be so controlled such that the noise in the work zone shall be limited to 75 dBA. For people working in the high noise area, requisite personal protective equipment like earplugs/ear muffs etc. shall be provided. Workers engaged in noisy areas such as turbine area, air compressors etc shall be periodically examined to maintain audiometric record and for treatment for any hearing loss including shifting to non-noisy/noise less areas.

(xi) Regular monitoring of ground level concentration of SO_2, NOx, $PM_{2.5}$ & PM_{10} and Hg shall be carried out in the impact zone and records maintained. If at any stage these levels are found to exceed the prescribed limits, necessary control measures shall be provided immediately. The location of the monitoring stations and frequency of monitoring shall be decided in consultation with SPCB. Periodic reports shall be submitted to the Regional Office of this Ministry. The data shall also be put on the website of the company.

(xii) Provision shall be made for the housing of construction labour (as applicable) within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

(xiii) The project proponent shall advertise in at least two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned within seven days from the date of this clearance letter.

(xiv) A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parisad / Municipal Corporation, urban local Body and the Local NGO, if any, from whom suggestions/representations, if any, received while processing the proposal. The clearance letter shall also be put on the website of the Company by the project proponent.

(xv) An Environmental Cell shall be created at the project site itself and shall be headed by an officer of appropriate seniority and qualification. It shall be ensured that the head of the Cell shall directly report to the Head of the Organization. The status report on the functioning of the Cell shall be submitted to the regional office of the Ministry periodically. The Cell shall comprise of an expert in Marine Biology, Fishery and Mangroves preservation.

(xvi) The proponent shall upload the status of compliance of the stipulated environmental clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MOEF, the respective

Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM ($PM_{2.5}$ & PM_{10}), SO_2, NO_x (ambient levels as well as stack emissions) shall be displayed at a convenient location near the main gate of the company in the public domain.

(xvii) The environment statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Offices of the Ministry by e-mail.

(xviii) **The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests, its Regional Office, Central Pollution Control Board and State Pollution Control Board. The project proponent shall upload the status of compliance of the environment of the environmental clearance conditions on their website and update the same periodically and simultaneously send the same by e-mail to the Regional Office, Ministry of Environment and Forests.**

(xix) Regional Office of the Ministry of Environment & Forests will monitor the implementation of the stipulated conditions. A complete set of documents including Environmental Impact Assessment Report and Environment Management Plan along with the additional information submitted from time to time shall be forwarded to the Regional Office for their use during monitoring. Project proponent will up-load the compliance status in their website and up-date the same from time to time at least six monthly basis. **Criteria pollutants levels including NO_x (from stack & ambient air) shall be displayed at the main gate of the power plant.**

(xx) Separate funds shall be allocated for implementation of environmental protection measures along with item-wise break-up. These cost shall be included as part of the project cost. The funds earmarked for the environment protection measures shall not be diverted for other purposes and year-wise expenditure should be reported to the Ministry.

(xxi) The project authorities shall inform the Regional Office as well as the Ministry regarding the date of financial closure and final approval of the project by the concerned authorities and the dates of start of land development work and commissioning of plant.

(xxii) Full cooperation shall be extended to the Scientists/Officers from the Ministry / Regional Office of the Ministry at Bangalore / CPCB/ SPCB who would be monitoring the compliance of environmental status.

5. The Ministry of Environment and Forests reserves the right to revoke the clearance if conditions stipulated are not implemented to the satisfaction of the Ministry. The Ministry may also impose additional environmental conditions or modify the existing ones, if necessary.

6. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

7. In case of any deviation or alteration in the project a fresh reference should be made to the Ministry to assess the adequacy of the condition(s) imposed and to add additional environmental protection measures required, if any.

8. The above stipulations would be enforced among others under the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and rules there under, Hazardous Wastes (Management and Handling) Rules, 2008 and its amendments, the Public Liability Insurance Act, 1991 and its amendments.

Yours faithfully,

(Dr. P.L. Ahujarai)
Scientist'F'

//BY REGD. POST WITH ACK. DUE//

(This document contains.....pages including annexure)

Combined Consent order No: KSPCB/HPI/074/UDUPI/2011 Dated: 09.12.2011

Consent for discharge of effluents under the Water (Prevention and Control of Pollution) Act 1974 and Emissions under the Air (Prevention and Control of Pollution) Act 1981.

Ref:

1) Board office consent order No.KSPCB/SEO-17Cat/CFO/UPCL/2010-11/421, dt:18.8.2010.
2) Proceedings of Personal Hearing held on 7.03.2011, No.KSPCB/HPI/074/UPCL/2010-11/43, dt: 6.4.2011.
3) Your letter No UPCL/B02/2011/3363 dt 13.04.2011.
4) The notice issued to the industry by R.O., Udupi on 11.04.2011.
5) Your letter No. UPCL/Plant/O&M/ENV/11-12/0122 dt 30.04.2011
6) Inspection of the industry by the Hon'ble Chairman on 17.05.2011.
7) Notice No.PCB/UDUPI/LR/2011-12/147, dated 31.05.2011.
8) Your letter No UPCL/Plant/O&M/ENV/11-12/0643 dt 9.06.2011
9) Your letter No UPCL/B02/2011/3698, dated 25.06.2011.
10) Your letter No. UPCL/Plant/O&M/ENV/11-12/0815 dt 27.06.2011
11) T.O. letter No PCB/HPI/074/UPCL/2011-12/1794, dated 02.07.2011.
12) Your letter No.UPCL/B02/2011/3742, dated 4.07.2011.
13) R.O., Udupi letter No. PCB/UDUPI/LR/2011-12/R.No.6390/317, dated 7.7.2011. Enclosing the consent application submitted by the industry for the period upto 30.6.2012
14) Inspection report of CEO vide No.KSPCB CEO/2011-12/2334, dated 25.7.2011 for the inspections made on 18.7.2011 and on 19.07.2011.
15) T.O. Show Cause Notice No.KSPCB/HPI/074/UDUPI/2011-12/2944, dated 6.8.2011.
16) Proceedings of Personal Hearing held on 16.08.2011, No.KSPCB/HPI/074/UPCL/2011-12/3369 dt 26.08.2011.
17) Your letter No UPCL/B02/2011/3941, dated 18.08.2011.
18) SEO, Mangalore inspection report No PCB/SEO-MNG/2011/141, dated 11.8.2011.
19) Your letter No UPCL/B02/2011/4004 dated 6.09.2011.
20) SEO, Mangalore inspection report No.PCB/SEO-MNG/2011/200, dated 17.10.2011.

Consent is granted to **The Director Technical, M/s. Udupi Power Corporation Ltd. Yellur Village, Nandikuru post, Udupi dist. 574138,** authorizing him to operate the industrial plant at **"the above said premises"** and to make discharge of effluents and emissions from the premises as mentioned above

Discharge of effluents under the Water Act:

Sl. No	Description	Permitted Quantity of discharge	Place of discharge
1	Trade effluent	1,70,352 KLD but restricted to the operation of Unit-1 only	• Cooling tower blow down of quantity 5680 m^3/hr and Reverse osmosis plant reject of quantity 1418 m^3/hr to be discharged to sea through guard pond after confirming with standards stipulated in Annexure-I • The other trade effluent shall be utilized for secondary purposes viz., green belt and dust suppression after treatment in the Central ETP to the standards stipulated in Annexure-II During monsoon the excess treated effluent shall be discharged into guard pond.
2	Domestic effluent	300 KLD	The domestic effluent shall be treated as per Annexure III and recycled in the plant area for other uses. Till the design flow is achieved, industry shall treat the sewage in septic tank and soak pit.

Discharge of air emissions under the Air Act from the following stacks etc.

Sl No.	Description of chimney/ outlet	Limits specified refer schedule
As per Annexure V		

The consent is valid for

Sl. No	Products/activity	Maximum Capacity
1	Thermal Power Plant – Unit-1	1 X 600 MW (Unit-1)

THE CONSENT IS GRANTED FOR THE PERIOD from 01.07.2011 to 30-06-2012.

Note: *This consent is issued subject to the limitations to the time limit stipulated and compliance made to the conditions in Environmental Clearance of MOEF No J-13011/23/1996-IA.II(I), dated 1.9.2011*

For and on behalf of the
Karnataka State Pollution Control Board
Sd/-
SENIOR ENVIRONMENTAL OFFICER

To
The Director Technical,
M/s. Udupi Power Corporation Ltd,

SCHEDULE

TERMS AND CONDITIONS

(To accompany consent No: KSPCB/HPI/074/UDUPI/2011 Dated:

A. TREATMENT AND DISPOSAL OF EFFLUENTS UNDER THE WATER ACT.

I. Quantity of the water use & Specification of Coal.

1 Total Sea water quantity usage shall not exceed 10000 m^3/hr for industrial and domestic purpose.

2. The Applicant shall use imported coal with ash and Sulphur content as specified in the Comprehensive Environmental Clearance dated 01.09.2011.

II. Treatment and disposal of trade and sewage effluent:

1 The discharge from the effluent treatment plants of the applicant shall pass through terminal manhole/manholes where from the Board shall be free to collect samples at any time in accordance with the provisions of the Act or Rules made there under.

2 The applicant shall treat the trade effluent & sewage as per Annexure I, II & III of this order

3. The applicant shall provide flow measuring devices at both inlet and outlet of ETP & STP along with separate energy meter for the ETP & STP and maintain logbooks for hourly recording for verification by inspecting officers.

4. The Applicant shall not change or alter either the quality or the quantity or the rate of discharge or temperature or the route of discharge without the previous written permission of the Board.

5. The applicant shall not allow the discharge from the other premises to mix with the discharge from his premises. Storm water shall not be allowed to mix with the effluents on the upstream of the terminal manhole where the flow measuring devices are installed.

6. All the treatment units of STP of 300 KLD shall be totally impervious.

10 The applicant should recycle the treated trade effluent to the extent possible. The RO reject, Cooling tower blow down, unutilized treated effluents from ETP/STP (during monsoon) shall be discharged into the Guard pond before the same is further discharged into sea at a distance of 670 meters inside the sea off Yermal shore and 4.99 meters below the surface with diffuser arrangement, as identified by National Institute of Oceanography, Goa. The effluent discharged into sea shall meet the standards as stipulated in **Annexure - I**. The water balance/waste water balance shall be as per the flow sheet enclosed as **Annexure – IV,** but restricted to the extent needed for operating Unit-I

11 (a) The Boiler blow down effluent shall meet the standards stipulated below before the same is discharged into guard pond.

Boiler blow down	Suspended Solids mg/l.Max.	100
	Oils and Grease mg/l. Max.	20
	Copper (Total) mg/l. Max	1.0
	Iron (Total) mg/l. Max	1.0

(b) The cooling tower blow down shall meet the standards stipulated below before the same is discharged into the guard pond.

Cooling tower blow down	Free available Chlorine mg/l. Max	0.5
	Zinc mg/l. Max	1.0
	Chromium (Total) mg/l. Max	0.2
	Phosphate mg/l. Max	5.0

(c) There shall not be any overflow from the ash pond. During monsoon overflow if any, shall confirm to the standards shown below and discharged into sea through guard pond.

Ash Pond Effluent	pH	6.5-8.5
	Suspended Solids, mg/l. Max	100
	Oils and Grease mg/l. Max.	20

12.The applicant shall provide a sufficient capacity treated effluent storage tank/guard pond [illegible] pumping the effluent into sea. The quality of the treated effluent shall be

15. The applicant shall operate the integrated flow measuring/recording devices on the effluent line leading to sea. A record of daily effluent discharge shall be maintained.

16. The industry shall install an on-line monitoring system at the outlet of the Guard Pond for pH level, Dissolved Oxygen and temperature of discharged water. The results shall be displayed on real time basis in company web site.

17. The industry shall maintain alternate power supply to the ETP for its continuous operation

B. SPECIFIC CONDITIONS AND TIME LIMITS:

1. Industry shall comply with the conditions and time schedules stipulated in the Comprehensive Environmental Clearance issued by MOEF vide dated 1.9.2011. Industry shall submit monthly reports on the progress achieved

2. Company shall submit a detail plan for spending Rs 5 Crores for CSR activity as specified in the EC on priority.

3. Action shall be taken to constitute a monitoring committee as specified in the EC at the earliest

4. Industry shall install Alarms and Systems to shut down the pumping of water in case of any leakage of the sea water from the sea water pipeline along with proper risk mitigation measures. There shall be a risk analysis study report in place.

5. Industry shall undertake a scientific study on Risk Assessment for the ash dyke and submit report

6. The revised EMP shall be submitted by engaging experts in the field which should also include the works to prevent impact of civil works/ over burdens by the end of January, 2012

7. Industry shall conduct drift analysis test before and after the installation of drift eliminators and submit report to the Board.

8. The drift eliminators shall be installed within January, 2012.

11.

a) Industry shall provide adequate garland canal all around the coal area storage to arrest all the run offs from the coal yard and also restrict the height of the coal dump to avoid any fugitive dust being carried away to surrounding areas due to wind. The coal yard runoff shall be collected

b)The industry shall provide barricade of suitable height around the coal stock immediately to avoid fugitive emissions during wind blow.

12. Industry shall take all necessary measures to improve the house keeping and greenery in the premises Action shall be initiated to plant suitable species of trees in consultation with Forest Department.

C. WATER CESS:

1 The applicant shall provide water meter at all the intake points as under Section (5) of Water Cess Act, 1977 and shall file the Water Cess returns regularly and also pay the Cess Assessed with the time stipulated

D. EMISSIONS:

1. The discharge of emissions from the premises of the Applicant shall pass through the stacks/chimneys mentioned in **Annexure-V** where from the Board shall be free to collect the samples at any time in accordance with the provisions of the Act and Rules made there under. stacks/chimneys heights shall be as per **Annexure-V**.

2. The hourly rate of emissions discharged and the tolerance limits of the constituents forming the emissions in each of the chimneys/stacks shall not exceed the limits laid down in Annexure-V.

3. The applicant shall provide port holes for sampling the emissions, access platforms for carrying out stack sampling, electrical points and all other necessary arrangements including lighting.

4. The applicant shall operate the Air pollution control equipment as specified in the Annexure continuously so as to ensure that the emission does not exceed the limits specified. Operation of the control equipment shall be synchronized with the operation of emission source.

8 Applicant shall provide adequate number of rows of trees all round the ash pond.

9 Applicant shall provide water sprinkling system to suppress dust for coal unloading from the wagons coal handling area, and coal yard at all the time.

10. The applicant shall operate continuously, the Flue Gas Desulphurisation plant to control SO2 missi

11. The coal transportation from new Mangalore port shall be by rail and during the transportation route to power plant site, there shall not be any fugitive emissions. Proper dev shall be provided to prevent the same. During transportation there shall not be any coal spillages.

12 Coal storage yard and ash management areas should be suitably lined with impervious lining to avoid leaching in to the groundwater.

13 The applicant shall provide adequate dust control measure for coal handling area and coal transfer points

14. The applicant shall use low NOx burner.

15. The applicant shall monitor Mercury content on monthly basis in the ash generated and as well as in the emissions and submit monthly report to the Board.

16. All efforts shall be made to control fugitive emissions.

II. Self Monitoring and Reporting

A) Water pollution Control:

1. The treated trade effluent shall be analyzed for the parameters stipulated in **Annexure-II**, in every day before utilising for green belt/discharge to sea. Similarly, the sewage effluent be analysed for the parameters in **Annexure-III** before utilising for other the Board Empanelled Labs.

2. A record daily effluent discharge shall be maintained and once in a month the extract shall be submitted to Regional Officer, Udupi.

4 The applicant shall check the submarine pipeline for any damage, anchorage, etc, through Goa or any competent agency once in a year and report should be furnished to the Board by November/December every year.

B) Air Pollution Control:

1 The applicant apart from providing the porthole and plat form for the stack shall also provide meters/continuous monitoring systems with proper calibration for instantaneous monitoring of the emissions.

2. The emission monitoring shall be recorded in the proper formats in a log book and the monitored results shall be submitted to the Regional office of the Board once in a month.

