**BEFORE THE HON’BLE SUPREME COURT OF INDIA**

(Civil Appellate Jurisdiction)

I.A. No. 6 of 2013

CIVIL APPEAL NO. 6736 OF 2013

**IN THE MATTER OF:**

Alaknanda Hydro Power Co. Ltd. etc. … Appellant

**Versus**

Anuj Joshi & Ors. Etc. etc. …Respondents

**COUNTER AFFIDAVIT ON BEHALF OF RESPONDENT NO. 1 i.e. MINISTRY OF ENVIRONMENT, FORESTS & CLIMATE CHANGE**

 I, B. B. Barman S/o Late Shri M. C. Barman aged about 48 years currently working as Director in Ministry of Environment, Forests & Climate Change, Indira Paryavaran Bhawan, Jor Bagh road, New Delhi, do hereby state and affirm under oath as under:

 That I am the Director in the Ministry of Environment, Forests & Climate Change (MoEF&CC) and I

am well conversant with the facts and circumstances of this case and hence competent to swear this affidavit.

That I have read the contents of the counter affidavit and I say that I have understood the contents thereof. I further state that the contents thereof are true and correct to the best of my knowledge and belief. I have also read the accompanying I.A.s, which I have understood completely and I state that the averments made therein are true and correct. I further state that no part of it is false and that nothing material has been concealed therefrom.

 DEPONENT

VERIFICATION:

Verified at New Delhi on this the 5th day of the month of December of the year 2014 that the contents of the above affidavit are true and correct to my knowledge and belief.

DEPONENT

**Submission in Hon’ble Supreme Court by MoEF&CC**

1. **Background:**

**(1)** The rejuvenation of the river Ganga is on top priority for the present government in view of her current highly degraded state. Scientifically the river Ganga is a living ecosystem. It supports myriad life-forms on its bed, its sediments and on its banks. Recognizing her geographical, historical, social-cultural and economic importance and therefore, for conservation of her ecology and flow, MoEF Via its notification dated 20.02.2009 under Environmental Protection Act (1986), has given the Ganga the status of a ‘National River’ of India and constituted a National Ganga River Basin Authority (NGRBA).

**(2)** A cradle of civilization, it is a life support system for about half-a-billion people who live in its basin today. Acknowledging these values of the National River Ganga, the government has accorded the highest priority to rejuvenating it. All along her path anthropogenic interventions have overburdened the flow of the river. The restoration of an *aviral* and *nirmal dhara* of the Ganga has thus become essential immediate steps.

**(3)** In the upper reaches of the Ganga, growing concerns on *Aviral Dhara* of Ganga as well as deteriorating health of the fragile Himalayan ecology has been a primary concern for past decade. A large & small hydro power projects on the Ganga & her tributaries all over the Himalayas are a threat to the *aviral dhara* of the Ganga. The absence of this is leading to a serious threat to the biodiversity of the Himalayan ecology.

**(4)** The construction of hydro projects, especially in upper stretches has been a contentious issue among the various representatives of civil society and concerned authorities. Concerns have been raised against the construction of series of hydro projects in the upper reaches by several peoples including spiritual leaders, environmentalists, experts, social activists and local affected population in the past few years in the state of Uttarakhand.

**(5)**After the formation of National Ganga River Basin Authority (NGRBA), in consideration of the *Aviral Dhara* of Ganga in terms of her cultural significance and in relation to the eco sensitivity of the Ganga-Himalayan basin, the Govt. of India took cognizance of this issue and intended to reach a solution for conservation & protection of the Ganga. In this regard following decisions and proceedings were subsequently carried out:

1. In the first meeting of NGRBA held on 05th Oct 2009 under the chairmanship of Prime Minister, it was decided to study the issue of hydro projects located in the upper reaches of Bhagirathi (Loharinag-Pala, Pala-Maneri and Bhairon-Ghati) to be studied by MoEF and Ministry of Power. Finally it was decided by the govt. of India through its letter dated 23rd August 2010 to completely scrap these projects in Gangotri valley.
2. In the second meeting of NGRBA held on 01st Nov 2010 under the chairmanship of Prime Minister, the decision of scraping of hydro power projects (Loharinag-Pala, Pala-Maneri, Bhairon-Ghati) was finally approved and it was recommended to declare the area from Gaumukh to Uttarkashi as an “Eco-Sensitive Zone”, which was further executed by MoEF. The catchment area along 100km stretch of Bhagirathi was notified as an “Eco-Sensitive Zone” via its notification dated 18th December 2012 under environmental protection act 1986.

Implementation of these guidelines is still pending with the State Government.