3. The industry shall establish adequate number of ambient air quality monitoring stations based on core zone and in the radius of impact a representative station to monitor the air quality in the predominant wind-ward direction. The report of analysis shall be submitted in both soft and hard format and monthly extract sent the Regional office. In a year the analysis shall be statistically evaluated for all the stations as per as required under the National Ambient Air Quality Standards shall be submitted to the Regional Office of the Board. The monitoring shall be carried out for the parameters as stipulated in the MoEF notification dated 16.11.2009.

4 The industry shall monitor the noise levels at the boundary of the industry at 5 locations and shall submit the monitoring reports to the Regional Office as per annexure -

5. The industry shall provide and maintain at its own cost a meteorological station to record data on wind velocity, direction, temperature, humidity, rainfall etc., and the data shall be recorded and shall be stored in soft copy and a monthly average data in soft format shall be submitted to Regional Office, Udupi

6. Soil quality shall be regularly monitored through Fisheries College and submit report to Regional Office.

7. The industry shall submit results of online AAQM to the Regional Office. The industry shall have provision to post the results on real time in their website.

D. ENVIRONMENTAL STATEMENT

F. FLY ASH & SOLID WASTE (OTHER THAN HAZARDOUS WASTE) DISPOSAL:

1. The applicant shall adhere to the directions contained in the fly ash utilization Notification issued by Ministry of Environment and Forest Government of India vide No S O 763 (E) dated 14.9.1999 and its amendments dated 27.8.2003 & 3.11.2009

2 The applicant shall provide with water sprinkling arrangement in ash pond area to avoid any fugitive emission due to wind.

3. The following solid waste shall be handled & disposed as indicated below

Sl No	Category	Quantity (*)	Disposal details
1	Bottom ash	165 TPD	Collected in dry form in water impounded hopper and this ash after grinding should be dewatered and transported in trucks (dumper trucks) to ash dump area.
2	Fly ash	650 TPD	Collected in dry form in ash silo and made available for Cement plants, brick manufacturing industries etc, for utilisation. Excess fly ash if any, shall be transported to ash dump area in closed trucks without causing any spillages/ fugitive emissions.
3.	Gypsum	85 TPD	Collected in Silos in dry form and made available for Cement plants and plaster Board manufacturers.

4 The Industry shall submit compliance report to the above conditions once in a month to Board.

5. The solid waste collected in the Factory premises as sweepings wastage packaging, empty containers, sludge including those from air pollution control equipments shall be disposed of scientifically to the satisfaction of the Board so as not to cause fugitive emission problems or water pollution problems through leaching etc., of any kind.

G. NOISE POLLUTION CONTROL:

2. The Board reserves the right to review, impose additional conditions, revoke, change or alter terms and conditions of this consent.

3. This consent for discharging sewage and/or Trade effluents from the factory shall not be taken or considered as the Board's permission to continue to discharge the sewage and/or Trade effluents from the factory into the place (as mentioned in this consent Order) which pollutes the water therein endangering the life and property of the persons using the said water before or after the periods indicated in the Terms and Conditions of this Consent Order.

4. The Applicant shall not change or alter either the quality or quantity or rate of emission or install or after the air pollution control equipment, change in raw material or manufacturing process resulting in change in quality and/or quantity of emissions without the prior approval of the Board

5. The industry shall not change or alter (a) raw materials or manufacturing process, (b) change the products or product mix (c) the quality, quantity or rate of discharge/ emission (d) install/replace/alter the water or air pollution control equipments without the approval of the Board.

6. The applicant shall promptly comply with all orders and instructions issued from time to time by the Board or any other officers of the Board duly authorized in this behalf.

7. The Applicant shall forthwith keep the Board informed of any accidental discharge of emissions into the atmosphere in excess of the standards laid down by the Board. The applicant shall also take corrective steps to mitigate the impact

8. The applicant shall not store any raw materials/ chemicals drums on naked ground

9. The applicant shall display flow diagram of the pollution control system at the site

10. The applicant shall comply with the guidelines under Corporate Responsibilities for Environment 2003 issued by Ministry of Environmental Forests and CPCB.

11. The applicant shall maintain register recording the ambient air quality, stack monitoring and analysis of treated effluents. The register shall be open for inspection by the Board at all time. All the monitored data, compliance to EC and consent

14. The entire premises shall be always kept clean. The effluent holding area, inspection chambers, drains, flow measuring points should made easily approachable. The applicant shall display the consent granted in a prominent place for perusal of the inspecting officers of the Board.

15. The applicant's heirs, legal representatives or assigns shall have no claims what so ever to the consideration of renewal of this consent after expiry of the period of consent.

16. The industry shall transport and store the raw materials in a manner so as not to cause any damage to environment, life and property. The applicant shall be solely responsible for any damage to environment.

17. The applicant shall plant and maintain adequate number of trees in and around the industry premises to the extent emissions escaping into the surrounding area and improve the environment and aesthetic appearance of the industry and the surrounding.

18. The applicant shall use only imported crushed coal.

19. The applicant shall make an application for consent at least 120 days before expiry of this consent.

20. Industry shall comply with all the consent conditions and furnish report within 30 days to the Regional Office.

For and on behalf of the
Karnataka State Pollution Control Board

SENIOR ENVIRONMENTAL OFFICER

ANNEXURE-I

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENTAL POLLUTANTS

Sl No	Parameter	Marine coastal areas
1.	Colour and odour	All efforts should be made to remove colour and unpleasant odour as far as practicable.
2.	Suspended solids mg/l, max	a. For process waste water -100 b. For cooling water effluent 10 percent above total suspended matter of influent.
3.	pH value	5.5 to 9
4.	Temperature	Shall not exceed 5^0C above the receiving water temperature
5.	Oil and grease mg/l max.	20
6.	Total residual Chlorine mg/l max	1.0
7.	Biochemical oxygen demand (3 days at 27^0C) mg/l, max.	100
8.	Arsenic (as As), [mg/l] max.	0.2
9.	Mercury (as Hg), mg/l max.	0.01
10.	Lead (as Pb) mg/l, max.	2.0
11.	Cadmium (as Cd) mg/l, max.	2.0
12.	Hexavalent Chromium (as Cr +6), mg/l, max.	1.0
13.	Total Chromium (as Cr) mg/l, max.	2.0
14.	Copper (as Cu) mg/l max.	3.0
15.	Zinc (as Zn) mg/l, max.	15
16.	Selenium (as Se) mg/l, max.	0.05
17.	Nickel (as Ni) mg/l, max.	5.0
18.	Cyanide (as CN) mg/l max.	0.2
19.	Fluoride (as F) mg/l max.	15
20.	Dissolved Sulphides (as S) mg/l max.	5.0
21.	Phenolic compounds (as C_6H_5OH) mg/l max.	5.0
22	Bio-assay test	90% survival of fish after 96 hours in 100%

ANNEXURE-II

ON LAND FOR IRRIGATION

Sl. No.	Characteristics	Tolerance limits
1	Colour & Odour	See Note
2	Suspended Solids, mg/l. Max	200
3	Conductivity micro ohms/cm max	2250
4	pH value	6.5 to 8.5
5	Oil and Grease, mg/l. Max	10
6	Bio-chemical Oxygen Demand, mg/L (5 days at 27°C) max)	100
7	Chemical Oxygen Demand mg/L. Max	250
8	Chlorides (as Cl) mg/L Max	350
9	Sulphates as SO4 mg/L. Max	1000
10	Total Dissolved Solids (Inorganic) mg/L. Max	2100
11	Zinc as Zn	2.0
12	Fluorides as F Max	2.0
13	Mercury as Hg	0.01

Note: All efforts shall be made to remove colour and unpleasant odour as far as practicable.

ANNEXURE – III

STANDARDS FOR USING THE TREATED SWEAGE EFFLUENT FOR GARDENING/IRRIGATION

SL. NO.	Parameters	Tolerance limits
1	pH	6 to 9
2	Total Dissolved Solids mg/L Max	30
3	Bio-chemical Oxygen Demand mg/L (3 days at 27°C) max.	20

ANNEXURE-IV

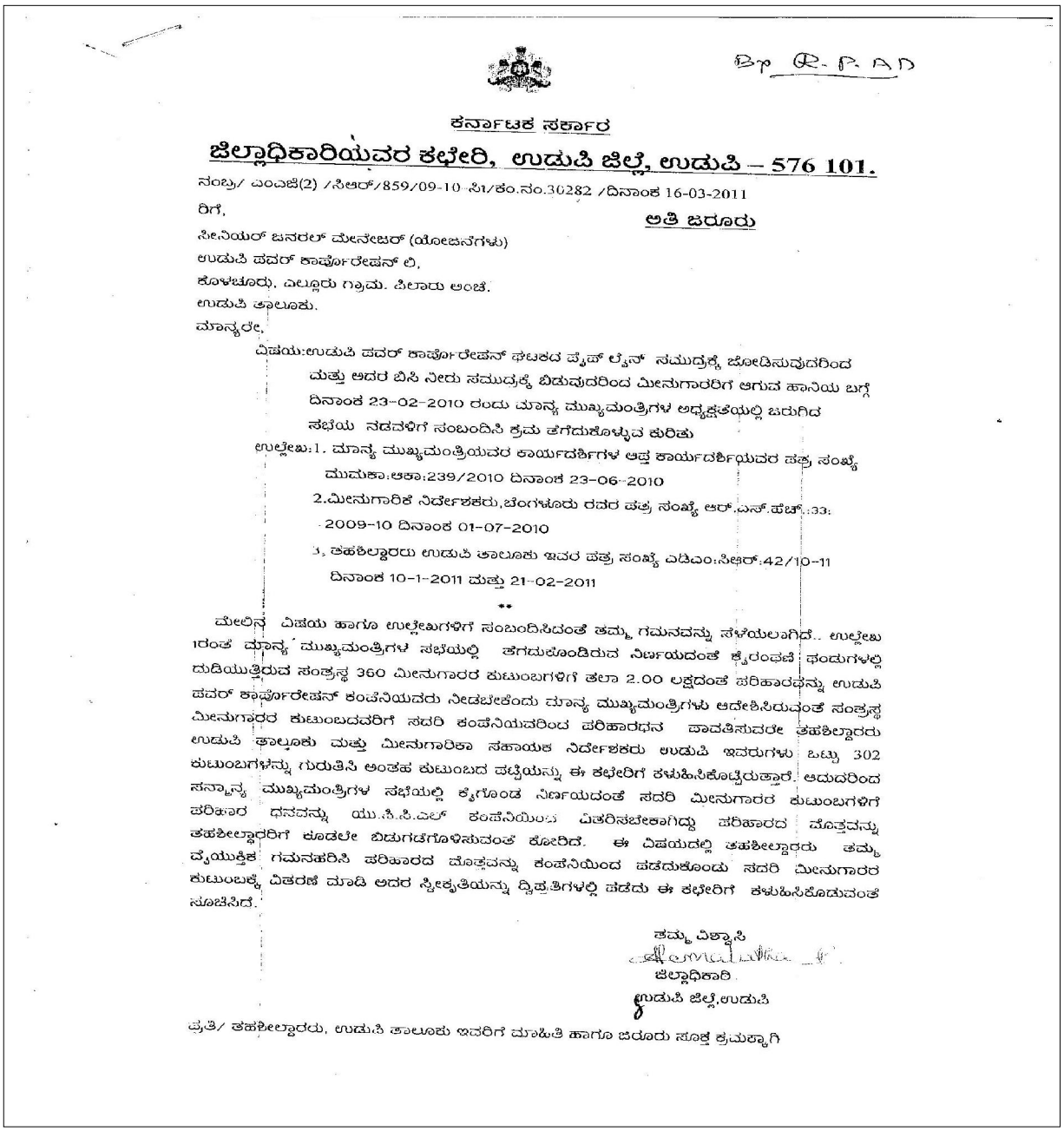
Chim. No.	Chim. attache to	Minimum chimney height to be provided above ground level/roof level (AGL/ARL)	Rate of emission Nm^3/Hr	Consti-tuents to be controlled in the emission	Tolerance limits mg/ Nm^3	Air pollution Control equipment to be installed, in addition to chimney height as per Col.(3)
1	2	3	4	5	6	7
1	1 no. of 2028 TPH Boiler	275 m AGL with twin flue and ESP and FGD	-	Particulate matter	50	Electrostatic Precipitator & FGD
2	1250 KVA DG Set 2 nos	Individual chimney of 30m AGL or 6m above the building where the generator set is installed whichever is higher	-	NOx NMHC PM CO	710 ppmv 100 75 150	Acoustic enclosures

Note: The applicant shall provide fume extraction and dust suppression systems in coal crusher unit and transfer points.

The ambient noise levels shall not exceed 75 dB(A) leq. and 70 dB(A) leq. during day time and night time respectively.

SENIOR ENVIRONMENTAL OFFICER

Annexure XI



ಕರ್ನಾಟಕ ಸರ್ಕಾರ

ಜಿಲ್ಲಾಧಿಕಾರಿಯವರ ಕಛೇರಿ, ಉಡುಪಿ ಜಿಲ್ಲೆ, ಉಡುಪಿ – 576 101.

ನಂಬ್ರ/ ಎಂಎಜೆ(2) /ಸಿಆರ್/859/09-10 ಸಿಬ/ಕಂ.ನಂ.30282 /ದಿನಾಂಕ 16-03-2011

ರಿಗೆ,

ಅತಿ ಜರೂರು

ಸೀನಿಯರ್ ಜನರಲ್ ಮೇನೇಜರ್ (ಯೋಜನೆಗಳು)
ಉಡುಪಿ ಪವರ್ ಕಾರ್ಪೊರೇಷನ್ ಲಿ,
ಕೊಳಚೂರು, ಎಲ್ಲೂರು ಗ್ರಾಮ, ಪಿಲಾರು ಅಂಚೆ,
ಉಡುಪಿ ತಾಲೂಕು.

ಮಾನ್ಯರೇ,

ವಿಷಯ:ಉಡುಪಿ ಪವರ್ ಕಾರ್ಪೊರೇಷನ್ ಘಟಕದ ಪೈಪ್ ಲೈನ್ ಸಮುದ್ರಕ್ಕೆ ಜೋಡಿಸುವುದರಿಂದ ಮತ್ತು ಅದರ ಬಿಸಿ ನೀರು ಸಮುದ್ರಕ್ಕೆ ಬಿಡುವುದರಿಂದ ಮೀನುಗಾರರಿಗೆ ಆಗುವ ಹಾನಿಯ ಬಗ್ಗೆ ದಿನಾಂಕ 23-02-2010 ರಂದು ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಗಳ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ಜರುಗಿದ ಸಭೆಯ ನಡವಳಿಗೆ ಸಂಬಂದಿಸಿ ಕ್ರಮ ತೆಗೆದುಕೊಳ್ಳುವ ಕುರಿತು

ಉಲ್ಲೇಖ:1. ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಯವರ ಕಾರ್ಯದರ್ಶಿಗಳ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಯವರ ಪತ್ರ ಸಂಖ್ಯೆ ಮುಮಕಾ:ಆಕಾ:239/2010 ದಿನಾಂಕ 23-06-2010

2.ಮೀನುಗಾರಿಕೆ ನಿರ್ದೇಶಕರು,ಬೆಂಗಳೂರು ರವರ ಪತ್ರ ಸಂಖ್ಯೆ ಆರ್.ಎಸ್.ಹೆಚ್.33: 2009-10 ದಿನಾಂಕ 01-07-2010

3. ತಹಶೀಲ್ದಾರರು ಉಡುಪಿ ತಾಲೂಕು ಇವರ ಪತ್ರ ಸಂಖ್ಯೆ ಎಡಿಎಂ:ಸೀಆರ್:42/10-11 ದಿನಾಂಕ 10-1-2011 ಮತ್ತು 21-02-2011

**

ಮೇಲಿನ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಗಳಿಗೆ ಸಂಬಂದಿಸಿದಂತೆ ತಮ್ಮ ಗಮನವನ್ನು ಸೆಳೆಯಲಾಗಿದೆ.. ಉಲ್ಲೇಖ 1ರಂತೆ ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಗಳ ಸಭೆಯಲ್ಲಿ ಕೈಗಮುಕೊಂಡಿರುವ ನಿರ್ಣಯದಂತೆ ಕೈರಂಪಣಿ ಫಂಡುಗಳಲ್ಲಿ ದುದಿಯುತ್ತಿರುವ ಸಂಪ್ರಸ್ಥ 360 ಮೀನುಗಾರರ ಕುಟುಂಬಗಳಿಗೆ ತಲಾ 2.00 ಲಕ್ಷದಂತೆ ಪರಿಹಾರಧನ್ನು ಉಡುಪಿ ಪವರ್ ಕಾರ್ಪೊರೇಷನ್ ಕಂಪೆನಿಯವರು ನೀಡಬೇಕೆಂದು ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಗಳು ಆದೇಶಿಸಿರುವಂತೆ ಸಂಪ್ರಸ್ಥ ಮೀನುಗಾರರ ಕುಟುಂಬದವರಿಗೆ ಸದರಿ ಕಂಪೆನಿಯವರಿಂದ ಪರಿಹಾರಧನ ಪಾವತಿಸುವರೇ ತಹಶೀಲ್ದಾರರು ಉಡುಪಿ ತಾಲೂಕು ಮತ್ತು ಮೀನುಗಾರಿಕಾ ಸಹಾಯಕ ನಿರ್ದೇಶಕರು ಉಡುಪಿ ಇವರುಗಳು ಒಟ್ಟು 302 ಕುಟುಂಬಗಳನ್ನು ಗುರುತಿಸಿ ಅಂತಹ ಕುಟುಂಬದ ಪಟ್ಟಿಯನ್ನು ಈ ಕಛೇರಿಗೆ ಕಳುಹಿಸಿಕೊಟ್ಟಿರುತ್ತಾರೆ. ಆದುದರಿಂದ ಸನ್ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಗಳ ಸಭೆಯಲ್ಲಿ ಕೈಗೊಂಡ ನಿರ್ಣಯದಂತೆ ಸದರಿ ಮೀನುಗಾರರ ಕುಟುಂಬಗಳಿಗೆ ಪರಿಹಾರ ಧನವನ್ನು ಯು.ಪಿ.ಸಿ.ಎಲ್ ಕಂಪೆನಿಯಿಂದ ವಿತರಿಸಬೇಕಾಗಿದ್ದು ಪರಿಹಾರದ ಮೊತ್ತವನ್ನು ತಹಶೀಲ್ದಾರರಿಗೆ ಕೂಡಲೇ ಬಿಡುಗಡೆಗೊಳಿಸುವಂತೆ ಕೋರಿದೆ. ಈ ವಿಷಯದಲ್ಲಿ ತಹಶೀಲ್ದಾರರು ತಮ್ಮ ವೈಯುಕ್ತಿಕ ಗಮನಹರಿಸಿ ಪರಿಹಾರದ ಮೊತ್ತವನ್ನು ಕಂಪೆನಿಯಿಂದ ಪಡೆದುಕೊಂಡು ಸದರಿ ಮೀನುಗಾರರ ಕುಟುಂಬಕ್ಕೆ ವಿತರಣೆ ಮಾಡಿ ಅದರ ಸ್ವೀಕೃತಿಯನ್ನು ದ್ವಿಪ್ರತಿಗಳಲ್ಲಿ ಪಡೆದು ಈ ಕಛೇರಿಗೆ ಕಳುಹಿಸಿಕೊಡುವಂತೆ ಸೂಚಿಸಿದೆ.

ತಮ್ಮ ವಿಶ್ವಾಸಿ

ಜಿಲ್ಲಾಧಿಕಾರಿ
ಉಡುಪಿ ಜಿಲ್ಲೆ,ಉಡುಪಿ

ಪ್ರತಿ/ ತಹಶೀಲ್ದಾರರು, ಉಡುಪಿ ತಾಲೂಕು ಇವರಿಗೆ ಮಾಹಿತಿ ಹಾಗೂ ಜರೂರು ಸೂಕ್ತ ಕ್ರಮಕ್ಕಾಗಿ

ಕರ್ನಾಟಕ ಸರ್ಕಾರ
(ಮೀನುಗಾರಿಕೆ ಇಲಾಖೆ)

ಸಂಖ್ಯೆ:ಆರ್.ಎನ್.ಹೆಚ್/33/2009-10

ಮೀನುಗಾರಿಕೆ ನಿರ್ದೇಶನಾಲಯ,
3ನೇ ಮಹಡಿ, ಪೋಡಿಯಂ ಬ್ಲಾಕ್,
ವಿಶ್ವೇಶ್ವರಯ್ಯ ಕೇಂದ್ರ, ಡಾ:ಅಂಬೇಡ್ಕರ್ ವೀಧಿ,
ಬೆಂಗಳೂರು-1, ದಿನಾಂಕ:25-06-2010.

ಇವರಿಗೆ:

ಶ್ರೀ ಲಾಲಾಜಿ ಮೆಂಡನ್,
ಮಾನ್ಯ ವಿಧಾನ ಸಭಾ ಸದಸ್ಯರು,
ಕಾಪು ವಿದಾನ ಸಭಾ ಕ್ಷೇತ್ರ,
ಕಾಪು, ಉಡುಪಿ ಜಿಲ್ಲೆ.

ಮಾನ್ಯರೆ,

ವಿಷಯ: ದಿನಾಂಕ:23-02-2010ರಂದು ಉಡುಪಿ ಪವರ್ ಕಾರ್ಪೋರೇಷನ್ ಲಿಮಿಟೆಡ್ ಘಟಕದ ಪೈಪ್‌ಲೈನ್ ಸಮುದ್ರಕ್ಕೆ ಜೋಡಿಸುವುದರಿಂದ ಮತ್ತು ಅದರ ಬಿಸಿ ನೀರು ಸಮುದ್ರಕ್ಕೆ ಬಿಡುವುದರಿಂದ ಮೀನುಗಾರರಿಗೆ ಆಗುವ ಹಾನಿಯ ಕುರಿತು ಶ್ರೀ ಯಡ್ಡೂರಪ್ಪ, ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಗಳ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ಜರುಗಿದ ಸಭೆಯ ನಡವಳಿಗಳು.

ಉಲ್ಲೇಖ: 1)ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಯವರು ವಿಶೇಷ ಕರ್ತವ್ಯಾಧಿಕಾರಿಯವರ ಸಭಾ ಸೂಚನಾ ಪತ್ರ ಸಂಖ್ಯೆ ಮುಮ/55 /ಎಕ ಆ/10, ದಿ:1-2-2010,
2)ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಯವರ ಕಾರ್ಯದರ್ಶಿಗಳ ಪತ್ರ ಕಾರ್ಯದರ್ಶಿಯವರ ಪತ್ರ ಸಂಖ್ಯೆ.ಮುಮಕಾ/ಆಕಾ/ 239/2010, ದಿ:23-06-2010.

ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಗಳ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ದಿನಾಂಕ:23-02-2010ರಂದು ವಿಧಾನ ಸೌಧದ 3ನೇ ಮಹಡಿಯಲ್ಲಿರುವ ಸಮ್ಮೇಳನ ಸಭಾಂಗಣದಲ್ಲಿ ಉಡುಪಿ ಪವರ್ ಕಾರ್ಪೋರೇಷನ್, ಉಷ್ಣ ವಿದ್ಯುತ್ ಘಟಕದ ಪೈಪ್‌ಲೈನ್ ಸಮುದ್ರಕ್ಕೆ ಜೋಡಿಸುವುದರಿಂದ ಮತ್ತು ಅದರ ಬಿಸಿ ನೀರು ಸಮುದ್ರಕ್ಕೆ ಬಿಡುವುದರಿಂದ ಮೀನುಗಾರರಿಗೆ ಆಗುವ ಹಾನಿಯ ಕುರಿತಂತೆ ಕರೆಯಲಾಗಿದ್ದ ಸಭೆಯ ನಡವಳಿಗಳನ್ನು ಮಾಹಿತಿ ಹಾಗೂ ಅಗತ್ಯ ಕ್ರಮಕ್ಕಾಗಿ ಕಳುಹಿಸಲಾಗಿದೆ.

ತಮ್ಮ ನಂಬುಗೆಯ,

ಮೀನುಗಾರಿಕೆ ನಿರ್ದೇಶಕರು.

ಅಡಕ:1.

ದಿನಾಂಕ:23-02-2010ರಂದು ಉಡುಪಿ ಪವರ್ ಕಾರ್ಪೋರೇಷನ್ ಲಿಮಿಟೆಡ್ ಘಟಕದ ಪೈಪ್‌ಲೈನ್ ಸಮುದ್ರಕ್ಕೆ ಜೋಡಿಸುವುದರಿಂದ ಮತ್ತು ಅದರ ಬಿಸಿ ನೀರು ಸಮುದ್ರಕ್ಕೆ ಬಿಡುವುದರಿಂದ ಮೀನುಗಾರರಿಗೆ ಆಗುವ ಹಾನಿಯ ಕುರಿತು ಶ್ರೀ ಯಡ್ಡೂರಪ್ಪ, ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಗಳ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ಜರುಗಿದ ಸಭೆಯ ನಡವಳಿಗಳು.

ಸಭೆಗೆ ಹಾಜರಾದವರ ಪಟ್ಟಿಯನ್ನು ಅನುಬಂಧದಲ್ಲಿ ಒದಗಿಸಲಾಗಿದೆ.

ಡಾ: ವಿ.ಎಸ್.ಆಚಾರ್ಯ, ಮಾನ್ಯ ಗೃಹ ಸಚಿವರು ಸಭೆಗೆ ಎಲ್ಲರನ್ನೂ ಸ್ವಾಗತಿಸುತ್ತಾ, ಉಡುಪಿ ಪವರ್ ಕಾರ್ಪೋರೇಷನ್ ಲಿಮಿಟೆಡ್‌ನ ವಿದ್ಯುತ್ ಘಟಕ ಸ್ಥಾಪನೆಯಿಂದ ಸ್ಥಳೀಯ ಮೀನುಗಾರರಿಗೆ ಆಗುವ ತೊಂದರೆಗಳ ಬಗ್ಗೆ ವಿವರಿಸಿ ಕಂಪನಿಯು ಸೂಕ್ತ ಪರಿಹಾರ ನೀಡುವುದು ಅವಶ್ಯಕವೆಂದು ಅಭಿಪ್ರಾಯ ಪಟ್ಟರು.

ಉಡುಪಿ ಪವರ್ ಕಾರ್ಪೋರೇಷನ್ ಲಿಮಿಟೆಡ್‌ನ ವಿದ್ಯುತ್ ಘಟಕದ ಪೈಪ್‌ಲೈನ್‌ನ್ನು ಸಮುದ್ರದ ಒಂದು ಕಿ.ಮೀ ಒಳಗೆ ಮತ್ತು 8-10 ಮೀಟರ್ ಆಳದಲ್ಲಿ ಬಡಲಾಗುವುದಂದೂ ನೀರಿನ ಉಷ್ಣತೆಯಲ್ಲಿ ಕೇವಲ 0.03 ಸೆಂಟಿಗ್ರೇಡ್ ಹೆಚ್ಚಾಗಲಿದ್ದು, ಡಿಫ್ಯೂಸರ್‌ಗಳನ್ನು ಅಳವಡಿಸುವುದರಿಂದ ಕೂಡಲೇ ಸಮಿಶ್ರಣಗೊಳ್ಳುತ್ತದೆಯೆಂದು ಕಂಪನಿಯ ಶ್ರೀ ಕಿಶೋರ್ ಆಳ್ವರವರು ಸಭೆಗೆ ತಿಳಿಸಿದರು. ಈ ಬಗ್ಗೆ ವಿವರವಾದ ಅಧ್ಯಯನ ಕೈಗೊಂಡ NIO ಗೋವಾ ತಜ್ಞರಾದ ಡಾ: ಆನಂದರವರು ಪೈಪ್‌ಲೈನನ್ನು ಸಮುದ್ರದ ಅಡಿಯಲ್ಲಿ ಹಾಕುತ್ತಿರುವುದರಿಂದ ಮತ್ತು ಬಿಸಿ ನೀರನ್ನು ಸಮುದ್ರಕ್ಕೆ ಬಿಡುವುದರಿಂದ ಮೀನುಗಾರಿಕೆಗೆ ಯಾವುದೇ ತೊಂದರೆ ಉಂಟಾಗದೆಂದು ತಿಳಿಸಿದ್ದರು. ಮೀನುಗಳ ಸಾಂದ್ರತೆಯನ್ನು ಹೆಚ್ಚಿಸಲು ಕಂಪನಿಯು ಎಫ್.ಎ.ಡಿ ಮತ್ತು Artificial Reef ಗಳನ್ನು ನಿರ್ಮಿಸಿ ಹೆಚ್ಚು ಮೀನು ದೊರೆಯುವಂತೆ ಮೀನುಗಾರಿಕೆ ಇಲಾಖೆ ಸೂಚಿಸಿದಂತೆ ಕ್ರಮ ಕೈಗೊಳ್ಳಲಾಗುವುದೆಂದು ಸಭೆಗೆ ತಿಳಿಸಿದರು.

ಪರಿಸರವಾದಿ ಡಾ: ಅಶೋಕ್ ಕುಂದಾಪುರ್‌ರವರು ಸದರಿ ಉಷ್ಣ ಸ್ಥಾವರದಿಂದ ಮೀನುಗಾರರಿಗೆ ಆಗುವ ತೊಂದರೆಗಳ ಬಗ್ಗೆ ಮನದಟ್ಟು ಮಾಡಿದರು. ಮೊಗವೀರ ಯುವ ಸಂಘಟನೆಯ ಗೌರವ ಅಧ್ಯಕ್ಷರಾದ ಡಾ: ಜಿ.ಶಂಕರ್‌ರವರು ಉಡುಪಿ ಪವರ್ ಕಾರ್ಪೋರೇಷನ್ ಲಿಮಿಟೆಡ್‌ನ ಉಷ್ಣ ವಿದ್ಯುತ್ ಘಟಕದವರು ಪೈಪ್‌ಲೈನ್ ಅನ್ನು ಸಮುದ್ರದಲ್ಲಿ ಆಳವಡಿಸುವುದರಿಂದ 3 ಗ್ರಾಮಗಳ 6 ಕೈರಂಪಣಿ ಫಂಡುಗಳಲ್ಲಿ ದುಡಿಯುವ ಮೀನುಗಾರರ ಕುಟುಂಬಗಳಿಗೆ ಜೀವನೋಪಾಯದ ತೊಂದರೆ ಉಂಟಾಗುವ ಬಗ್ಗೆ ಸಭೆಗೆ ವಿವರಿಸಿದರು. ಕಾಪು ವಿಧಾನ ಸಭಾ ಕ್ಷೇತ್ರದ ಶಾಸಕರಾದ ಮಾನ್ಯ ಶ್ರೀ ಲಾಲಾಜಿ ಮೆಂಡನ್‌ರವರು ಮತ್ತು ಜಿಲ್ಲಾಧ್ಯಕ್ಷರು ಮೊಗವೀರ ಯುವ ಸಂಘಟನೆ, ಉಡುಪಿ ಮತ್ತು ಕೈರಂಪಣಿ ಫಂಡುಗಳ ಅಧ್ಯಕ್ಷರು ಹಾಗೂ ಪದಾದಿಕಾರಿಗಳು ಮೀನುಗಾರರಿಗೆ ಉಂಟಾಗುವ ತೊಂದರೆಗಳ ಬಗ್ಗೆ ವಿಷದೀಕರಿಸಿದರು. 6 ಕೈರಂಪಣಿ ಫಂಡುಗಳ 360 ಮೀನುಗಾರ ಕುಟುಂಬಗಳು ಸಂಕಷ್ಟಕ್ಕೆ ಸಿಲುಕುವುದರಿಂದ ಪ್ರತಿಯೊಂದು ಕುಟುಂಬಕ್ಕೆ ತಲಾ ರೂ.5.00 ಲಕ್ಷದಂತ ಪರಿಹಾರ ದೊರಕಿಸಿಕೊಡಬೇಕೆಂದು ಮತ್ತು ಪ್ರತಿ ಕುಟುಂಬದ ಒಬ್ಬ ಸದಸ್ಯರಿಗೆ ಉದ್ಯೋಗವನ್ನು ಸದರಿ ಕಂಪನಿಯು ನೀಡುವಂತೆ ಸಭೆಯಲ್ಲಿ ಒತ್ತಾಯಿಸಿದರು.

ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಗಳು ಮಾನ್ಯ ಶಾಸಕರು ಮತ್ತು ಮೀನುಗಾರರ ಮುಖಂಡರ ಅಭಿಪ್ರಾಯಗಳನ್ನು ಆಲಿಸಿ ಮಾನ್ಯ ಗೃಹ ಸಚಿವರೊಂದಿಗೆ ಚರ್ಚಿಸಿ ಸಂತ್ರಸ್ಥಗೊಳ್ಳುವ 360 ಕೈರಂಪಣಿ ಮೀನುಗಾರ ಕುಟುಂಬಗಳಿಗೆ ತಲಾ ರೂ.2.00 ಲಕ್ಷದಂತೆ ಪರಿಹಾರವನ್ನು ಮತ್ತು ಪ್ರತಿಯೊಂದು ಕುಟುಂಬದಿಂದ ಒರ್ವರಿಗೆ ತಾಂತ್ರಿಕೇತರ ಕೆಲಸವನ್ನು ಉಡುಪಿ ಪವರ್ ಕಾರ್ಪೋರೇಷನ್ ನೀಡಬೇಕೆಂದು ಅದೇಶಿಸಿದರು.

ಉಷ್ಣ ವಿದ್ಯುತ್ ಸ್ಥಾವರದ ಹಾರುಬೂದಿ ಶೇಖರಣೆಯಿಂದ ಸ್ಥಳೀಯ ಜನರ ಆರೋಗ್ಯದ ಮೇಲೆ ಉಂಟಾಗಬಹುದಾದ ಪರಿಣಾಮಗಳ ಬಗ್ಗೆ ಕಾರ್ಯಾನೆ ಪ್ರಾರಂಭಿಸುವ ಮೊದಲು ವೈದ್ಯಕೀಯ ಸಮೀಕ್ಷೆಯೊಂದನ್ನು ಕೈಗೊಳ್ಳುವಂತೆ ಜಿಲ್ಲಾಧಿಕಾರಿಗಳು, ಉಡುಪಿ ಇವರಿಗೆ ಸೂಚಿಸಲಾಯಿತು. ನಂತರ ಪ್ರತಿ 2 ವರ್ಷಕ್ಕೊಮ್ಮೆ ಸದರಿ ವೈದ್ಯಕೀಯ ಸಮೀಕ್ಷೆಯನ್ನು ಮುನರ್ ಕೈಗೊಂಡು ಜನರ ಆರೋಗ್ಯದ ಮೇಲೆ ಏನಾದರೂ ಪರಿಣಾಮ ಉಂಟಾಗುವ ಸೂಚನೆ ಕಂಡು ಬಂದಲ್ಲಿ ಸೂಕ್ತ ಪರಿಹಾರ ವ್ಯವಸ್ಥೆ ಕೈಗೊಳ್ಳತಕ್ಕದಂದು ತೀರ್ಮಾನಿಸಲಾಯಿತು.

ಉಷ್ಣ ವಿದ್ಯುತ್ ಸ್ಥಾವರಕ್ಕೆ ಸಮುದ್ರದಿಂದ ತೆಗೆದುಕೊಳ್ಳುವ ಮತ್ತು ಬಿಡುವ ನೀರು ಮತ್ತು ಇತರ ಕಲ್ಮಶಗಳಿಂದ ಪರಿಸರ ಮತ್ತು ಮೀನುಗಾರಿಕೆಗೆ ತೊಂದರೆ ಉಂಟಾಗದಂತೆ ತಜ್ಞ ಸಂಸ್ಥೆಯಿಂದ ನಿಯತಕಾಲಿಕವಾಗಿ ಅಧ್ಯಯನ ಕೈಗೊಳ್ಳುವಂತೆಯೂ ಮತ್ತು ಈ ಕ್ರಿಯೆಯಲ್ಲಿ ಸ್ಥಳೀಯ ಮೀನುಗಾರರ ಮುಖಂಡರನ್ನು ಸೇರಿಸಿಕೊಳ್ಳುವಂತೆ ತೀರ್ಮಾನಿಸಲಾಯಿತು.

ಸದರಿ ಕಂಪನಿಯಿಂದ ಸ್ಥಳೀಯರಿಗೆ, ಮೀನುಗಾರರಿಗೆ ಮತ್ತು ಸಾರ್ವಜನಿಕರಿಗೆ ಯಾವುದೇ ರೀತಿಯಲ್ಲಿ ತೊಂದರೆ ಉಂಟಾದಲ್ಲಿ ಮತ್ತು ಅವರ ಜೀವನೋಪಾಯಕ್ಕೆ ಕುತ್ತು ಉಂಟಾದಲ್ಲಿ ಸೂಕ್ತ ಪರಿಹಾರ ನೀಡುವ ಬಗ್ಗೆ ಕಂದಾಯ ಇಲಾಖೆಯು ಕೂಡಲೇ ಸ್ವವಿವರವಾದ ಸಮೀಕ್ಷೆಯನ್ನು ಕೈಗೊಳ್ಳಬೇಕೆಂದು ಮತ್ತು ತೂಂದರೆ ಕಂಡು ಬಂದಲ್ಲಿ ಸೂಕ್ತ ಪರಿಹಾರ ಮತ್ತು ಪುನರ್ ವಸತಿ ವ್ಯವಸ್ಥೆ ಕಲ್ಪಿಸತಕ್ಕದೆಂದು ನಿರ್ಣಯಿಸಲಾಯಿತು.

(ಬಿ.ಎಸ್.ಯಡ್ಡೂರಪ್ಪ)
ಮುಖ್ಯಮಂತ್ರಿಗಳು
ಕರ್ನಾಟಕ ಸರ್ಕಾರ.

ಮುಖ್ಯಮಂತ್ರಿಯವರ ಸಚಿವಾಲಯ
CHIEF MINISTER'S SECRETARIAT

ವಿಧಾನ ಸೌಧ, ಬೆಂಗಳೂರು
VIDHANA SOUDHA, BANGALORE
PIN : 560 001

ಕ್ರಮಾಂಕ:
No.: ಮುಮಕಾ/ಆಕಾ/239 /2010

ದಿನಾಂಕ
DATED 23-06-2010

ನಿರ್ದೇಶಕರು
ಮೀನುಗಾರಿಕೆ ನಿರ್ದೇಶನಾಲಯ
ಬೆಂಗಳೂರು

ದಿನಾಂಕ 23-02-2010 ರಂದು ಉಡುಪಿ ಪವರ್ ಕಾರ್ಪೋರೇಷನ್ ಲಿಮಿಟೆಡ್ ಘಟಕದ ಪೈಪ್‌ಲೈನ್ ಸಮುದ್ರಕ್ಕೆ ಜೋಡಿಸುವುದರಿಂದ ಮತ್ತು ಅದರ ಬಿಸಿ ನೀರು ಸಮುದ್ರಕ್ಕೆ ಬಿಡುವುದರಿಂದ ಮೀನುಗಾರರಿಗೆ ಆಗುವ ಹಾನಿಯ ಕುರಿತು ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಯವರ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ನಡೆದ ಸಭೆಯ ನಡವಳಿಕೆಗಳನ್ನು ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಯವರು ಅನುಮೋದಿಸಿದ್ದು, ಮುಂದಿನ ಸೂಕ್ತ ಕ್ರಮಕ್ಕಾಗಿ ಇದರೊಂದಿಗೆ ಲಗತ್ತಿಸಿ ಕಳುಹಿಸಿಕೊಡಲಾಗಿದೆ.

ತಮ್ಮ ವಿಶ್ವಾಸಿ

ಎಸ್.ನಾರಾಯಣ
ಮುಖ್ಯಮಂತ್ರಿಯವರ ಕಾರ್ಯದರ್ಶಿಗಳ
ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿ

ಅನುಬಂಧ

ದಿನಾಂಕ:23-02-2010ರಂದು ಉಡುಪಿ ಪವರ್ ಕಾರ್ಪೋರೇಷನ್ ಲಿಮಿಟೆಡ್ ಉಷ್ಣ ವಿದ್ಯುತ್ ಘಟಕದ ಪೈಪ್‌ಲೈನ್ ಸಮುದ್ರಕ್ಕೆ ಜೋಡಿಸುವುದರಿಂದ ಮತ್ತು ಅದರ ಬಿಸಿ ನೀರು ಸಮುದ್ರಕ್ಕೆ ಬಿಡುವುದರಿಂದ ಮೀನುಗಾರರಿಗೆ ಆಗುವ ಹಾನಿಯ ಕುರಿತು ಶ್ರೀ ಯಡ್ಡೂರಪ್ಪ, ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಗಳ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ಜರುಗಿದ ಸಭೆಗೆ
ಹಾಜರಾದವರ ಪಟ್ಟಿ

1) ಡಾ: ವಿ.ಎಸ್.ಆಚಾರ್ಯ,
ಮಾನ್ಯ ಗೃಹ ಮತ್ತು ಮುಜರಾಯಿ ಸಚಿವರು
ಹಾಗೂ ಉಡುಪಿ ಜಿಲ್ಲಾ ಉಸ್ತುವಾರಿ ಸಚಿವರ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು.

2) ಶ್ರೀ ಲಾಲಾಜಿಮೆಂಡನ್,
ಮಾನ್ಯ ವಿಧಾನ ಸಭಾ ಸದಸ್ಯರು,
ಕಾಪು ವಿಧಾನ ಸಭಾ ಕ್ಷೇತ್ರ.

3) ಡಾ: ರಾಜು,
ಮಾನ್ಯ ಮುಖ್ಯಮಂತ್ರಿಗಳ ಆರ್ಥಿಕ ಸಲಹೆಗಾರರು.

4) ಶ್ರೀ ಕನ್ವರ್‌ಪಾಲ್
ಕಾರ್ಯದರ್ಶಿ
ಜೀವಿಶಾಸ್ತ್ರ ಮತ್ತು ಪರಿಸರ
ಅರಣ್ಯ ಜೀವಿಶಾಸ್ತ್ರ ಮತ್ತು ಪರಿಸರ ಇಲಾಖೆ.

5) ಶ್ರೀಮತಿ ಹೇಮಲತಾ,
ಜಿಲ್ಲಾಧಿಕಾರಿಗಳು,
ಉಡುಪಿ ಜಿಲ್ಲೆ, ಉಡುಪಿ.

6) ಶ್ರೀ ಹೆಚ್.ಎಸ್.ವೀರಪ್ಪಗೌಡ,
ನಿರ್ದೇಶಕರು,
ಮೀನುಗಾರಿಕೆ ಇಲಾಖೆ,
ಬೆಂಗಳೂರು.

7) ಶ್ರೀ ಕಿಶೋರ್‌ಆಳ್ವ,
ಉಡುಪಿ ಪವರ್ ಕಾರ್ಪೋರೇಷನ್ ನಿಯಮಿತ
ಉಡುಪಿ.

8) ಡಾ: ಆನಂದ್,
ಎನ್.ಐ.ಒ, ಗೋವಾ.

9) ಡಾ: ಜಿ.ಶಂಕರ್,
ಗೌರವಾಧ್ಯಕ್ಷರು,
ಮೊಗವೀರ ಯುವ ಸಂಘಟನೆ, ಉಡುಪಿ.

10) ಡಾ: ಅಶೋಕ್ ಕುಂದಾಪುರ್,
ಪರಿಸರವಾದಿ,
ಉಡುಪಿ.

11) ಶ್ರೀ ಸತೀಶ್ ಅಮೀನ್,
ಸ್ಥಾಪಕಾಧ್ಯಕ್ಷರು,
ಮೊಗವೀರ ಯುವ ಸಂಘಟನೆ, ಉಡುಪಿ.

12) ಶ್ರೀ ಸತೀಶ್ ನಾಯಕ್,
ಜಿಲ್ಲಾಧ್ಯಕ್ಷರು,
ಮೊಗವೀರ ಯುವ ಸಂಘಟನೆ, ಉಡುಪಿ.

13) ಶ್ರೀ ಕೇಶವಕುಂದರ್,
ಅಧ್ಯಕ್ಷರು,
ದಕ್ಷಿಣ ಕನ್ನಡ ಮೊಗವೀರ ಮಹಾಜನಸಂಘ, ಉಚ್ಚಿಲ.

14) ಅಧ್ಯಕ್ಷರು ಮತ್ತು ಪದಾಧಿಕಾರಿಗಳು,
ಆರು ಕೈರಂಪಣಿ ಫಂಡುಗಳು.

Annexure XII

Annexure XII

ಸ್ಥಳ: [illegible]

ದಿನಾಂಕ: 08. 10. 2011.

ಇಂದ: [illegible]

Cell : 9845738578.

ರವರಿಗೆ: [illegible]

ಮಾನ್ಯರೇ,

ವಿಷಯ:- 400 ಕೆ.ವಿ [illegible] ವಿದ್ಯುತ್ ಮಾರ್ಗ [illegible]

[illegible]

ಸಹಿ

[illegible]

(1) [illegible]

(2) [illegible]

(3) 400 ಕೆ.ವಿ [illegible]

(4) [illegible]

Surendra S [illegible]

4) ಕೆಪಿಟಿಸಿಎಲ್ ನ ಅಧಿಕಾರಿಗಳು ತಪ್ಪು ಮಾಹಿತಿ ನೀಡಿ , ಆಶ್ವಾಸನೆ ಈಡೇರಿಸದ ಬಗ್ಗೆ -ಈ ಎಲ್ಲದರ ಬಗ್ಗೆ ದೂರು ನೀಡಿ , ಆಕ್ರೋಶ ವ್ಯಕ್ತಪಡಿಸಿ , ತಮ್ಮ ಸಮಸ್ಯೆಗಳಿಗೆ ಸೂಕ್ತ ಪರಿಹಾರ ಸಿಗದ ಕಾರಣ ಉಲ್ಲೇಖ 2) ರ ವಿಶೇಷ ಗ್ರಾಮಸಭೆಯನ್ನೇ ನಿಲ್ಲಿಸಬೇಕೆಂದು ಒತ್ತಾಯಿಸಿರುತ್ತಾರೆ.

ಸದ್ರಿ ವಿಶೇಷ ಗ್ರಾಮಸಭೆಯಲ್ಲಿ ಬಂದ ಎಲ್ಲಾ ದೂರು ಅರ್ಜಿಗಳನ್ನು ಈ ಪತ್ರದೊಂದಿಗೆ ಲಗತ್ತಿಸಿ ಮುಂದಿನ ಕ್ರಮಕ್ಕಾಗಿ ತಮಗೆ ಕಳುಹಿಸಿ ಕೊಡಲಾಗಿದೆ. ತಾವು ಎಲ್ಲಾ ಅರ್ಜಿಗಳನ್ನು ಪರಿಶೀಲಿಸಿ , ಸದ್ರಿ ಯೋಜನೆಯಲ್ಲಿ ತೊಂದರೆಗೊಳಗಾದವರಿಗೆ ಸೂಕ್ತ ಪರಿಹಾರ –ನ್ಯಾಯ ಒದಗಿಸಿಕೊಡಬೇಕೆಂದು ಮುಂಡ್ಕೂರು ಪಂಚಾಯತ್ ಮತ್ತು ಎಲ್ಲಾ ಗ್ರಾಮಸ್ಥರ ಪರವಿಯಿಂದ ತಮ್ಮನ್ನು ಕೋರುತ್ತೇನೆ.

ಇತಿ ತಮ್ಮ ವಿಶ್ವಾಸಿ

ಈ ಕೆಳಗಿನ ದೂರು ಅರ್ಜಿಗಳನ್ನು ಲಗತ್ತಿಸಿದೆ.