1. A consortium of seven IITs were given the task of preparing a comprehensive river basin management plan. Meanwhile it was decided to carry out cumulative impact study of hydro projects in Alkananda and Bhagirathi river basins and the studies regarding technical impact assessment and biodiversity impact assessment were assigned in July 2010 to Alternate Hydro Energy Center (AHEC) and Wildlife Institute of India (WII) respectively. The AHEC study was at the instance of the NGRBA, the apex body for Ganga Rejuvenation. AHEC submitted their report to MoEF in December 2011 and WII finalized its report in December 2012. Vide its order dated 13th August 2013, page 64 para 46 the Hon’ble SC has, among other things, stated that- “…We have gone through the Reports and, *prima facie*, we are of the view that the AHEC Report has not made any in depth study on the cumulative impact of all project components like construction of dam, tunnels, blasting, power-house, muck disposal, mining, deforestation etc. by the various projects in question and its consequences on Alaknanda as well as Bhagirathi river basins **so also on Ganga which is a pristine river. …”. Hon’ble Court further mentioned the findings by WII stating in para-47 that- “… WII report also states that out of total 39 proposed projects, 24 projects have been found to be significantly impacting biodiversity in the two sub-basins and the combined footprint of all 24 projects have been considered for their potential to impact areas with biodiversity values, both aquatic and terrestrial, critically important habitat of rare, endangered and threatened species of flora and fauna and IWPA projected species….”**
2. Furthermore, a study regarding environmental flow of Ganga was assigned to Inter Ministerial Group (IMG) in July 2012 which was submitted in April 2013. The issue of E-flow was addressed by IMG and it is noticed by IMG that the implementation of all the above **projects will lead to 81% of River Bhagirathi and 65% of River Alaknanda getting affected and has extensive implications for other needs of this society and the river itself.** Also there are a large number of projects which have very small distances between them leaving little space for river to regenerate and revive. The IMG, therefore, recommended that seven rivers, including Nayar, Bal Ganga River, Rishi Ganga, Assi Ganga, Dhauli Ganga (upper reaches), Birahi Ganga and Bhyunder Ganga rivers should be kept in pristine form no further hydropower developments should take place in this region. Further, environment up-gradation should be taken up in these sub-basins extensively.
3. **Disaster of June-2013 in the Himalayan basin of Ganga:**
4. The entire Alaknanda and Bhagirathi basins (A-B basins) in Uttarakhand experienced an intense rainfall during June 15-17, 2013. According to Indian Metrological Department (IMD) analysis of this severe storm, “wide spread very heavy to extremely heavy rainfall occurred over Uttarakhand and neighbouring states during 16-18 June 2013. This has caused severe flood, landslides, large scale loss of lives, properties and damages.” **The analysis also mentioned that anthropogenic activities has also led to massive over-exploitation of the local environment, thereby loosening the top soil and making the region susceptible to landslides and flash floods.**
5. The glacial stretch above Gangotri, Kedarnath, Badrinath and Nandadevi Biosphere Reserve/ National Park received heavy rainfall and the consequential catastrophic flood originating from Chorabari lake outburst in conjunction with massive landslides and flash-floods principally in the Mandakini, upper Bhagirathi and Alaknanda basins ravaged Uttarakhand. The tragedy of colossal loss of human and animal lives along with infrastructure is huge.
6. This disaster was extensively debated among environmentalists, experts, Government, social activists, political class, local people of Uttarakhand, widely reported by the media and people all across **the country expressed concern over the state of Himalayas and strongly objected to the rampant construction activities taking place in the Ganga basin that weakened the delicate balance of the Himalayan ecology leading to such an event.** The hon’ble members of Parliament also took cognizance of the events and a heated debate on this disaster being man-made vs this being a natural disaster took place and the anthropoegenic overload on the Himalayan ecosystem was vehemently opposed by the hon’ble members. **This massive disaster in the Ganga Basin of Uttarakhand Himalayas has forced rethinking of the aspects of understanding the “developmental activities” in the fragile Himalayas.**
7. The Hon’ble Supreme Court, in the matter of Alakananda Hydro Power Co. Ltd. versus Anuj Joshi & others, had then taken a *suo moto* cognizance of the disaster in its order dated 13th August 2013 in the matter of Alakananda Hydro Power Co. Ltd. versus Anuj Joshi & others arising out of Civil Appeal no. 6736 of 2013 (SLP (C) no. 362) of 2012), with appeal no. 6746-6747 of 2013 arising out of SLP (C) no. 5849-5850 of 2012 and TC (C) no. 55-57 of 2013. In this order, Hon’ble court had stated and directed as under-
	1. Regarding reports of WII, AHEC and Shri B. K. Chaturvedi Committee i.e. IMG, “The above mentioned Reports would indicate the adverse impact of the various hydroelectric power projects on the ecology and environment of Alaknanda and Bhagirathi river basins. **The cumulative impact of the various projects in place and which are under construction on the river basins have not been properly examined or assessed, which requires a detailed technical and scientific study.”** (Page-69, Para-50).
	2. Further the Hon’ble court stated that “We are also deeply concerned with the recent tragedy, which has affected the Char Dham area of Uttarakhand. Wadia Institute of Himalayan Geology (WIG) recorded 350mm of rain on June 15-16, 2013. Snowfall ahead of the cloudburst also has contributed to the floods resulting in the burst on the banks of Chorabari lake near Kedarnath, leading to large scale calamity leading to loss of human lives and property. **The adverse effect of the existing projects, projects under construction and proposed, on the environment and ecology calls for a detailed scientific study.** Proper disaster Management Plan, it is seen, is also not in place, resulting in loss of lives and property. In view of the above mentioned circumstances, we are inclined to give following directions:
	3. We direct the MoEF as well as State of Uttarakhand not to grant any further environmental clearance or forest clearance for any hydroelectric power project in the State of Uttarakhand, until further orders.
	4. MoEF is directed to constitute an Expert Body consisting of representatives of the State Government, WII, Central Electricity Authority, Central Water Commission and other expert bodies to make a detailed study as to whether **Hydroelectric Power Projects existing and under construction have contributed to the environmental degradation, if so, to what extent and also whether it has contributed to the present tragedy occurred at Uttarakhand in the month of June 2013.**
	5. MoEF is directed to examine, as noticed by WII in its report, as to whether the proposed 24 projects are causing significant impact on the biodiversity of Alaknanda and Bhagirath River basins.
	6. The Disaster Management Authority, Uttarakhand would submit a Report to this Court as to whether they had any Disaster Management Plan in place in the State of Uttarakhand and how effective that plan was for combating the present unprecedented tragedy at Uttarakhand.” (Page-70,71 Para-51, 51.1, 51.2, 51.3, 51.4).
8. MoEF in compliance of the above order had constituted an Expert Body (EB) via its order (No. L-11011/14/2011-IA.I (Vol-II)) dated 15th Oct 2013 to carry out the task given by Hon’ble Supreme Court and have also set up the following additional TORs (3.1-3.5) which are connected and supplements the purpose of preparing the detail report on the concerned raised and asked by the Hon’ble Supreme Court (2.1-2.2).
9. Assess whether the existing and ongoing/under construction hydropower projects have contributed to the environmental degradation and, if so, to what extent and also whether they have contributed to the tragedy that occurred at Uttarakhand in the month of June, 2013. Also to make a detailed study and evaluate as to how far HEPs have contributed to the aggravation of damage caused by downstream floods.
10. Examine, as observed by Wildlife Institute of India (WII) in its report, as to whether the proposed 24 projects in Uttarakhand are causing significant impact on the Biodiversity of Alaknanda & Bhagirathi river basins.
11. The Expert Committee will devise its own, but follow established approaches and methodologies in collecting, collating and interpreting data/information for the purpose of preparing the report including but not limiting to the following:
12. Assess and review extent of progress made in respect of ongoing/under construction Hydroelectric power projects as on the date of occurrence of the tragedy vis-a-vis progress made in compliance of environmental conditions/safeguard measures.
13. A Study the current state of Himalayan glaciers and impact of HEPs on glaciers, as well as the impact of receding glaciers on HEPs.
14. To study cumulative effects of proposed and existing bumper to bumper & run of river schemes and on this basis review existing Cumulative Impact Assessment Reports.
15. Review compliance of existing protocols for construction activities in the basins of Alkananda and Bhagirathi.
16. Assess the status of progress in respect of proposed 24 projects.
17. Assess projects where impacts cannot be mitigated to preserve biodiversity.
18. A Draft a Himalayan Policy for Uttarakhand keeping in mind the unique ecological, social and cultural characteristics of the state, and suggest environment friendly development activities.
19. Suggest suitable environmental safeguard measures to mitigate the adverse environmental impacts in respect of ongoing projects for which ECs have been granted including tourism projects. Wherever felt necessary, the committee may also suggest necessary changes in project parameters.
20. The Expert Body (EB) constituted by MoEF has submitted its report to the MoEF in April 2014, two members in the EB, CWC and CEA have submitted a separate dissent report. A grant of period of three months was requested by the ministry to read the reports carefully. Now, after examining the expert body report and in compliance of the previous orders made by the Hon’ble Supreme court, MoEF&CC submits as under-

**B.**

* + - 1. **Opinion of MoEF&CC On Expert Body (EB) and the Dissent Report:**
1. The main Expert Body (EB) report submitted by 11 members has comprehensively covered the TORs assigned by ministry. MoEF appreciates the attempt, approach by EB for carrying out a detailed job in a very limited time frame. EB investigated some important ground issues and also compiled and formulated its recommendations after reviewing the disaster affected areas and considering the already available credible and published studies.
2. MoEF&CC observes that the conclusions of EB were based on field visits with factual evidences, discussions, scientific observations and findings. All the TORs assigned to the EB have been addressed appropriately. Moreover, most of the experts (geologist, glaciologist, wildlife-expert, ecologist, socio-cultural experts) including chairman of EB have had a long experience of working in the Himalayan area, which made this task possible to be completed in a limited time frame. However, due to the lack of availability of time, many field visits are still pending and the EB was unable to investigate many relevant aspects and has recommended different studies to be carried in order to have a holistic view on the increased frequency & intensity of recent disasters in the state and the steps to prevent the same in future. The limited time available to the EB also resulted in some analytical differences remaining unresolved and recorded as dissenting notes.
3. By examining the two members report prepared by central water commission (CWC) and central electricity authority (CEA), which are known as technical institutions to provide technical clearances and promotes the hydro power projects as their adopted policy, it is found that this report mainly concerns the potential realization of hydro power generation and does not deal in the concerns of environmental degradation, as raised by Hon’ble Supreme Court and assigned by MoEF via its TORs. *Prima-Facie,* this 2 member report is basically technical and hydro projects centric and have not carried out any significant and specific study regarding environmental degradation post the disaster in the Ganga-Himalayan basin. This report simply states that “….Development of hydro electric projects have no environmental degradation effects if EIA studies and mitigation measures brought out in EMP are carried out by developers and ratified/implemented by MoEF and associated ministries. Blaming hydropower projects and halting their construction, without any technical or scientific basis will seriously impact the energy security……”. Arriving at such a conclusion, with reference to such a massive calamity needs in depth study covering all aspects such as Himalayan fragility, sensitivity, proneness to land slide, cumulative impact study etc, which has not been done.
4. MoEF&CC therefore, finds merit in main 11 members expert body (EB) report in context of the compliance of directions by Hon’ble court made on its order dated 13th August 2013 in the matter of Alaknanda Hydro Power Corporation ltd. vrs Anuj Joshi and others.

**C.**

* + - 1. **Main factual Observations of Expert Body (EB) report:**

The State of Uttarakhand has planned an ambitious program to develop 450 HEPs (HEPs) to harness its potential of 27039 MW. So far 92 projects with a total installed capacity of 3624 MW have been commissioned. Of these, 15 large and medium projects account for 95 per cent of the installed capacity. Another 38 projects (3292 MW) are under construction. Here too 8 large and medium projects account for 97 per cent of the capacity. Detailed Project Reports (DPRs) prepared for 38 more projects (3318 MW) are awaiting clearances.

**(9) Role of HEPs on Environmental Degradation:**

1. Based on reviews of available scientific studies, official documents and field visits the EB has concluded that existing and under construction hydro-power projects (HEPs) in Uttarakhand have led to several deleterious environmental impacts. Among the significant impacts it has identified are on the (i) river eco-system, (ii) forests and terrestrial biodiversity, (iii) geological environment and (iv) social infrastructure. These are elaborated below:
2. All HEPs (big or small) have environmental and social impacts during their construction & operational phases. The negative impacts of small projects can be less intense and therefore mitigated more easily. Large projects often lead to massive impacts that are hard to mitigate and may result in permanent scarring of nature and society. Many of them are not even seen or felt immediately. They emerge over time. In the state of Uttarakhand, findings of Expert Body shows that the mitigation measures adopted by the project authorities are almost not effective and further the degradation is enhanced due to in-effective compensatory afforestation (CA) scheme, catchment area treatment plan (CAT) and violation of other stipulated norms and conditions by the project authorities.
3. Most of Uttarakhand’s HEPs are diversion projects which divert water upstream of a dam into a tunnel and drop it several kilometers downstream in order to obtain a large head. Series of dams are proposed for the major rivers of Uttarakhand. As per this scheme a dam shall be built every 20 to 25 km of the length of river and in some cases in even shorter stretches. The rivers shall then be converted into a series of ponds (reservoirs behind the dams) connected by pipes (tunnels). Large fragments of these rivers could be left with minimal flow as almost all the river water is extracted for producing hydroelectricity, as per current practice.

Scientific studies have shown that this has led to disruption of fish migration and the loss of aquatic biota and diversity.

1. The construction of multiple dams on a river has led to fragmentation of the river’s length, again affecting riverine biota and diversity. For example, a series of dams on the Bhagirathi between Maneri in Uttarkashi district and Koteshwar in Tehri Garhwal district which have disrupted free flow in a stretch of about 110 km, almost half the length of the Bhagirathi from its origin to Devprayag. Similar dried river beds can be seen downstream of Vishnuprayag in Alaknanda for a stretch of approximately 20 kms.
2. It is speculated that when large fractions of river lengths go dry or convert into a form of reservoir due to multiple projects on them, changes in the micro climate may occur. The temperature in the river valley may increase. The accompanying reduction in moisture can diminish the valley’s biodiversity and productivities. In the long run it may also speed up the melting of nearby glaciers. The ratio of the river length diverted to its total length is a good indicator of the cumulative impact of multiple dams. This is also reflected in the AHEC, WII and IMG reports. The affected river length was first determined by AHEC. IMG recommended that some of the rivers be maintained in a pristine state which would mean the cancellation of a few projects and hence changes in the river length affected. Table below shows likely cumulative fragmentation by proposed, under construction and existing projects.
3. Moreover, in the EB report chapter 2, 5, 7 and 8 categorize, compile and explain the environmental degradation in different aspects and terms as under-
4. Impacts on river ecosystem and water quality in the context of already existing projects especially like Tehri, Maneri , Vishnuprayag. With reference to the other studies like NEERI, CPCB, PSI, IIT-Roorkee etc. (TOR 2.1, Chapter-2 Main EB report)
5. Impacts on terrestrial and forests biodiversity, irreversible loss of riverine ecosystem. (TOR 2.1, Chapter-2 Main EB report)
6. Impacts on geological environment, slope stability in context of existing and under construction projects in Bhagirathi & Alaknanda basin. (TOR 2.1, Chapter-2 Main EB report).
7. Impacts on social infrastructure in context of existing/under-construction projects in Alaknanda and Bhagirathi river basins. (TOR 2.1, Chapter-2 Main EB report).
8. Chapter 5 of EB report regarding the TOR 3.1, 3.2 and 3.3 elaborates that how the forest cover of the state like Uttarakhand is degrading rapidly, where now actual forest cover stand only 45.80 % while the Uttarakhand govt. claims it to be 64.54 %. Further this chapter shows the non-compliances by project authorities, poor performances of compensatory afforestation (CA) and catchment area treatment plan (CAT). The various violations of stipulated norms and conditions by the hydro power authorities are also mentioned in this chapter.
9. Chapter 7 elaborates the cumulative impacts of bumper to bumper projects, and chapter 8 indicates the irreversible impacts on biodiversity as has been asked by MoEF in its TORs 3.4B and 3.4 respectively.