1) ರಾಧು ಶೆಡ್ತಿ w/o ನಾರಾಯಣ ಶೆಟ್ಟಿ
2) ಶಕುಂತಳಾ ಶೆಡ್ತಿ
3) ಗೋಪಿ ಸಪಳ್ಳಿ w/o ಮಂಜು ಸಪಳಿಗ
4) ಸೀಮಾಮೌ ಮನೇಜಸ್ –ಕಜೆ ಕಾಪಿಕಾಡು ಮನೆ (ಮೌಖಿಕವಾಗಿ ದೂರು ನೀಡಿರುತ್ತಾರೆ).
5) ಪದ್ಮನಾಭ ಪೂಜಾರಿ –ಗರಡಿ ಮನೆ (ಮೌಖಿಕವಾಗಿ ದೂರು ನೀಡಿರುತ್ತಾರೆ).
6) ಇಗ್ನೇಷಿಯಸ್ ಪಿಕ್ಚರಾ ಬಿಫ್ ಸಪಳ್ಳಿಯಾ ಮನೇಜಸ್ (ಮೌಖಿಕವಾಗಿ ದೂರು ನೀಡಿರುತ್ತಾರೆ).
7) ರತ್ನಾ ಶೆಡ್ತಿ ಗುಲಾಬಿ ಶೆಡ್ತಿ (ಮೌಖಿಕವಾಗಿ ದೂರು ನೀಡಿರುತ್ತಾರೆ).
8) ಬಾಬು ಮೂಲ್ಯ ಮುಲ್ಲಡ್ಕ (ಮೌಖಿಕವಾಗಿ ದೂರು ನೀಡಿರುತ್ತಾರೆ).
9) ಸುಧಾಕರ ಶೆಟ್ಟಿ, ಸವಿತಾರೈ, ಜಯಶೀಲ ಶೆಟ್ಟಿ(ಮೌಖಿಕವಾಗಿ ದೂರು ನೀಡಿರುತ್ತಾರೆ).

ಪ್ರತಿಯನ್ನು:

1) ಡಾ/ವಿ.ಎಸ್ ಆಚಾರ್ಯ ಮಾನ್ಯ ಉಸ್ತುವಾರಿ ಸಚಿವರು ಉಡುಪಿ ಜಿಲ್ಲೆ.
2) ಕು. ಶೋಭಾ ಕರಂದಾಜೆ, ಮಾನ್ಯ ಇಂಧನ ಸಚಿವರು, ಕರ್ನಾಟಕ ಸರಕಾರ
3) ಶ್ರೀ ಗೋಪಾಲ ಭಂಡಾರಿ , ಮಾನ್ಯ ಶಾಸಕರು ಕಾರ್ಕಳ
4) ಮಾನ್ಯ ದೆಸಾ ಧಿಕಾರಿಯವರು.
5) ಮುಖ್ಯ ಕಾರ್ಯನಿರ್ವಾಹಕ ಇಂಜಿನಿಯರ್, ಮರೋಳಿ ಮಂಗಳೂರು.

(೨)

ದಿನಾಂಕ: 26-09-2011 ರ ಸೋಮವಾರ ಪೂರ್ವಾಹ್ನ ಗಂಟೆ 11-00ಕ್ಕೆ ಕರೆಯಲಾದ ಮುಂಡ್ಕೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್ ಸಭಾಭವನದಲ್ಲಿ ಪಂಚಾಯತ್ ಅಧ್ಯಕ್ಷರಾದ ಶ್ರೀಮತಿ ರತ್ನ ಇವರ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ಜರಗಿದ ಸಾಮಾನ್ಯ ಸಭೆಯ ನಡವಳಿಗಳು:

ಅಧ್ಯಕ್ಷರು :- ಶ್ರೀಮತಿ ರತ್ನ ಮೂಲ್ಯ ಗ್ರಾ.ಪಂ. ಅಧ್ಯಕ್ಷರು ಜೊತೆ ಒಟ್ಟು 16 ಮಂದಿ ಸದಸ್ಯರು.

ವಿಷಯ :- ಶ್ರೀಮತಿ ರಾಧ ಶೆಟ್ಟಿ, ಶಾಂತಿಮನೆ, ಮುಲ್ಲಡ್ಕ - ಇವರು ಹಾಸನ-ನಂದಿಕೂರು 400 ಕೆ.ವಿ. ವಿದ್ಯುತ್ ಮಾರ್ಗದ ಸಂತ್ರಸ್ತರ ಪರವಾಗಿ ಸಲ್ಲಿಸಿದ ಅರ್ಜಿಯ ಕುರಿತು.

ನಿರ್ಣಯ ನಂ. 51/2011-12 ಅರ್ಜಿಯ ವಿವರವನ್ನು ಸಭೆಗೆ ಓದಿ ಹೇಳಲಾಯಿತು. ಸದ್ರಿ ಹಾಸನ-ನಂದಿಕೂರು 400 ಕೆ.ವಿ. ವಿದ್ಯುತ್ ಮಾರ್ಗದ ಸಂಬಂಧಿ ಈ ಹಿಂದೆ ನಡೆದ ವಿಶೇಷ ಗ್ರಾಮ ಸಭೆಯಲ್ಲಿ ಯೋಜನೆಯಿಂದ ತೊಂದರೆಗೊಳಗಾದವರು, ರೈತರು ತಮ್ಮ ಕೃಷಿಭೂಮಿಗೆ ಯೋಜನೆಯಿಂದಾದ ಹಾನಿಯ ಬಗ್ಗೆ ಮತ್ತು ಸಮರ್ಪಕವಾಗಿ ಪರಿಹಾರ ವಿತರಣೆಯಾಗದಿರುವ ಬಗ್ಗೆ ಗ್ರಾಮಸ್ಥರ ಆಕ್ಷೇಪ ವ್ಯಕ್ತವಾಗಿರುವ ಬಗ್ಗೆ ಸಭೆಯ ಗಮನ ಸೆಳೆಯಲಾಯಿತು. ಈ ಹಿಂದಿನ ವಿಶೇಷ ಗ್ರಾಮ ಸಭೆಗೆ ಬಂದ ಅರ್ಜಿಗಳನ್ನು ಮಾನ್ಯ ಕಾರ್ಯನಿರ್ವಾಹಕ ಇಂಜಿನಿಯರ್, 400 ಕೆ.ವಿ. ಪ್ರಸರಣಾ ಮಾರ್ಗ ವಿಭಾಗ, KPTCL ಉಡುಪಿ - ಇವರಿಗೆ ಹಸ್ತಾಂತರಿಸಿ, ಅರ್ಜಿದಾರರ ಮನವಿಯ ಬಗ್ಗೆ ಪರಿಶೀಲಿಸಿ ಯೋಜನೆಯಲ್ಲಿ ತೊಂದರೆಗೊಳಗಾದವರಿಗೆ ಸೂಕ್ತ ಪರಿಹಾರ-ನ್ಯಾಯ ಒದಗಿಸುವಂತೆ, ಪ್ರಸ್ತುತ ಅವರಿಗೆ ಪತ್ರ ಬರೆದು ಪತ್ರದ ಪ್ರತಿಯನ್ನು ಸಂಬಂಧಿಸಿದ ಎಲ್ಲಾ ಜನಪ್ರತಿನಿಧಿಗಳಿಗೆ ಮತ್ತು ಹಿರಿಯ ಅಧಿಕಾರಿಗಳಿಗೆ ಕಳುಹಿಸುವುದಾಗಿ ಸರ್ವಾನುಮತದಿಂದ ನಿರ್ಣಯಿಸಲಾಯಿತು.

ದೃಢೀಕರಿಸಿದೆ.

S. K. Shetty 04/10/11 — ಯಥಾಪ್ರತಿ —

ಪಂಚಾಯತ್ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
ಮುಂಡ್ಕೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್
ಕಾರ್ಕಳ ತಾಲೂಕು, ಉಡುಪಿ

ಸಹಿ xx xxxx
ಅಧ್ಯಕ್ಷರು

(1) ಗ್ರಾ.ಪಂ. ... ಪಂಚಾಯತ್.
(2) ಗ್ರಾ.ಪಂ. ನಿರ್ಣಯದ ಪ್ರತಿ
(3) 400 ಕೆ.ವಿ ಹಾಸನ-ನಂದಿಕೂರು ವಿದ್ಯುತ್ ಪ್ರಸರಣ ಮಾರ್ಗದ [illegible]
(4) [illegible]

Surendra S Shetty

4) ಕೆಪಿಟಿಸಿಎಲ್ ನ ಅಧಿಕಾರಿಗಳು ತಪ್ಪು ಮಾಹಿತಿ ನೀಡಿ , ಆಶ್ವಾಸನೆ ಈಡೇರಿಸದ ಬಗ್ಗೆ -ಈ ವಿಲ್ಲದರ ಬಗ್ಗೆ ದೂರು ನೀಡಿ ಆಕ್ರೋಶ ವ್ಯಕ್ತಪಡಿಸಿ , ತಮ್ಮ ಸಮಸ್ಯೆಗಳಿಗೆ ಸೂಕ್ತ ಪರಿಹಾರ ಸಿಗದ ಕಾರಣ ಉಲ್ಲೇಖ 2) ರ ವಿಶೇಷ ಗ್ರಾಮಸಭೆಯನ್ನೇ ನಿಲ್ಲಿಸಬೇಕೆಂದು ಒತ್ತಾಯಿಸಿರುತ್ತಾರೆ.

ಸದ್ರಿ ವಿಶೇಷ ಗ್ರಾಮಸಭೆಯಲ್ಲಿ ಬಂದ ಎಲ್ಲಾ ದೂರು ಅರ್ಜಿಗಳನ್ನು ಈ ಪತ್ರದೊಂದಿಗೆ ಲಗತ್ತಿಸಿ ಮುಂದಿನ ಕ್ರಮಕ್ಕಾಗಿ ತಮಗೆ ಕಳುಹಿಸಿ ಕೊಡಲಾಗಿದೆ. ತಾವು ಎಲ್ಲಾ ಅರ್ಜಿಗಳನ್ನು ಪರಿಶೀಲಿಸಿ , ಸದ್ರಿ ಯೋಜನೆಯಲ್ಲಿ ತೊಂದರೆಗೊಳಗಾದವರಿಗೆ ಸೂಕ್ತ ಪರಿಹಾರ –ನ್ಯಾಯ ಒದಗಿಸಿಕೊಡಬೇಕೆಂದು ಮುಂಡ್ಕೂರು ಪಂಚಾಯತ್ ಮತ್ತು ಎಲ್ಲಾ ಗ್ರಾಮಸ್ಥರ ವತಿಯಿಂದ ತಮ್ಮನ್ನು ಕೋರುತ್ತೇನೆ.

ಇತಿ ತಮ್ಮ ವಿಶ್ವಾಸಿ

ಗ್ರಾಮ ಪಂಚಾಯತ್ ಮುಂಡ್ಕೂರು
ಕಾರ್ಕಳ ತಾಲೂಕು, ಉಡುಪಿ ಜಿಲ್ಲೆ

ಈ ಕೆಳಗಿನ ದೂರು ಅರ್ಜಿಗಳನ್ನು ಲಗತ್ತಿಸಿದೆ.

1) ರಾಧು ಶೆಡ್ತಿ w/o ನಾರಾಯಣ ಶೆಟ್ಟಿ
2) ಶಕುಂತಳಾ ಶೆಡ್ತಿ
3) ಗೋಪಿ ಸಪಳಿಗ w/o ಮಂಜು ಸಪಳಿಗ
4) ಸೀಮಾಮ್ ಮಾನೇಜಸ್ –ಕಚೆ ಕಾಪಿಕಾಡು ಮನೆ (ಮೌಖಿಕವಾಗಿ ದೂರು ನೀಡಿರುತ್ತಾರೆ).
5) ಪದ್ಮನಾಭ ಪೂಜಾರಿ –ಗರಡಿ ಮನೆ (ಮೌಖಿಕವಾಗಿ ದೂರು ನೀಡಿರುತ್ತಾರೆ).
6) ಇಗ್ನೇಷಿಯಸ್ ಸಿಕ್ವೇರಾ ಬಿನ್ ಸೆಬಾಸ್ಟಿನ್ ಮಾನೇಜಸ್ (ಮೌಖಿಕವಾಗಿ ದೂರು ನೀಡಿರುತ್ತಾರೆ).
7) ರತ್ನಾಶೆಡ್ತಿ ಗುಲಾಬಿ ಶೆಡ್ತಿ (ಮೌಖಿಕವಾಗಿ ದೂರು ನೀಡಿರುತ್ತಾರೆ)
8) ಬಾಬು ಮೂಲ್ಯ ಮುಲ್ಲಡ್ಕ (ಮೌಖಿಕವಾಗಿ ದೂರು ನೀಡಿರುತ್ತಾರೆ).
9) ಸುಧಾಕರ ಶೆಟ್ಟಿ, ಸವಿತಾರೈ, ಜಯಶೀಲ ಶೆಟ್ಟಿ (ಮೌಖಿಕವಾಗಿ ದೂರು ನೀಡಿರುತ್ತಾರೆ)

ಪ್ರತಿಯನ್ನು:

1) ಡಾ/ವಿ.ಎಸ್.ಆಚಾರ್ಯ ಮಾನ್ಯ ಉಸ್ತುವಾರಿ ಸಚಿವರು ಉಡುಪಿ ಜಿಲ್ಲೆ.
2) ಕು. ಶೋಭಾ ಕರಂದ್ಲಾಜೆ, ಮಾನ್ಯ ಇಂಧನ ಸಚಿವರು, ಕರ್ನಾಟಕ ಸರಕಾರ.
3) ಶ್ರೀ ಗೋಪಾಲ ಭಂಡಾರಿ , ಮಾನ್ಯ ತಾಸಕರು ಕಾರ್ಕಳ
4) ಮಾನ್ಯ ಜಿಲ್ಲಾಧಿಕಾರಿಯವರು.
5) ಮುಖ್ಯ ಕಾರ್ಯನಿರ್ವಾಹಕ ಇಂಜಿನಿಯರ್, ಮರೋಳಿ ಮಂಗಳೂರು.

(೨)

ದಿನಾಂಕ: 26-09-2011 ರ ಸೋಮವಾರ ಪೂರ್ವಾಹ್ನ ಗಂಟೆ 11-00ಕ್ಕೆ ಕಾರ್ಕಳ ತಾಲೂಕಿನ ಮುಂಡ್ಕೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್ ಸಭಾಭವನದಲ್ಲಿ ಪಂಚಾಯತ್ ಅಧ್ಯಕ್ಷರಾದ ಶ್ರೀಮತಿ ರತ್ನ ಇವರ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ಜರಗಿದ ಸಾಮಾನ್ಯ ಸಭೆಯಲ್ಲಿ ನಡೆದ ನಡವಳಿ:

ಅಧ್ಯಕ್ಷರು :- ಶ್ರೀಮತಿ ರತ್ನ ಮೂಲ್ಯ ಗ್ರಾ.ಪಂ. ಅಧ್ಯಕ್ಷರು ಜೊತೆ ಒಟ್ಟು 16 ಮಂದಿ ಸದಸ್ಯರು.

ವಿಷಯ :- ಶ್ರೀಮತಿ [illegible] ಶೆಟ್ಟಿ, ಕೊಡಮನೆ, ಮುಂಡ್ಕೂರು - ಇವರು ಹಾಸನ-ನಂದಿಕೂರು 400 ಕೆ.ವಿ. ವಿದ್ಯುತ್ ಮಾರ್ಗದ ಸಂತ್ರಸ್ತರ ಪರವಾಗಿ ಒಪ್ಪಿಸಿದ ಅರ್ಜಿಯ ಕುರಿತು.