**(10) Role of HEPs on flood aggravation:**

It was observed widely that the entire disaster affected area of Uttarakhand from Yamuna to Kali river, the major damages in Kharadi (Yamuna Valley), Uttarkashi (Asi-Ganga, Bhagirathi Valley), Srinagar and Pandukeshwar (Alaknanda Valley), Dharchula (Kali Valley) occurred in the area around or downstream of the project barrage site. Expert body has investigated some sites and compiled their findings in Chapter-3 of EB report. The Central Water Commission (CWC) carried out hydrological analysis of the floods in the Alaknanda and Bhagirathi (A-B) basins. It concluded that if the Tehri dam had not existed a combined discharge of over 21,500 cumecs would have engulfed the towns of Rishikesh and Haridwar on the Ganga. Thus it was claimed by CWC, THDC (Tehri Hydro Development Corporation), State officials and others that the Tehri dam had helped avert a major tragedy.

1. According to EB report, it cannot be denied that the Tehri dam attenuated a major flood in the downstream Ganga basin. But this was a fortuitous circumstance since the flood occurred in mid-June, a few days before the normal onset of the monsoon season, when the Tehri reservoir was perhaps at its lowest level. The Tehri dam is not designed to perform a flood control function. It does not have a mandated flood cushion. Hence it can hold back major floods only up to its mandated FRL. In September 2010, to retain flood inflows in the face of water levels rising beyond the permitted FRL the dam authorities had to seek the permission of the Supreme Court. It led to inundation of the upstream town of Chinyalisaur and later a draw down fresh landslide zones were created around the reservoir rim.
2. The EB, however, raised doubts on how much of Haridwar would have been affected if the Tehri dam had not been there based on its analysis of the inundation maps provided by THDC. The problem at Haridwar, as at other towns and habitations along river banks, is that there has been wide spread encroachment and construction inside the river’s flood plain regime. Therefore, it is imperative to set up river regulation zones where encroachments are forbidden. (Unscientific sand mining on river beds adds to the problem.)
3. The EB findings highlighted the fact that floods are not just about water but also sediments. The major damage was inflicted by the sediments and water rather than just the water.
4. Assessing flood damages: The findings of EB report reveal that the damages during the 2013 disaster were more concentrated/ aggravated in the immediate upstream or around or mainly on the downstream of existing and under construction barrages of hydro power projects. This being a generic finding all over Uttarakhand, a few cases have been elaborated in the EB report. Some specific cases in Mandakini and Alaknanda valleys were studied and explained in detail by Expert Body. The main findings related to aggravation of flood are summarized as under-
5. Damage at Phata-Byung 76 MW HEP:
6. EB found that the barrage at the under-construction Phata-Byung (76 MW) HEP was not designed to handle a flood of the magnitude that struck the project on June 17, 2013. It received a flood of 2000 cumecs against a design capacity of 1106 cumecs. The Phata-Byung barrage is located at a narrow gorge just downstream of Sitapur. The flood level started rising very rapidly on June 16th morning and by 5.00 pm the dam with its crest at 1635 m was over-topped, because the passage of large boulders rolling down from Rambara was blocked by the vents in the dam. This led to the formation of a temporary lake at Sitapur which swept away the local bus stand with many yatra season vehicles parked there, adjacent houses and hotels and further upstream a bridge on the Sonprayag. The washing away of this bridge was calamitous as the survivors who came down from Kedarnath could no longer simply walk across the Songanga stream into Sonprayag.
7. According to the findings of EB, downstream from the barrage site gorge the concentration of bed load sediments decreases. This implies that had the barrage and the diversion not been there the Mandakini river could have possibly carried much more bed load further downstream and the maximum flood level at Sitapur would have been lower. It is, however, conceded that considering the magnitude of sediments transported downstream between June 15 and 17, 2013, barrage or no barrage, the river would have eventually got obstructed by the boulders and uprooted tree stumps at the constricted passage downstream at Sitapur. The almost finished barrage simply constricted the passage for the water and sediments through a naturally narrow gorge. Thus it can be said that the Phata-Byung HEP aggravated the damage caused by the floods.
8. Damage at Singoli-Bhatwari 99 MW HEP :
9. According to EB report, by June 2013 the barrage was more than 50% complete and the HRT was 60% complete over its 10.5 km length. The powerhouse excavation and mat concreting had been done. A hydrograph of the recorded flood, prepared by the developer (L&T), showed that the discharge in the river rose to 1378 cumecs by June 16th morning after which the gauge was washed away. Local water marks indicated that the highest discharge reached was of the order of 4032 cumecs, against the designed spill of 4684 cumecs. Therefore the waterway provided for the barrage would have been adequate. Evidence at the barrage site indicated that the vents in the barrage were choked with boulders, trees, sediments and debris, forming a temporary lake for a brief period. Although the actual upstream extent needs to be ascertained, it appears that the ponding extended below Semi village.
10. The EB team observed major problems of land subsidence at Semi village, rendering many houses unsafe for living. Based on the limited observations, however, it is difficult to conclude unequivocally the role of the HEPs in the subsidence of Semi village. In order to arrive at a definite answer a detailed study is warranted. The EB noted that though the barrage had not suffered major structural damage about 30 m on the right flank had been scoured. The scour washed away a part of the hill slope. It also damaged the adit to the main tunnel. Ten metre high flood waves are said to have entered into and silted the adit under construction.
11. Bank erosion downstream of the barrage could have been due to the project construction. Scientific studies show that under hyper concentrated flow, when a river is overwhelmed by its sediment supply, it tends to (i) aggrade in stretches where the velocity drops (wide valley expanses/meanders) and (ii) migrate laterally in order to follow a minimum resistance path. Both these processes cause bank erosion and flooding. Geomorphic evidence of this process was visible in the relatively wider segment of the Mandakini valley below the Singoli-Bhatwari HEP and downstream of the power house area.
12. At several locations complaints were made by local communities that muck dumping by the river banks had aggravated the flood damage. Field observations by the EB team suggest that localized problems may have been caused at dump site I and in the vicinity of the switchyard. Below the under construction power house there was significant lateral migration in the flow path of the Mandakini river due to a drop in the river gradient and high sediment supply. This could probably have led to lateral migration and erosion of non-cohesive river banks upto the stretch around Chandrapuri.
13. Destruction at Vishnuprayag 400 MW HEP:

The Vishnuprayag barrage obstructed a very high intensity debris flow brought by the Khiron Ganga, a tributary of the Alaknanda just upstream of the Vishnuprayag HEP. It caused extensive destruction of public and private property.

1. EB found that, on June 17th when a major flood pulse arrived at the barrage site, the 8.5 m radial gates were clogged with boulders and debris. Not finding an outlet the flooded river was forced to carve a channel through a minimum resistance path. This was available along the alluvial dominated left flank through which the river gushed out. Shifting to the left flank, it swept away the company’s site offices, helipad and a large swathe of the main highway to Badrinath that was excavated through the old and stabilized alluvial fan.
2. Once the boulder laden river struck hard rock on the left flank, with its amplified erosive potential, it migrated laterally towards the right bank, eroding the old terrace sediments. In the process the company’s structures encroaching the river regime and the local market at Lambagar were destroyed, looking upstream. The geomorphic evidence of accelerated erosion and deposition of the flood sediments can be seen by the presence of thick pile of sediments along the relatively wider river section between Lambagar and Govindghat and the narrow segment between Govindghat to Vishnuprayag.
3. According to EB, the Vishnuprayag HEP is a classic example of how human structures can alter river morphology during unusual weather events. It is constructed in a paraglacial zone. Since glaciers once existed in these zones, they leave plentiful of sediments behind. During abnormal monsoons -- as in June 2013 -- torrential rainfall can cause massive debris flows. Such events which seem to have decadal recurrence interval play an important role in the overall sediment flux toward the Himalayan foreland. **Therefore paraglacial zones in the Himalaya are sediment hot spots.**
4. Damages in Srinagar town below Srinagar HEP (330 Mw):
5. According to EB, which observed a mass protest by flood affected people in Srinagar town during its field visit heard the complaints from the affected people in Srinagar, who believe that the improper disposal of muck generated by the HEP was largely responsible for raising the river bed and hence flooding the lower reaches of the town.
6. In EB report, project authorities also claimed the reservoir had stored 28 Mm3 of water before the flood. While disposing the flood from about 1,000 cumecs (before June 13), to a peak of 12,600 cumecs on June 17th, the water level rose to almost 600 m and its storage from 28 Mm3 at 585 m to 65 Mm3 at 600 m (from Area-Capacity Curve). Table below was released to give the sequence of the rise and fall of the flood. The project authorities claimed that an estimated 26 Mm3 of sediments were stored behind the dam and that without the dam this material would have caused more severe damage in Srinagar urban area.
7. EB reported that local eye witnesses and the project authorities seemed to agree that the flow downstream reduced till about 4am on June 17th when the highest level of the reservoir was reached. But thereafter the gates were opened further and the water level was reduced on June 17th at 9 am. This led to a high flow and the flushing of downstream muck. The high flood caused morphological changes to the river, extending several kilometers downstream of the dam. The river carved out a new course to the right immediately below the dam and kept attacking the concave bank against the HNB University area scouring 100m of the bank. Deposition of fine sediment upto 7 to 8 m height occurred in Srinagar urban area.The local ITI, the SSB training campus and housing colonies downstream – all along the left bank of the river -- were submerged one to two stories deep in silt.
8. **Geo-chemical analysis by Expert Body:** To unravel the truth, EB carried out Geo Chemical analysis of sediment samples taken from various locations along the river stretch in Srinagar. Analysis done by EB indicated dominance of phyllite rocks. In the flood sediments collected along the river course below the barrage indicate that the phyllite (from muck) contribution varies from 47% to 23% implying significant contribution of muck in raising the river bed during the flood thus inundating the lower terraces around Srinagar. Hence, a significant contribution from muck eroded from muck disposal sites of the Srinagar Hydro project was confirmed.
9. EB further concluded that the Srinagar HEP is located upstream of Srinagar town in the lesser Himalaya. This town was one of the worst hit during the June 2013 flood. The location that was flooded in June 2013 was also affected during the 1894 and 1970 floods. Whereas the events of 1894 and 1970 impacted the entire Alaknanda valley, the damage due to the June 2013 flood in the Alaknanda valley was focused at two locations, i.e., around the Vishnuprpayag HEP at Lambagar and downstream of Srinagar barrage till Bagwan.
10. **Impact of 24 proposed projects on Biodiversity:**
11. In chapter-4 of the EB report, review of the 24 HEPs cited by WII concluded that the cumulative impact of all the 24 projects on biodiversity would be significant. There are several reasons for reaching to this conclusion.

ii. It is well known that in several river stretches of the Alaknanda and Bhagirathi basins there are series of dams. Hence, their cumulative impact on the biodiversity has to be considered also. The EB noted that all the 24 HEPs were located in sub-basins with high to very high biodiversity values (Table 4.2 of the Main Report).

iii. On the suggestion of the CWC representative in the EB for a peer review of the WII report, the EB Chairman with the concurrence of the Co-chair, requested Dr. Brij Gopal, an eminent ecological scientist, to review WII’s report. In his review (See Appendix 7a, Main Report), Prof. Gopal mentioned that the methodology adopted by WII had certain limitations. But he agreed with WII’s findings that the 24 proposed hydropower projects would significantly impact the biodiversity of the Alaknanda and Bhagirathi basins. He added that WII could have gone further in its recommendations. Based on his own analysis, Prof Gopal recommended that several more than the recommended 24 should actually be dropped.

iv. In its analysis of the 24 projects the EB stated, “In discussions on WII’s analysis and other terms of reference of the EB it was also realized that some of the HEPs would lie at elevations above 2200-2500 m. Field visits and published scientific literature, cited in Chapter 3 of EB report, show that these altitudes come in the paraglacial and glacial zones. In these zones the rivers are capable of mobilizing tremendous amounts of sediments, under intense rainfall conditions, from the moraine material left behind in the past by receding glaciers. In such situations, they cause havoc in the vicinity of HEPs as witnessed at the Vishnuprayag HEP barrage site and below during the June 2013 disaster.

v. It may be noted that the Inter-Ministerial Group appointed by MoEF to consider issues related to HEPs and environmental flows recommended that six rivers, *viz*., Nayar, Balganga, Asiganga, Dhauliganga (upper reaches), Birahi Ganga and Bhyundar Ganga be kept in pristine form. This would entail cancelling 11 out of the 24 projects.

vi. The stretch of Ganga from Devprayag to Rishikesh falls in the lower Himalayan range. A major spring-fed perennial river Nayar joins Ganga near Byasi and several small streams also drain into this basin. This area encompasses the subtropical sal and mixed forests, open grassy slopes and scrub, and patches of riverine forests along the river. This stretch of river Ganga has many deep pools and rapids, which are the most preferred habitat for large size fishes like *mahseers* and carps.