ಒಳಬಂದ ನಂ. 51/2011-12 ಅರ್ಜಿಯ ವಿವರವನ್ನು ಸಭೆಗೆ ಓದಿ ಹೇಳಲಾಯಿತು. ಸದ್ರಿ ಹಾಸನ-ನಂದಿಕೂರು 400 ಕೆ.ವಿ. ವಿದ್ಯುತ್ ಮಾರ್ಗದ ಸಂಬಂಧ ಈ ಹಿಂದೆ ನಡೆದ ವಿಶೇಷ ಗ್ರಾಮ ಸಭೆಯಲ್ಲಿ ಯೋಜನೆಯಿಂದ ತೊಂದರೆಗೊಳಗಾದವರು, ರೈತರು ತಮ್ಮ ಕೃಷಿಭೂಮಿಗೆ ಯೋಜನೆಯಿಂದಾದ ಹಾನಿಯ ಬಗ್ಗೆ ಮತ್ತು ಸಮರ್ಪಕವಾಗಿ ಪರಿಹಾರ ವಿತರಣೆಯಾಗದಿರುವ ಬಗ್ಗೆ ಗ್ರಾಮಸ್ಥರ ಆಕ್ರೋಶ ವ್ಯಕ್ತವಾಗಿರುವ ಬಗ್ಗೆ ಸಭೆಯ ಗಮನ ಸೆಳೆಯಲಾಯಿತು. ಈ ಹಿಂದಿನ ವಿಶೇಷ ಗ್ರಾಮಸಭೆಗೆ ಬಂದ ಅರ್ಜಿಗಳನ್ನು ಮಾನ್ಯ ಕಾರ್ಯನಿರ್ವಾಹಕ ಇಂಜಿನಿಯರ್, 400 ಕೆ.ವಿ. ಪ್ರಸರಣಾ ಯೋಜನೆ ವಿಭಾಗ, KPTCL ಉಡುಪಿ - ಇವರಿಗೆ ಹಸ್ತಾಂತರಿಸಿ, ಅರ್ಜಿದಾರರ ಮನವಿಗಳ ಬಗ್ಗೆ ಪರಿಶೀಲಿಸಿ ಯೋಜನೆಯಲ್ಲಿ ತೊಂದರೆಗೊಳಗಾದವರಿಗೆ ಸೂಕ್ತ ಪರಿಹಾರ-ಸ್ಥಾಂತರ ಒದಗಿಸುವಂತೆ, ಪ್ರತಿಯು ಅವರಿಗೆ ಪತ್ರ ಬರೆದು ಪತ್ರದ ಪ್ರತಿಯನ್ನು ಸಂಬಂಧಪಟ್ಟ ಎಲ್ಲಾ ಜನಪ್ರತಿನಿಧಿಗಳಿಗೆ ಮತ್ತು ಹಿರಿಯ ಅಧಿಕಾರಿಗಳಿಗೆ ಕಳುಹಿಸುವುದಾಗಿ ಸರ್ವಾನುಮತದಿಂದ ನಿರ್ಣಯಿಸಲಾಯಿತು.

ದೃಢೀಕರಿಸಿದೆ — S.K. Sko 04/10/11 — ಯಥಾಪ್ರತಿ —

ಪಂಚಾಯತ್ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
ಮುಂಡ್ಕೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್
ಕಾರ್ಕಳ ತಾಲೂಕು, ಉಡುಪಿ

ಅಧ್ಯಕ್ಷರು ಸಹಿ xxx

(1) ಗ್ರಾ.ಪಂ. [illegible] ಇಂಜಿನಿಯರ್.
(2) ಗ್ರಾ.ಪಂ. ನಿರ್ಣಯದ ಪ್ರತಿ
(3) 400 ಕೆ.ವಿ ಹಾಸನ-ನಂದಿಕೂರು ವಿದ್ಯುತ್ ಪ್ರಸರಣ ಮಾರ್ಗದ [illegible] ಮಾಡಿದ ಜಮೀನಿನ ಬಗ್ಗೆ [illegible] ಪ್ರತಿ.
(4) [illegible] ಇಂಜಿನಿಯರ್ [illegible] ಇವರಿಗೆ ಬರೆದ ಪತ್ರ.

ಇತರ [illegible]

Surendra S Shetty

(3)

ಕರ್ನಾಟಕ ವಿದ್ಯುತ್ ಪ್ರಸರಣ ನಿಗಮ ನಿಯಮಿತ

Phone No (O):0820-2527536
Fax: 0820-2527536
E-mail: eeeudpline@yahoo.co.in

ಕಾರ್ಯನಿರ್ವಾಹಕ ಇಂಜಿನಿಯರ್(ವಿ),
400 ಕೆ.ವಿ. ಪ್ರಸರಣಾ ಮಾರ್ಗ ವಿಭಾಗ,
ಕವಿಪ್ರನಿನಿ., 2ನೇ ಮಹಡಿ, ಹರಿದರ್ಶನ್ ಬಿಲ್ಡಿಂಗ್
ಉಡುಪಿ– ಮಲ್ಪೆ ರಸ್ತೆ, ಬನ್ನಂಜೆ, ಉಡುಪಿ– 576101.

ನಂ: ಕಾನಿಅ/400ಕೆವಿ/ಉಡುಪಿ/2010–11/ ಕ–6/ ೮೮೪–೮೬ ದಿನಾಂಕ: 20.09.2010

ಅಧ್ಯಕ್ಷರು
ಮುಂಡ್ಕೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್
ಮುಂಡ್ಕೂರು, ಕಾರ್ಕಳ ತಾಲೂಕು,
ಉಡುಪಿ ಜಿಲ್ಲೆ.

ಮಾನ್ಯರೇ,

ವಿಷಯ:– ಮುಲ್ಲಡ್ಕ ಗ್ರಾಮದ ಸರಹದ್ದಿನಲ್ಲಿ ಹಾಯ್ದುಹೋಗುತ್ತಿರುವ ಕವಿ.ಪ್ರ.ನಿ.ನಿಯಮಿತ ನಿರ್ಮಾಣಗೊಳ್ಳುತ್ತಿರುವ 400 ಕೆ.ವಿ. ಹಾಸನ –ನಂದಿಕೂರು ವಿದ್ಯುತ್ ಪ್ರಸರಣಾ ಮಾರ್ಗದ ಮಾಹಿತಿ ನೀಡುವ ಕುರಿತು.

ಉಲ್ಲೇಖ: ನಿಮ್ಮ ಪತ್ರ ಸಂಖ್ಯೆ:59/10–11. ದಿನಾಂಕ:30.08.2010. ಈ ಕಛೇರಿಯಲ್ಲಿ ಸ್ವೀಕೃತವಾದ ದಿನಾಂಕ:08.09.2010.

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ಈ ಮೇಲಿನ ವಿಷಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ, ಉಲ್ಲೇಖದಲ್ಲಿಯ ನಿಮ್ಮ ಪತ್ರದಲ್ಲಿ ಕೋರಿರುವಂತೆ, ಈ ಕೆಳಕಂಡ ಮಾಹಿತಿಯನ್ನು ನೀಡಲಾಗಿದೆ.

1. 400 ಕೆ.ವಿ ಹಾಸನ ನಂದಿಕೂರು ದ್ವಿ ಪ್ರಸರಣಾ ಮಾರ್ಗವನ್ನು ಕರ್ನಾಟಕ ವಿದ್ಯುತ್ ಪ್ರಸರಣಾ ನಿಗಮ ನಿಯಮಿತವು ನಿರ್ಮಿಸುತ್ತಿದ್ದು, ಸದರಿ ಮಾರ್ಗದ ಟವರ್‌ಗಳನ್ನು ಸ್ಥಾಪಿಸಲು ಯಾವುದೇ ರೀತಿಯಲ್ಲಿ ಭೂಸ್ವಾಧೀನವನ್ನು ಮಾಡಿಕೊಂಡಿರುವುದಿಲ್ಲ. ಮಾರ್ಗ ನಿರ್ಮಾಣದ ಸಮಯದಲ್ಲಿ ಆಗುವ ಗಿಡ–ಮರ ಮತ್ತು ಬೆಳೆಗಳ ಹಾನಿಯಿಂದ ಆಗುವ ನಷ್ಟ ಪರಿಹಾರವನ್ನು ನಿಗಮದ ನಿಯಾಮಾವಳಿಯಂತೆ ಪರಿಹಾರವನ್ನು ಸಂಬಂಧಿಸಿದ ಭೂಮಾಲೀಕರಿಗೆ ಅಗತ್ಯ ದಾಖಲೆಗಳ ಆದಾರದ ಮೇಲೆ ನೀಡಲಾಗುತ್ತಿದೆ.

2. ಟವರ್‌ಗಳನ್ನು ಹಾಕಲು ತಗಲುವ ವೆಚ್ಚವು ವಿವಿಧ ರೀತಿಯ ಟವರ್‌ಗಳ ಮೇಲೆ ಅವಲಂಬಿಸಿದ್ದು ಅಂದಾಜು 16 ಲಕ್ಷ ರೂ.ಗಳಿಂದ 41 ಲಕ್ಷ ರೂ. ಈ ರೀತಿ ಇರುತ್ತದೆ.

3. ಸದರಿ ಮಾರ್ಗವನ್ನು ಟರ್ನ್‌ಕೀ ಆಧಾರದ ಮೇಲೆ ನಿರ್ಮಾಣ ಮಾಡಲು ಕ.ವಿ.ಪ್ರ.ನಿ.ನಿಯು ಮೆ.ದೀಪಕ್ ಕೇಬಲ್ಸ್ ಇಂಡಿಯಾ ಲಿ. ಶೇಷಾದ್ರಿಪುರಂ ಬೆಂಗಳೂರು ಇವರಿಗೆ ಕಾಮಗಾರಿ ನಿರ್ಮಾಣ ಗುತ್ತಿಗೆಯನ್ನು ನೀಡಲಾಗಿದೆ.

4. ಸದರಿ ಮಾರ್ಗದ ನಿರ್ಮಾಣದ ಕುರಿತು ನಷ್ಟ ಪರಿಹಾರ ಮತ್ತು ಇತರ ಮಾಹಿತಿಗಾಗಿ ಈ ಕೆಳಕಂಡ ಕ.ವಿ.ಪ್ರ.ನಿ.ನಿಯ ಅಧಿಕಾರಿಗಳನ್ನು ಸಂಪರ್ಕಿಸ ಬಹುದು.
   1) ಶ್ರೀ ಮೋಹನ್ ಸಹಾಯಕ ಕಾರ್ಯ ನಿರ್ವಾಹಕ ಅಭಿಯಂತರರು –9448998026
   2) ಶ್ರೀ ದಯಾನಂದ ನಾಯ್ಕ್ ಕಾರ್ಯ ನಿರ್ವಾಹಕ ಅಭಿಯಂತರರು– 9448998059.

ತಮ್ಮ ವಿಶ್ವಾಸಿ,

ಕಾರ್ಯನಿರ್ವಾಹಕ ಇಂಜಿನಿಯರ್(ವಿ),
ಕವಿಪ್ರನಿನಿ., ಉಡುಪಿ.

ಸಹಾಯಕ ಕಾರ್ಯನಿರ್ವಾಹಕ ಅಭಿಯಂತರರು: ಉಡುಪಿ , ಸದರಿ ಗ್ರಾಮ ಪಂಚಾಯತ್ ಅಧ್ಯಕ್ಷರಿಗ ಸೂಕ್ತ ಮಾಹಿತಿಯನ್ನು ನೀಡಲು.

(1) ಗ್ರಾ.ಪಂ.
(2) ಗ್ರಾ.ಪಂ.-ಗೆ ಕಳುಹಿಸಿದ ಪತ್ರದ ಪ್ರತಿ.
(3) 400.ಕೆ.ವಿ ಹಾಸನ-ನಂದಿಕೂರು ಪ್ರಸರಣಾ ಮಾರ್ಗದ ಟವರ್ ಸ್ಥಳದಲ್ಲಿನ ಸ್ಥಾಪಿತ ಸಂಖ್ಯೆಯ ಬಗ್ಗೆ ಮಾಹಿತಿ ಪಡೆಯಲು ಮೊಬೈಲ್ ಸಂಖ್ಯೆ ನೀಡಿದ್ದು.
(4) ಹೆಚ್ಚಿನ ಮಾಹಿತಿಗಾಗಿ ಬನ್ನಂಜೆ ಬಾಬಾಜಿ ಇವರು ಸಂಪರ್ಕಿಸಲು ತಿಳಿಸಿದ್ದು.

Surendra 24/9/10

೨೭ನೇ ಎಲ್ಲೂರು ಗ್ರಾಮ ಪಂಚಾಯತು

57th YELLUR GRAMA PANCHAYATH

ಅಂಚೆ : ಎಲ್ಲೂರು, ಉಡುಪಿ ತಾಲೂಕು ಮತ್ತು ಜಿಲ್ಲೆ.
ದೂರವಾಣಿ : 2550476

ಪತ್ರ ಸಂಖ್ಯ : ಎ.ಗ್ರಾ.ಪಂ/ಕ್ರಿ/೨೦೧೧-೧೨ ದಿನಾಂಕ : ೨೬/೯/೨೦೧೧

ರಿಗೆ,

[redacted] ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಕೆ.ಪಿ.ಟಿ.ಸಿ.ಎಲ್ ಉಡುಪಿ ಕಛೇರಿ (ಪ್ರಸರಣ) ಮಾರ್ಗ ವಿಭಾಗ
ಉಡುಪಿ ತಾಲೂಕು ಮತ್ತು ಜಿಲ್ಲಾ - 576101

ಮಾನ್ಯರೇ,

ವಿಷಯ:-ದಿನಾಂಕ **12-9-2011** ರ ವಿಶೇಷ ಗ್ರಾಮಸಭೆ ಮತ್ತು **26-9-2011** ರ ಸಾಮಾನ್ಯ ಸಭೆಯ ನಿರ್ಣಯದಂತೆ

ಮೇಲಿನ ವಿಷಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ದಿನಾಂಕ **12-9-2011** ರ ವಿಶೇಷ ಗ್ರಾಮ ಸಭೆಯ ಮತ್ತು ದಿನಾಂಕ **26-9-2011** ರ ಸಾಮಾನ್ಯ ಸಭೆಯ ನಿರ್ಣಯ ಪ್ರತಿಯನ್ನು ಈ ಪತ್ರದೊಂದಿಗೆ ಲಗತ್ತಿಸಿ ಸೂಕ್ತ ಕ್ರಮಕ್ಕಾಗಿ ಸಲ್ಲಿಸಲಾಗಿದೆ.

ತಮ್ಮ ವಿಶ್ವಾಸಿ

ಅಧ್ಯಕ್ಷರು
ಗ್ರಾಮ ಪಂಚಾಯತ್ ಎಲ್ಲೂರು
ಉಡುಪಿ ತಾಲೂಕು

ಪಂಚಾಯತ್ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
ಎಲ್ಲೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್
ಉಡುಪಿ ತಾಲೂಕು

57ನೇ ಎಲ್ಲೂರು ಗ್ರಾಮ ಪಂಚಾಯತು

57th YELLUR GRAMA PANCHAYAT

ಅಂಚೆ : ಎಲ್ಲೂರು, ಉಡುಪಿ ತಾಲೂಕು ಮತ್ತು ಜಿಲ್ಲೆ.
ದೂರವಾಣಿ : 2550476

ಪತ್ರ ನಂಬ್ರ :ಸಾ.ಸ.ನಂ/ಪಂ/2011-12 ದಿನಾಂಕ : 26 / 09 /2011

ಸಾಮಾನ್ಯ ಸಭೆ

ಎಲ್ಲೂರು ಗ್ರಾಮ ಪಂಚಾಯತದ ಸಾಮಾನ್ಯ ಸಭೆಯನ್ನು ದಿನಾಂಕ 26-09-2011 ರಂದು ಪೂರ್ವಾಹ್ನ 10.30 ಗಂಟೆಗೆ ಸರಿಯಾಗಿ ಎಲ್ಲೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್ ಸಭಾ ಭವನದಲ್ಲಿ ಗ್ರಾಮ ಪಂಚಾಯತ್ ಆಧ್ಯಕ್ಷರಾದ ಶ್ರೀಮತಿ ಸುಮನ.ಎಸ್ ರವರ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ಜರಗಿದ ಪಂಚಾಯತ್ ಸಾಮನ್ಯ ಸಭೆಯಲ್ಲಿ ಕೈಕೊಂಡ ನಡವಳಿಗಳು

ಹಾಜರಿ: ಅಧ್ಯಕ್ಷರು ಕೂಡ 13 ಮಂದಿ ಸದಸ್ಯರು.

ವಿಷಯ ನಂಬ್ರ5(2)/2011-12:- ಕಾನೂನು ಬಾಹಿರವಾಗಿ ನಿರ್ಮಿಸುತ್ತಿರುವ ಯು.ಪಿ.ಸಿ.ಎಲ್ ಕೇಬಲ್ ಟವರ್ ಕಾಮಗಾರಿಯನ್ನು ಕೂಡಲೇ ನಿಲ್ಲಿಸುವಂತೆ ಜಯಂತ್ ರಾವ್ ಸದಸ್ಯರು ಗ್ರಾಮ ಪಂಚಾಯತ್ ಎಲ್ಲೂರು ಇವರು ನಿರ್ಣಯ ಕೋರಿ ಬರಕೊಂಡ ಅರ್ಜಿಕುರಿತು.