1. This is the richest sector of the entire Ganga river basin in terms of fish diversity and abundance in Uttarakhand. A total of 56 species of fishes, including 30 restricted range fishes, 16 threatened fishes and 2 endemic fishes namely *Glyptothorax alaknandi* and *Glyptothorax Garhwali* have been recorded in this sub-basin. These two species are endemic to the upper reaches of Ganga. The threatened species of this basin are: *Tor putitora, Tor chelinoides, Schizothorax richardsonii, Bagarius bagarius, Garra gotyla gotyla, Garra lamda, Chagunius chagunio, Nemacheilus multifasciatus, Pseudecheneius sulcatus, Puntius arana, Puntius chola, Botia dario, Amblyceps mangois, Crossocheillus latius latius, Glyptothorax cavia* and *Glyptothorax telchitta*.
	1. In the entire Ganga this is the only sector with a viable population of golden *mahseer*. This population moves along the Nayar river during monsoon for breeding. Based on the WII survey, the Nayar river is recognised as one of the critical habitat for the golden *mahseer* and associated species, and therefore proposed as ‘Fish Conservation Reserve’. This is why the IMG recommended that the Nayar be maintained in a pristine form. (There are reports on the presence of otters, but potential otter habitats are present in some stretches along this basin.)

**(12) Potential threat of Paraglacial zones (Important findings by Expert Body):**

1. Chapter-3 and Chapter-6 of EB report refers to a major potential threat in the Himalayan region, the ‘Paraglacial Zones’. Streams emanating from glaciers and snow covered areas facilitate snow avalanches, debris flows and landslides.
2. A large area above 2500 m (asl) is occupied by glaciogenic sediments which are unconsolidated and prone to remobilization under extreme rainfall events, as happened in June 2013. Such areas, called paraglacial zones, lie ~ 2200-2500 m in Uttarakhand.

1. According to the EB finding- Since glaciers once existed in the paraglacial zones, these areas are not sediment limited. Plentiful sediments exist, left behind by receding glaciers and the ongoing mass wasting processes. During abnormal monsoons -- as was the case during June 2013 -- violent rainstorms cross over the southern orographic barrier into the Higher and Trans Himalaya where torrential rainfall events significantly increase and trigger extensive erosional processes, i.e., debris flows. Such events which seem to have decadal recurrence interval, play an important role in the overall sediment flux towards the Himalayan foreland. In view of the above phenomena, paraglacial zones in the Himalaya, like the terrain north of Lambagar can be considered as sediment hot spots which are continuously adjusting to changing climatic and environmental conditions.
2. This was observed by EB in Alaknanda and Bhagirathi valley that the major contribution of flood water is coming from the flash floods in tributaries like Khiro Ganga, Assi-Ganga etc. For example, Khiro Ganga originates from the southern flank of the Nilkanth mountain. It is a major tributary which joins the Vishnu Ganga (Alaknanda river) on its right bank below Hanuman Chatti. According to the project officials, during June 15-17, 2013 a major sediment pulse in the form of debris flow came from the Khiro Ganga valley. These sediments which have been incised to a depth of 5-10 m pushed the Vishnu Ganga towards the left flank.
3. Such paraglacial valleys are loaded with sediments. In June 2013 abnormal monsoon rain in combination with an over-steepened river course transported the available sediments as debris flow *which overwhelmed the river transport capacity*.

**D.**

**13. Recommendation of EB:**

 Learning from the June 2013 event, the EB believes that the enhanced sediment availability from and in paraglacial zones could be a serious problem for the longevity of the existing, under construction and proposed HEPs in Uttarakhand. Therefore the EB recommends that the terrain above the MCT in general and above the winter snow line in particular (~2200-2500 m and above) should be kept free from hydropower interventions in Uttarakhand.

**(14) Disaster management and disaster preparedness of HEPs:**

1. EB observed very poor performance and a dangerous lacuna in terms of the disaster preparedness of existing as well as under construction hydro electric projects. According to EB,the operation of barrages during extreme events leaves a lot of ambiguity as to when the gates should be fully lifted. Without any real time flood forecasting network or an automated weather station upstream and the possibility of massive landslides, blocking of the barrages is a hazard in June when the snow melt component is very high. To mitigate the threat a real time flood forecasting network or automated weather stations are required. The probability of errant monsoon behavior is only likely to increase with global warming.
2. EB recommended that for the Tehri dam to safely meet the objective of flood moderation, particularly during the later part of the monsoon, it also requires the installation of a Real Time Flow Forecasting Network which could forecast inflows into Tehri reservoir at least 12 to 18 hours in advance. Such advance forecasts are also required for the likely contribution of Alaknanda at Devprayag and of the basin below Devprayag up to Haridwar. A Real Time Flow Forecasting Network will enable decisions on appropriate releases to prevent synchronisation of Bhagirathi (Tehri release) and Alaknanda floods. Until then the Tehri reservoir level should be limited to 825m in mid-September, to be filled up judiciously from the receding monsoon flows.

**E.**

**(15) Some Important observations and recommendations made in other Reports:**

1. Recommendations by Task Force of Planning Commission in 2010 headed by Shri G.B. Mukherji :

In 2010 a Report of the Task Force was submitted to look into problems of hill states and hill areas and to suggest ways to ensure that these states and areas do not suffer in any way because of their peculiarities. Some observations and recommendations regarding hydro power projects and EIAs are stated as under-

1. “….**At the same time, the cumulative impact of multiple hydropower projects along the same river basin and the threat of a cascading chain of catastrophes in case of structural failures or even from purely natural causes suggest the urgent need for a region or entire basin based Strategic Environmental Assessment (SEA) rather than individual project oriented environmental impact assessments (EIA) that neglect the summation effect. The Task Force supports the MoEF’s decision on basin based assessments for projects…”.**
2. It further supplements that –“…**It also seems logical and essential to demarcate zones in the higher Himalayan region that are naturally unstable. In these areas, no hydropower projects should be allowed to be developed…..”**
3. The importance and need of strategic environmental assessment (SEA) was categorically mentioned and recommended by the task force stating that- “…A new perspective to replace the practice of project based environmental impact assessment (EIA), with Strategic Environmental Assessment (SEA) needs to be introduced…”.