ನಿರ್ಣಯ ನಂಬ್ರ 5(2)2011-12:- ದಿನಾಂಕ 26-9-2011 ರ ಸಾಮಾನ್ಯ ಸಭೆಯಲ್ಲಿ ಗ್ರಾಮ ಪಂಚಾಯತ್ 5 ನೇ ವಾರ್ಡಿನ ಸದಸ್ಯರಾದ ಶ್ರೀಜಯಂತ್ ರಾವ್ 5 ನೇ ವಾರ್ಡಿನ ಬೆಳ್ಳಬೆಟ್ಟು ಎಂಬಲ್ಲಿ ಯು.ಪಿ.ಸಿ.ಎಲ್ ಕಂಪನಿಗಾಗಿ ಕೆ.ಪಿ.ಟಿ.ಸಿ.ಎಲ್ ರವರು ಕಾನೂನು ಬಾಹಿರವಾಗಿ ನಮ್ಮ ಗ್ರಾಮ ಪಂಚಾಯತ್ ವನ್ನು ಕಡೆಗಣಿಸಿ ಪಂಚಾಯತ್ ನ ಒಪ್ಪಿಗೆ ಪತ್ರವಿಲ್ಲದೆ ಕೇಬಲ್ ಟವರ್ ನಿರ್ಮಿಸುತ್ತಿದ್ದು ಹಾಗೂ ಈಗಾಗಲೇ ವಿಶೇಷ ಗ್ರಾಮ ಸಭೆಯಲ್ಲಿ ಇದರ ವಿರೋಧವಾಗಿ ನಿರ್ಣಯವಾಗಿರುತ್ತದೆ ಆದ್ದರಿಂದ ತಾವು ಈ ಕೂಡಲೇ ಗ್ರಾಮಸ್ಥರ ಈ ನಿರ್ಣಯಕ್ಕೆ ಸಾಮಾನ್ಯ ಸಭೆಯು ಅನುಮೋದನೆ ಪಡೆದು ಈ ಟವರ್ ಕಾಮಗಾರಿಯನ್ನು ನಿಲ್ಲಿಸುವಂತೆ ಇದಕ್ಕೆ ಸಂಬಂಧ ಪಟ್ಟ ಅಧಿಕಾರಿಗಳಿಗೆ ನೋಟೀಸು ಜಾರಿಗೊಳಿಸಿ ಈ ಕಾಮಗಾರಿಯನ್ನು ನಿಲ್ಲಿಸುವಂತೆ ಕಾನೂನು ಕ್ರಮವನ್ನು ತೆಗೆದುಕೊಳ್ಳಬೇಕಾಗಿ ಗ್ರಾಮಸ್ಥರ ಪರವಾಗಿ ವಿನಂತಿ.

ಈ ವಿಷಯಾವಾಗಿ ಸಭೆಯಲ್ಲಿ ಚರ್ಚಿಸಲಾಗಿ ದಿನಾಂಕ 12-9-2011 ರ ವಿಶೇಷ ಗ್ರಾಮ ಸಭೆ ನಿರ್ಣಯವನ್ನು ಸಾಮಾನ್ಯಸಭೆಯಲ್ಲಿ ಅನುಮೋದಿಸಿ ಸಂಬಂಧಿಸಿದ ಇಲಾಖೆಗೆ ಗ್ರಾಮ ಪಂಚಾಯತ್ ನಿಂದ ನೋಟೀಸು ನೀಡಲು ಸಭೆಯಲ್ಲಿ ಸರ್ವಾನು ಮತದಿಂದ ನಿರ್ಣಯಿಸಲಾಯಿತು.

!!ನಿರ್ಣಯನಕಲು ಯಥಾ ಪ್ರತಿ!!

ಸಹಿ/_
ಅಧ್ಯಕ್ಷರು
ಎಲ್ಲೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್

ಸಹಿ/_
ಪಂಚಾಯತ್ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
ಎಲ್ಲೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್

ಪಂಚಾಯತ್ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
ಎಲ್ಲೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್
ಉಡುಪಿ ತಾಲೂಕು

57ನೇ ಎಲ್ಲೂರು ಗ್ರಾಮ ಪಂಚಾಯತು

57th YELLUR GRAMA PANCHAYAT

ಅಂಚೆ : ಎಲ್ಲೂರು, ಉಡುಪಿ ತಾಲೂಕು ಮತ್ತು ಜಿಲ್ಲೆ.
ದೂರವಾಣಿ : 2550476

ಪತ್ರ ಸಂಖ್ಯ:- ಎಪಂ-ಎಲ್ಲೂ-12 ದಿನಾಂಕ: 14/9/11

ದಿನಾಂಕ 12-9-2011 ರಂದು ಪೂರ್ವಹ್ನ ಗಂಟೆ 11.00 ಕ್ಕೆ ಸರಿಯಾಗಿ ಎಲ್ಲೂರು ಗ್ರಾಮ ಪಂಚಾಯತಿಯಲ್ಲಿ ಪಂಚಾಯತ್ ಅಧ್ಯಕ್ಷರಾದ ಶ್ರೀಮತಿ ಸುಮನ.ಎಸ್ ರವರ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ಜರಗಿದ ವಿಶೇಷ ಗ್ರಾಮ ಸಭೆಯ ನಡವಳಿಗಳು.

ಎಲ್ಲೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಇರುವ ಅರಣ್ಯ ಪ್ರದೇಶದಲ್ಲಿ ಸದ್ರಿ ಮಾರ್ಗವು ಹಾಯ್ದು ಹೋಗುತ್ತಿದ್ದಲ್ಲಿ ಅರಣ್ಯ ಪ್ರದೇಶಗಳನ್ನು ಕ.ವಿ.ಪ್ರ.ನಿ.ಗೆ ಸರಕಾರದಿಂದ ಸದ್ರಿ ಮಾರ್ಗ ನಿರ್ಮಾಣಕ್ಕಾಗಿ ಬಿಡುಗಡೆಗೊಳಿಸಬೇಕಾಗಿದ್ದು ಅರಣ್ಯ ಹಕ್ಕು ಕಾಯ್ದೆ 2006 ಮತ್ತು ಅರಣ್ಯ ನಿಯಮಗಳು 2008 ರ ಅಡಿಯಲ್ಲಿ ಪರಿಶಿಷ್ಟ ಪಂಗಡ ಮತ್ತು ಇತರೆ ಪಾರಂಪರಿಕಾ ಅರಣ್ಯ ವಾಸಿಗಳ ಹಕ್ಕು ಕಾಯ್ದೆಯು ಅನ್ವಯವಾಗುವುದಿಲ್ಲ ಎಂಬುದರ ಬಗ್ಗೆ ಠರಾವು ನೀಡಲು ವಿಶೇಷ ಗ್ರಾಮ ಸಭೆಯಲ್ಲಿ ಸರ್ವಾನುಮತದಿಂದ ಆಕ್ಷೇಪಿಸಲಾಯಿತು.

ವಿದ್ಯುತ್ ಸಂಪರ್ಕವು ಹಾದು ಹೋಗುವ ಪ್ರದೇಶವು ಜನವಸತಿ ಪ್ರದೇಶವಾಗಿದ್ದು ವಾಸಿಸುತ್ತಿರುವ ಮನೆಗಳಿಗೆ ತೀವ್ರ ಹಾನಿ ಉಂಟಾಗುವುದರಿಂದ ಮನೆ ಮತ್ತು ಫಲವತ್ತಾದ ಭೂಮಿ ಇರುವುದರಿಂದ ಗ್ರಾಮ ಸಭೆಯಲ್ಲಿ ಸರ್ವಾನುಮತದಿಂದ ಆಕ್ಷೇಪ ವ್ಯಕ್ತ ಪಡಿಸಲಾಯಿತು.

ಸಹಿ/-
ಅಧ್ಯಕ್ಷರು
ಗ್ರಾಮ ಪಂಚಾಯತ್ ಎಲ್ಲೂರು
ಉಡುಪಿ ತಾಲೂಕು

ಸಹಿ/-
ಪಂಚಾಯತ್ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
ಎಲ್ಲೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್
ಉಡುಪಿ ತಾಲೂಕು

ಪಂಚಾಯತ್ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
ಎಲ್ಲೂರು ಗ್ರಾಮ ಪಂಚಾಯತ್
ಉಡುಪಿ ತಾಲೂಕು

ಫೋನ್ : 2577676

59ನೇ ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತ್

ಉಡುಪಿ ತಾಲೂಕು, ಉಡುಪಿ ಜಿಲ್ಲೆ – 574 119.

59 THENKA GRAMA PANCHAYATH

UDUPI TALUK, UDUPI DIST. - 574 119.

ಉಲ್ಲೇಖ ಸಂಖ್ಯೆ. ತೆಂ. ಗ್ರಾ. ಪಂ. ನಿ79/10-11

ದಿನಾಂಕ 23/11/10

ಶ್ರೀ. ಪ್ರಸಾದ್ - ಜೆ
ಜೆ - ಎಸ್. ನಿವಾಸ್
ಕಂಚನ ತೋಟ
ಉದ್ಯಾವರ, ತೆಂಕ

ಮಾನ್ಯರೇ,

ವಿಷಯ:- ಮನೆತೆರಿಗೆ ದರ್ಜೆ ಅಧಿನಿಯಮ ೨೦೦೬ರಡಿ
ಮನೆತೆರಿಗೆ ಒದಗಿಸುವ ಕುರಿತು

ನೀವು ಯು-ಮ.ಸ ಬಳಿ ತಂಬೆನಿಂಯ
ಕಟ್ಟಡಗಳ್ಳ ವರಮಾನಿಗೆ ಬಗ್ಗೆ ವಿಚಾರ ಕೇಳಿರುತ್ತೀರಿ. ತೆಂಕ
ಗ್ರಾಮ ಪಂಚಾಯತ ವತ್ತಿಂದ ಈ ಬಗ್ಗೆ ಯಾವುದೇ
ವರಮಾನಿಗೆ ನೀಡಿರುವುದಿಲ್ಲ. ತೆಂಕಗ್ರಾಮ ಪಂಚಾಯತ್
ವತ್ತಿಂದ ಈ ಕಟ್ಟಡಗಳನ್ನ ಅನಧಿಕೃತ ಕಟ್ಟಡವೆಂದು
ಪರಿಗಣಿಸಿ ಸೂಕ್ತ ದಂಡನೆಯೊಂದಿಗೆ ಸೂಕ್ತ ಕ್ರಮ
ಕೈಗೊಳ್ಳಲಾಗುವುದು.

ಇತಿ ತಮ್ಮ ವಿಶ್ವಾಸಿ

ಧನ್ಯವಾದಗಳು

59ನೇ ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತ್

ಉಡುಪಿ ತಾಲೂಕು, ಉಡುಪಿ ಜಿಲ್ಲೆ – 574 119.

59 THENKA GRAMA PANCHAYATH

UDUPI TALUK, UDUPI DIST. - 574 119.

ಉಲ್ಲೇಖ ಸಂಖ್ಯೆ. ತೆಂ.ಗ್ರಾ.ಪಂ 195/10-11

ದಿನಾಂಕ 18/10/2010

ಮಾನ್ಯ ತಹಶೀಲ್ದಾರರು
ಉಡುಪಿ ತಾಲೂಕು
ಉಡುಪಿ ಜಿಲ್ಲೆ.

ಮಾನ್ಯರೇ

ವಿಷಯ :- <u>ತೆಂಕ ಗ್ರಾಮ ಪವರ್ ಕಾರ್ಪೋರೇಶನ್ ಕಂಪೆನಿಯ ಪೈಪುಲೈನ್</u>
<u>ಹಾದು ಹೋಗಿ ಸಾರ್ವಜನಿಕರಿಗೆ ನಷ್ಟ ಆದ ಕುರಿತು.</u>

ಉಡುಪಿ ಜಿಲ್ಲೆ, ಉಡುಪಿ ತಾಲೂಕು ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತದಲ್ಲಿ ತೆಂಕ ಗ್ರಾಮವಿರುತ್ತದೆ. ಈ ಗ್ರಾಮದಲ್ಲಿ ಯು. ಪಿ. ಸಿ. ಎಲ್ ಕಂಪೆನಿಯ ಪೈಪುಲೈನ್ ಹಾದು ಹೋಗಿರುತ್ತದೆ. N.H.17 ನ ಪಶ್ಚಿಮ ಬದಿಯಲ್ಲಿನ ಈ ಕಂಪೆನಿಯ ಪಂಪು ಹೌಸ್‌ವಿರುತ್ತದೆ. ಪಶ್ಚಿಮ ಬದಿಯಲ್ಲಿ ಈ ಕಂಪೆನಿಯ ಕಾಮಗಾರಿ ನಡೆಯುವ ಸಂದರ್ಭದಲ್ಲಿ ಹಲವಾರು ಕಷ್ಟನಷ್ಟಗಳು ಸಂಭವಿಸಿರುತ್ತದೆ. ಕೃಷಿ ಭೂಮಿ ಮುಳುಗಡೆ, ಉಪ್ಪು ನೀರು, ಬೆಳೆ ಹಾನಿ ಇತ್ಯಾದಿಗಳು. ಈ ಪ್ರದೇಶದಲ್ಲಿ ಸುಮಾರು 50-60 ಕುಟುಂಬಗಳು ವಾಸ್ತವ್ಯವಿದ್ದು, ದೈನಂದಿನ ಜೀವನಕ್ಕಾಗಿ ಮುಖ್ಯ ಮೂಲಭೂತ ಸೌಕರ್ಯಗಳಲ್ಲಿ ಒಂದಾದ ರಸ್ತೆ ಸಂಪರ್ಕ, ಕುಡಿಯುವ ನೀರು ಇತ್ಯಾದಿಗಳಿಗೆ ಸಮಸ್ಯೆ ಉಂಟಾಗಿದ್ದು, ಈ ಕಾರಣ ಸಮೂಹಿಸಿದ ಸಮಸ್ಯೆಗಳಿಗೆ ಕೂಡಲೇ ಸೂಕ್ತ ಪರಿಹಾರ ನೀಡುವರೇ ತಮ್ಮಲ್ಲಿ ವಿನಂತಿಸಿಕೊಳ್ಳುತ್ತೇನೆ.

<u>ವಿವರಗಳು ಈ ಕೆಳಗಿನಂತಿವೆ:</u>

1) ಮಳೆಗಾಲದಲ್ಲಿ ನೀರು ಸರಿಯಾಗಿ ಹರಿದು ಹೋಗುವಂತೆ ತೋಡುಗಳ ನಿರ್ಮಾಣ.
2) ಕಂಪೆನಿಯಿಂದ ತೊಂದರೆಗೊಳಗಾದ ಸಾರ್ವಜನಿಕ ರಸ್ತೆಯನ್ನು ವಿಸ್ತರಿಸಿ ಡಾಮರೀಕರಣ.
3) ಕೃಷಿ ಭೂಮಿಗೆ ಉಪ್ಪು ನೀರು ಬಾರದಂತೆ ಶಾಶ್ವತವಾಗಿ ತಡಗಟ್ಟುವುದು.
4) ವಾಸ್ತವ್ಯದ ಮನೆಗಳ ಬಾವಿಯ ನೀರು ಕಲುಷಿತವಾಗದಂತ ಶಾಶ್ವತ ಪರಿಹಾರ.
5) ಭೂ ಸ್ವಾಧೀನ ಆದ ಜಾಗ ಹೊರತುಪಡಿಸಿ ಇತರ ಖಾಸಗಿ ಜಾಮೀನು ಹಾನಿಯಾಗಿರುತ್ತದೆ. ಅದನ್ನು ಸರಿಪಡಿಸಿ ಅವರ ಸೀಮರೇಖೆಗೆ ಶಾಶ್ವತವಾದ ಆವರಣ ಗೋಡೆ ನಿರ್ಮಾಣ.
6) ಬೆಳೆ ಹಾನಿಯಾದ 10 ಕುಟುಂಬಗಳಿಗೆ ಎಕ್ರೆಗೆ 36,000/- ರೂ ದಂತೆ ಪರಿಹಾರ ನೀಡುವುದು. 10 ಕುಟುಂಬಗಳ ವಿವರಗಳನ್ನು ಲಗ್ತೀಕರಿಸಿದೆ.
7) ಈ ಪ್ರದೇಶದಲ್ಲಿ ಕಂಪೆನಿಯು ನಿರ್ಮಿಸಿದ ಕಾರ್ಮಿಕರ ವಾಸ್ತವ್ಯದ ಮನೆಗಳ ಕೊಳಚೆ ನೀರು ಹರಿದು ಹೋಗುವಂತೆ ಇಂಗುಗುಂಡಿ ನಿರ್ಮಾಣ.