1. A report on the performance audit of the hydropower development through private sector participation in Uttarakhand submitted by CAG of India:

 Government of Uttarakhand has formulated and implemented policies in October 2002 to harness its hydropower potential through the concerted efforts of both the State and the private sector. The performance audit was conducted through a test-check of the records of the Uttarakhand Jal Vidyut Nigam Limited (Nodal Agency), physical verification of the project sites and collection and analysis of data from the Department of Energy, Uttarakhand Environment Protection and Pollution Control Board and Divisional Forest Offices of the State. The audit has been conducted in conformity with the Auditing Standards issued by the Comptroller and Auditor General of India. The report discloses the lack of strategic impact analysis, cumulative impact assessment and other serious discrepancies, few quotes from the report showing the lack of strategic impact analysis and negligence of environmental concerns are stated as under-

1. Pre-feasibility (PFR) study based on ground survey of the river basin, its topography and hydrology was to be carried by Uttarakhand Jal Vidhyut Nigam Limited (UJVNL), the nodal agency, for accurate evaluation of the hydro-power potential of a river/stream. **However, significant alterations ranging from 22 *per cent* to 329 *per cent* in the capacity of 85 *per cent* of projects, raised serious doubts on the credibility of PFR studies** **[Paragraph 3.1].**
2. The State’s policy on hydropower projects was silent on the vital issue of maintaining downstream flow in the diversion reach (the stretch of the river from the point of diversion into tunnel to the point where it is released back into its natural stream). **The physical verification of four1 out of five operational projects, showed that river-beds down stream had almost completely dried up, the water flow was down to a trickle, and extremely inadequate for the sustenance of ecology and nearby groundwater aquifers.** **[Paragraph 5.3.1]**
3. Given the current policy of the **State Government of pursuing hydro-power projects indiscriminately, the potential cumulative effect of multiple run-of-river power projects can turn out to be environmentally damaging**. Presently, 42 hydro-power projects are in operation, 203 are under construction or clearance stage, while several others are at the conceptual stage. **[Paragraph 5.3.2]**
4. Negligence of environmental concerns was obvious as the muck generated from excavation and construction activities was being openly dumped into the rivers contributing to increase in the turbidity of water. The projects seemed oblivious of the fact that such gross negligence of environmental concerns lead to deterioration of water quality and adverse impact on the aquatic biota.  **[Paragraph 5.3.3]**
5. Observations and recommendations made by Disaster Management and Mitigation Center (DMMC) of Uttarakhand are as below:

i. This was also observed and mentioned by DMMC that the **stipulated norms and conditions for such highly fragile and eco sensitive zones are being ignored and violated for the various developmental projects**. Even **hydro power projects for obtaining project clearances**, have **ignored the eco sensitivity and previous studies and recommendations.** The observations by DMMC was published in Current Science (Vol.98, No.,10, 25th May2010) in **2010, have noticed that how the mountain aquifer was damaged due to tunneling in declared sensitive and fragile hilly area of Joshimath in Alaknanda valley.**

* + 1. Further, after the 2012 Ukhimath and Assi-Ganga disaster in Uttarakhand, DMMC in its recommendations categorically mentioned as under-
1. “Ban on the use of explosives: **Use of explosives in the fragile Himalayan terrain for infrastructure developmental works introduces instability in the rocks and therefore use of explosives should necessarily be banned.”** (DMMC report, October-2012, Ukhimath)
2. **“..It is therefore highly important to strictly regulate developmental initiatives in close vicinity of streams and rivers. Appropriate legislative interventions would be required for formulating a policy in this regard and firm executive action in accordance with letter and spirit of this policy would be required to ensure compliance of the same.”** (DMMC report, October-2012, Uttarkashi)
3. Recorded landslides incidences by Geological Survey of India after June-2013 disaster:
4. It is geologically established facts about the landscape of Uttarakhand that these are rugged mountain chain with high relief. Varied geomorphic landforms: Glacial/ glacio-fluvial and fluvial and dominance of erosional & gravitational processes are found. **Entire area lies in Zone IV & V of Seismic Zoning map of India which is known to be one of the most landslide prone states in India. Rainfall & Earthquake are the main triggering factors for slope failures.** It suffered multiple **stages of deformation and metamorphism and traversed by major thrusts like Main Central Thrust** (MCT), **North Almora Thrust** (NAT) besides many other faults/shears.
5. A study carried out by Geological Survey of India (GSI) after June-2013 disaster in Uttarakhand identified that a number of landslides have been activated in these river basins. In **one of the disaster affected district Uttarkashi 60 landslides incidences were recorded by GSI only in Bhagirathi and Yamuna Valley**. Similar studies were done in other disaster affected areas and have shown the damages and critical conditions of the mountain.
6. It is pertinent to mention here that the task given to GSI by Govt. of Uttarakhand was only to assess the preliminary slope stability of disaster affected areas. Therefore, GSI has mainly recorded the landslide incidences thoroughly but has not done the study of the disaster/floods along with the other Ecological and social factors. However, it was felt and stated by the GSI in its report that- “ **The main factor responsible for triggering of the landslides are abnormal downpour causing flash floods, toe cutting, saturation of slope forming material.** Also, anthropogenic activities like road cutting, encroachment of human in the river/ *nala* bank and unplanned urbanization, etc have aggravated the situation.” It further recommends that- “In hilly region landslide related hazards can be reduced/ minimized by avoiding unplanned excavation and if cutting is essential sustainable measures may be adopted immediately.”
7. Observations and Recommendation by Wildlife Institute of India (WII) and Inter-Minsitrial Group (IMG) headed by B.K. Chaturvedi:

Both WII and IMG have show their **concerns on exploitation of rivers and eco system by number of hydro power projects in Bhagirathi and Alaknanda river basins.** On one side, while considering the significant biodiversity impact of proposed hydro power projects, WII recommended 24 projects should be reviewed. **While IMG too, in consideration of the e-flow of the rivers, recommended that 6 tributaries of Ganga named Assi-Ganga, Birahi Ganga, Nayar, Bal-Ganga, Bhyundar-Ganga and upper reaches of Dhauli-Ganga should be maintained as pristine.**

**F.**

**(16) Hon’ble Supreme Court’s directions given on 9.10.2014 and 5.11.2014.**

1. That in compliance of the directions of this Hon’ble Court issued vide dated 09.10.2014 and 5.11.2014, the MoEF&CC convened a preliminary meeting on 15.10.2014 with Hon’ble SC nominated members, various stake holders, experts and representatives of NTPC, NHPC & THDC wherein their Hydropower projects namely; Lata Tapovan HEP, Kotlibet (Stage-I) HEP and Jhelam Tamak HEP were discussed. As directed by this Court, design modifications and compliance were sought in respect of (a) a proper longitudinal connectivity in the dam/barrage to ensure smooth biota movement and non-disruptive sediment transportation (b) adequate e-flow release through dam/barrage and (c) Conservation and mitigation measures to contain and lessen impacts on Bi-diversity as reported by WII. Subsequently, a similar meeting was held with the GMR Energy & Super Hydro Electric Private Limited on 20.11.2014 to discuss their projects namely; Alaknanda HEP and Bhyunder Ganga & Khirao Ganga respectively.

**(17) Outcome and conclusions of the discussions:**

i. That During the 4 meetings incidence of severe damage to the environment and livelihood by the commissioned and under construction HEPs were brought out and demands was raised that these three criterion should not form the sole basis for their review and reconsiderations. Holistic views should be taken for all the HEPs and people should be given proper opportunity to be heard in deciding the fate of these projects.