ಇತೀ ತಮ್ಮ ವಿಶ್ವಾಸ

ತಿದ್ದುಪಡಿ ಲಗತ್ತಿಸಿದೆ

ಪಂಚಾಯತ್ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
59ನೇ ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತ್
ಉಡುಪಿ ತಾಲೂಕು.

59ನೇ ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತು
ಉಡುಪಿ ತಾಲೂಕು

ಪಂಚಾಯತ್ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
59ನೇ ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತ್
ಉಡುಪಿ ತಾಲೂಕು.

ಫೋನ್ : 2577676

59ನೇ ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತ್

ಉಡುಪಿ ತಾಲೂಕು, ಉಡುಪಿ ಜಿಲ್ಲೆ – 574 119.

59 THENKA GRAMA PANCHAYATH

UDUPI TALUK, UDUPI DIST. - 574 119.

ಉಲ್ಲೇಖ ಸಂಖ್ಯೆ. ತೆಂ.ಗ್ರಾ.ಪಂ/ಕ/10-11

ದಿನಾಂಕ 14/10/2010

ಜನರಲ್ ಮ್ಯಾನೇಜರ್
ಯು.ಪಿ.ಸಿ.ಯಲ್
ನಂದಿಕೂರು

ಮಾನ್ಯರೇ

ವಿಷಯ :- <u>ತೆಂಕ ಗ್ರಾಮ ಪವರ್ ಕಾರ್ಪೋರೇಶನ್ ಕಂಪೆನಿಯ ಪೈಪುಲೈನ್ ಹಾದು ಹೋಗಿ ಸಾರ್ವಜನಿಕರಿಗೆ ನಷ್ಟ ಆದ ಕುರಿತು.</u>

ಉಡುಪಿ ಜಿಲ್ಲೆ, ಉಡುಪಿ ತಾಲೂಕು ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತದಲ್ಲಿ ತೆಂಕ ಗ್ರಾಮವಿರುತ್ತದೆ. ಈ ಗ್ರಾಮದಲ್ಲಿ ಯು. ಪಿ. ಸಿ. ಎಲ್ ಕಂಪೆನಿಯ ಪೈಪುಲೈನ್ ಹಾದು ಹೋಗಿರುತ್ತದೆ. N.H.17 ನ ಪಶ್ಚಿಮ ಬದಿಯಲ್ಲಿನ ಈ ಕಂಪೆನಿಯ ಪಂಪು ಹೌಸ್‌ವಿರುತ್ತದೆ. ಪಶ್ಚಿಮ ಬದಿಯಲ್ಲಿ ಈ ಕಂಪೆನಿಯ ಕಾಮಗಾರಿ ನಡೆಯುವ ಸಂದರ್ಭದಲ್ಲಿ ಹಲವಾರು ಕಷ್ಟನಷ್ಟಗಳು ಸಂಭವಿಸಿರುತ್ತದೆ. ಕೃಷಿ ಭೂಮಿ ಮುಳುಗಡೆ, ಉಪ್ಪು ನೀರು, ಬೆಳೆ ಹಾನಿ ಇತ್ಯಾದಿಗಳು. ಈ ಪ್ರದೇಶದಲ್ಲಿ ಸುಮಾರು 50-60 ಕುಟುಂಬಗಳು ವಾಸ್ತವ್ಯವಿದ್ದು, ದೈನಂದಿನ ಜೀವನಕ್ಕಾಗಿ ಮುಖ್ಯ ಮೂಲಭೂತ ಸೌಕರ್ಯಗಳಲ್ಲಿ ಒಂದಾದ ರಸ್ತೆ ಸಂಪರ್ಕ, ಕುಡಿಯುವ ನೀರು ಇತ್ಯಾದಿಗಳಿಗೆ ಸಮಸ್ಯೆ ಉಂಟಾಗಿದ್ದು, ಈ ಕೆಳಗೆ ನಮೂದಿಸಿದ ಸಮಸ್ಯೆಗಳಿಗೆ ಕೂಡಲೇ ಸೂಕ್ತ ಪರಿಹಾರ ನೀಡುವರೇ ತಮ್ಮಲ್ಲಿ ವಿನಂತಿಸಿಕೊಳ್ಳುತ್ತೇನೆ.

ತೆಂಕ ಗ್ರಾಮದ ಸಾರ್ವಜನಿಕರಿಗೆ ತಮ್ಮ ಕಂಪೆನಿಯಿಂದ ಅನೇಕ ತೊಂದರೆಗಳು ಉಂಟಾಗಿ ಈ ಕಛೇರಿಗೆ ಹಲವಾರು ಬಾರಿ ಸೂಕ್ತ ಪರಿಹಾರಕ್ಕಾಗಿ ಪ್ರತಿಭಟನೆ ಮಾಡಿರುತ್ತಾರೆ. ಇನ್ನು ಮುಂದಕ್ಕೆ ಪಂಚಾಯತ್ ಕಛೇರಿ ಎದುರು ಪ್ರತಿಭಟನೆ ಆಗದಂತೆ ತಮ್ಮ ಕಂಪೆನಿಯತಿಯಿಂದ ಜನರ ಸಮಸ್ಯೆಗಳನ್ನು ಶೀಘ್ರ ಬಗೆಹರಿಸುವುದರ ಮುಖಾಂತರ ನಿಗಾವಹಿಸಬೇಕಾಗಿ ಈ ಮೂಲಕ ತಿಳಿಸಲಾಗಿದೆ.

<u>ವಿವರಗಳು ಈ ಕೆಳಗಿನಂತಿವೆ.</u>

1) ಮಳೆಗಾಲದಲ್ಲಿ ನೀರು ಸರಿಯಾಗಿ ಹರಿದು ಹೋಗುವಂತೆ ತೋಡುಗಳ ನಿರ್ಮಾಣ.
2) ಕಂಪೆನಿಯಿಂದ ತೊಂದರೆಗೊಳಗಾದ ಸಾರ್ವಜನಿಕ ರಸ್ತೆಯನ್ನು ವಿಸ್ತರಿಸಿ ಡಾಮರೀಕರಣ.
3) ಕೃಷಿ ಭೂಮಿಗೆ ಉಪ್ಪು ನೀರು ಬಾರದಂತೆ ಶಾಶ್ವತವಾಗಿ ತಡೆಗಟ್ಟುವುದು.
4) ವಾಸ್ತವ್ಯದ ಮನೆಗಳ ಬಾವಿಯ ನೀರು ಕಲುಷಿತವಾಗದಂತೆ ಶಾಶ್ವತ ಪರಿಹಾರ.
5) ಭೂ ಸ್ವಾದೀನ ಆದ ಜಾಗ ಹೊರತುಪಡಿಸಿ ಇತರ ಖಾಸಗಿ ಜಾಮೀನು ಹಾನಿಯಾಗಿರುತ್ತದೆ. ಅದನ್ನು ಸರಿಪಡಿಸಿ ಅವರ ಸೀಮರೇಖೆಗೆ ಶಾಶ್ವತವಾದ ಆವರಣ ಗೋಡೆ ನಿರ್ಮಾಣ.
6) ಬೆಳೆ ಹಾನಿಯಾದ 10 ಕುಟುಂಬಗಳಿಗೆ ಎಕ್ರೆಗೆ 36,000/- ರೂ ದಂತೆ ಪರಿಹಾರ ನೀಡುವುದು. 10 ಕುಟುಂಬಗಳ ವಿವರಗಳನ್ನು ಲಗ್ತೀಕರಿಸಿದೆ.
7) ಈ ಪ್ರದೇಶದಲ್ಲಿ ಕಂಪೆನಿಯು ನಿರ್ಮಿಸಿದ ಕಾರ್ಮಿಕರ ವಾಸ್ತವ್ಯದ ಮನೆಗಳ ಕೊಳಚೆ ನೀರು ಹರಿದು ಹೋಗುವಂತೆ ಇಂಗುಗುಂಡಿ ನಿರ್ಮಾಣ.

ಇತೀ ತಮ್ಮ ವಿಶ್ವಾಸಿ

ಪ್ರತಿ:- 1) ಮಾನ್ಯ ಜಿಲ್ಲಾಧಿಕಾರಿಯವರು, ಉಡುಪಿ ಜಿಲ್ಲೆ.
2) ಸಹಾಯಕ ಕಮಿಷನರ್, ಕುಂದಾಪುರ
3) ಮಾನ್ಯ ತಹಶೀಲ್ದಾರರು, ಉಡುಪಿ ತಾಲೂಕು.

ಪಂಚಾಯತ್ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
59ನೇ ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತ್
ಉಡುಪಿ ತಾಲೂಕು.

59ನೇ ತೆಂಕ ಗ್ರಾ.ಪಂ. ಸದಸ್ಯರು
ಉಡುಪಿ ತಾಲೂಕು

ಪಂಚಾಯತ್ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
59ನೇ ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತ್
ಉಡುಪಿ ತಾಲೂಕು.

ಫೋನ್ : 2577676

59ನೇ ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತ್

ಉಡುಪಿ ತಾಲೂಕು, ಉಡುಪಿ ಜಿಲ್ಲೆ - 574 119.

59 THENKA GRAMA PANCHAYATH

UDUPI TALUK, UDUPI DIST. - 574 119.

ದಿನಾಂಕ : 18/10/2019

ಶ್ಲೇಪಿ ಸಂಖ್ಯೆ. ತೆಂ.ಗ್ರಾ.ಪಂ 196/10-11

ಮಾನ್ಯ ಜಿಲ್ಲಾಧಿಕಾರಿಯವರು

ಉಡುಪಿ ಜಿಲ್ಲೆ.

ಮಾನ್ಯರೇ

ವಿಷಯ :- <u>ತೆಂಕ ಗ್ರಾಮ ಪವರ್ ಕಾರ್ಪೋರೇಶನ್ ಕಂಪೆನಿಯ ವ್ಯಾಪ್ತಿಯಲ್ಲಿನ</u>

<u>ಹಾದು ಹೋಗಿ ಸಾರ್ವಜನಿಕರಿಗೆ ನಷ್ಟ ಆದ ಕುರಿತು.</u>

ಉಡುಪಿ ಜಿಲ್ಲೆ , ಉಡುಪಿ ತಾಲೂಕು ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತದಲ್ಲಿ ತೆಂಕ ಗ್ರಾಮವಿರುತ್ತದೆ. ಈ ಗ್ರಾಮದಲ್ಲಿ ಯು. ಪಿ. ಸಿ. ಎಲ್ ಕಂಪೆನಿಯ ಪೈಪುಲೈನ್ ಹಾದು ಹೋಗಿರುತ್ತದೆ. N.H. 17 ನ ಪಶ್ಚಿಮ ಬದಿಯಲ್ಲಿನ ಈ ಕಂಪೆನಿಯ ಪಂಪು ಹೌಸ್‌ವಿರುತ್ತದೆ. ಪಶ್ಚಿಮ ಬದಿಯಲ್ಲಿ ಈ ಕಂಪೆನಿಯ ಕಾಮಗಾರಿ ನಡೆಯುವ ಸಂದರ್ಭದಲ್ಲಿ ಹಲವಾರು ಕಷ್ಟನಷ್ಟಗಳು ಸಂಭವಿಸಿರುತ್ತದೆ. ಕೃಷಿ ಭೂಮಿ ಮುಳುಗಡೆ , ಉಪ್ಪು ನೀರು , ಬೆಳೆ ಹಾನಿ ಇತ್ಯಾದಿಗಳು. ಈ ಪ್ರದೇಶದಲ್ಲಿ ಸುಮಾರು 50-60 ಕುಟುಂಬಗಳು ವಾಸ್ತವ್ಯವಿದ್ದು, ದೈನಂದಿನ ಜೀವನಕ್ಕಾಗಿ ಮುಖ್ಯ ಮೂಲಭೂತ ಸೌಕರ್ಯಗಳಲ್ಲಿ ಒಂದಾದ ರಸ್ತೆ ಸಂಪರ್ಕ , ಕುಡಿಯುವ ನೀರು ಇತ್ಯಾದಿಗಳಿಗೆ ಸಮಸ್ಯೆ ಉಂಟಾಗಿದ್ದು, ಈ ಕೆಳಗೆ ನಮೂದಿಸಿದ ಸಮಸ್ಯೆಗಳಿಗೆ ಕೂಡಲೇ ಸೂಕ್ತ ಪರಿಹಾರ ನೀಡುವರೇ ತಮ್ಮಲ್ಲಿ ವಿನಂತಿಸಿಕೊಳ್ಳುತ್ತೇನೆ.

<u>ವಿವರಗಳು ಈ ಕೆಳಗಿನಂತಿವೆ.</u>

1) ಮಳೆಗಾಲದಲ್ಲಿ ನೀರು ಸರಿಯಾಗಿ ಹರಿದು ಹೋಗುವಂತೆ ತೂಡುಗಳ ನಿರ್ಮಾಣ.
2) ಕಂಪೆನಿಯಿಂದ ಹೊಂದರೆಗೊಳಗಾದ ಸಾರ್ವಜನಿಕ ರಸ್ತೆಯನ್ನು ವಿಸ್ತರಿಸಿ ಡಾಮರೀಕರಣ.
3) ಕೃಷಿ ಭೂಮಿಗೆ ಉಪ್ಪು ನೀರು ಬಾರದಂತೆ ಶಾಶ್ವತವಾಗಿ ತಡಗಟ್ಟುವುದು.
4) ವಾಸ್ತವ್ಯದ ಮನೆಗಳ ಬಾವಿಯ ನೀರು ಕಲುಷಿತವಾಗದಂತೆ ಶಾಶ್ವತ ಪರಿಹಾರ.
5) ಭೂ ಸ್ವಾದೀನ ಆದ ಜಾಗ ಹೊರತುಪಡಿಸಿ ಇತರ ಖಾಸಗಿ ಜಾಮೀನು ಹಾನಿಯಾಗಿರುತ್ತದೆ. ಅದನ್ನು ಸರಿಪಡಿಸಿ ಅವರ ಸೀಮರೇಖೆಗೆ ಶಾಶ್ವತವಾದ ಆವರಣ ಗೋಡೆ ನಿರ್ಮಾಣ.
6) ಬೆಳೆ ಹಾನಿಯಾದ 10 ಕುಟುಂಬಗಳಿಗೆ ಎಕ್ರೆಗೆ 36,000/- ರೂ ದಂತೆ ಪರಿಹಾರ ನೀಡುವುದು. 10 ಕುಟುಂಬಗಳ ವಿವರಗಳನ್ನು ಲಗ್ತೀಕರಿಸಿದೆ.
7) ಈ ಪ್ರದೇಶದಲ್ಲಿ ಕಂಪೆನಿಯು ನಿರ್ಮಿಸಿದ ಕಾರ್ಮಿಕರ ವಾಸ್ತವ್ಯದ ಮನೆಗಳ ಕೊಳಚೆ ನೀರು ಹರಿದು ಹೋಗುವಂತೆ ಇಂಗುಗುಂಡಿ ನಿರ್ಮಾಣ.

ಇತೀ ತಮ್ಮ ವಿಶ್ವಾಸಿ

ಲಗತ್ತು 3

ಪಂಚಾಯತ್ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
59ನೇ ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತ್
ಉಡುಪಿ ತಾಲೂಕು.

59ನೇ ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತ್ ಅಧ್ಯಕ್ಷರು
ಉಡುಪಿ ತಾಲೂಕು

ಪಂಚಾಯತ್ ಅಭಿವೃದ್ಧಿ ಅಧಿಕಾರಿ
59ನೇ ತೆಂಕ ಗ್ರಾಮ ಪಂಚಾಯತ್
ಉಡುಪಿ ತಾಲೂಕು.




ENVIRONMENT




HEALTH




LIVELIHOOD




PUBLIC HEARING




FIELD VISITS