1. That Members of civil societies and NGOs insisted and demanded during the meetings that instead of considering the HEPs individually, they should be considered following the spirit of cumulative impacts in a holistic and integrated manner to arrive at a right decision. It was brought to notice by Matri Sadan that due to tunneling/blasting activities, spring and aquifer which are natural water sources have dried up and causing severe water shortage in those areas. Incidence of sinking of land and landslides due to such activities coupled with the geological fragility of the Himalayan region, were also brought out. Thus, demand was made that experts from geological field should also examine feasibility of rock blasting and tunneling ensuring safety of local people and stability of the region. Views was also expressed that experts of bio-diversity familiar with the region was not included in the IITC team as the IITC comprised mostly engineers. **Whereas, WII’s findings is purely based on impacts on bio-diversity. Impact of social, cultural and religious aspects was raised and demand made that these issues be also addressed adequately while deciding the fitness of the HEPs. Fear was expressed that fragile Himalayan region will become unstable and vulnerable to frequent landslides due to such tunneling and blasting activities coupled with stoppage of water flow by dams/ barrages. These may call for expanding the domain of scrutiny and appraisal to decide the fitness of these HEPs.**
2. The Developers proposals indicating some changes / modifications were not found adequate and satisfactory. During the discussions, it was strongly felt that the project should not be considered individually but, based on their cumulative impact study. Because, although a project individually may be having lesser impact, the same may be severe when this is considered cumulatively. Therefore, design modification alone was not considered adequate. These will entail change in project features and based on the revised/modified project features/parameters, bio-diversity impacts will have to be predicted afresh on a cumulative study basis and mitigating measures to be taken up accordingly.

The submission of the developers and the appraisal of this Ministry in respect of these six projects are **appended** with the affidavit. Some photographs showing poor condition of the river and surroundings are also **appended.**

**G.**

**(18) CONCLUSIONS:**

 Hence MoEF&CC found that the Expert Body (EB) Report restates what has been observed through the past decades by various reports and what it has also found through its own studies on the latest disasters in the Himalayas. Therefore, considering the Expert Body findings and in continuation of other above mentioned previous reports, MoEF&CC has reached the following conclusions:

**(19) Opinion on Environmental Degradation caused by HEPs in Ganga-Bhagirathi and Alaknanda basins:**

 It is clear from the report submitted by the Expert Body which is inclusive of the findings of many researches/committees, that with the construction of hydro power projects the local ecology is certainly overburdened. There are clear citing of irreversible damages of environment, in terms of loss of forests, degraded water quality, geological, social impacts and that they enhance landslides and other disasters.

 The common observations based on the field visits of the expert body and also reported by the local representation of Uttarakhand in the meetings carried out between the Petitioners and the project proponents, as directed by the Hon’ble Supreme Court, are significant and are listed below:

1. Impacts on social infrastructure in terms of loss of water sources in the vicinity of the existing & under-construction hydro-power projects, cracks on houses, fissures in fields, increased wild animal attacks in human settlements around the rim of the Tehri reservoir social degradation etc, as also mentioned in EB report.
2. Active landlslides especially in villages located in the vicinity of the tunnels of the under-construction & existing HEPs and changing in micro climate in the vicinity of reservoirs/tunnels of HEPs
3. The essential parameters of river connectivity have been compromised in many river stretches (Eg: 110 kms of fragmented river bed of Bhagirathi from Maneri to Koteshwar, 20kms of Alaknanda from Lambagad to Vishnuprayag) which have significantly disturbed the river ecosystem.
4. It is pertinent to note on the basis of the findings of the EB report that of the existing hydro power projects non-compliance/ inadequate compliance of many essential aspects such as Catchment Area Treatment plan (CAT), compensatory afforestation (CA), Corporate social responsibilities (CSR), fish nurseries (FN), muck disposal etc. and the violations observed at various project sites of the under-construction HEPs (like muck-dumping) have perhaps escalated the degradation.
5. Therefore, it can be concluded that while at some sites, the aspect of construction has perhaps significantly degraded the environment while many other sites have been impacted as a result of the cumulative effect of the already existing and under-construction HEPs, while some others, have escalated the environmental degradation just by the poor/non-compliance of mitigation measures & violations. Thus a significant effect of the HEPs on the environmental degradation seem evident but, still needs further quantitative assessment.

**(20) Opinion on Flood Aggravation by HEPs:**

It was commonly observed that all HEP (existing and under-construction) in the disaster affected areas have been significantly impacted and the maximum damage sites, in the disaster affected areas, were located either just upstream, or around or immediate downstream of these HEPs. ‎, it is pertinent to conclude that the there has been a direct and an indirect impact of the HEPs in the aggravation of the floods of 2013.

**(21) Opinion on 24 proposed Hydro power projects:**

 In view of the observations mentioned above, this Ministry would summarize conclusion on 24 proposed Hydro Electric Projects as under-

1. WII found significant biodiversity impact of the proposed 24 hydro power projects.
2. IMG has also expressed its concern about the likely over exploitation of critical river ecosystem and believes that pristine environment and free flow of such rivers should be maintained. The IMG, therefore, recommended that seven rivers, including Nayar, Bal Ganga River, Rishi Ganga, Assi Ganga, Dhauli Ganga (upper reaches), Birahi Ganga and Bhyunder Ganga rivers should be kept in pristine form no further hydropower developments should take place in this region. Instead environment up-gradation should be taken up in these sub-basins extensively which also includes 11 out of 24 proposed projects?
3. That the 6 other projects out of 24 falls in Gangotri “Eco Sensitive Zone”, notified by MoEF on 18.12.2012 under environmental protection act-1986. The Hydro electric projects (which entail tunneling, dams and formation of reservoirs) are prohibited inside this zone except the micro or mini projects (less than 2 Mw) which would serve the energy needs of local community.
4. That the Expert Body (EB) also reviewed the WII report and reconfirmed that these 24 projects will have significant impacts on biodiversity.
5. That the Expert Body, in its findings, warned about the potential threat of paraglacial zones and recommended that the terrain above the MCT in general and above the winter snow line in particular (~2200-2500 m) should be kept free from hydropower interventions in Uttarakhand.
6. That as per the directions of Hon’ble court, MoEF&CC also heard the project authorities and representatives of civil society on the meetings held on 15th, 27th , 29th Oct and 20th Nov 2014 and found that the project wise approach is not feasible and that carrying capacity study, strategic environmental assessment (SEA) and cumulative impact assessment (CIA) must be carried out before any decision could be taken.
7. In view of the above expert observations, recommendations, the present disastrous circumstances which renders the Bhagirathi and Alaknanda basin more fragile and the exercise done by MoEF&CC during the meetings on the directions of Hon’ble court, MoEF&CC has not found any reason to reconsider any of these projects individually.

**(22)** **Opinion** **on existing and under-construction HEPs:**

i. Major ecological damages have been recorded after the June-2013 disaster of Uttarakhand especially in Bhagirathi and Alaknanda river basins. Restoration and rehabilitation works are still in under process by the Govt. of Uttarakhand on a large scale. Potential threat of Landslide, cloudburst, land-subsidence, flash-floods has increased tremendously in past few years and many critical zones needs immediate treatment in these river valleys as mentioned by GSI and other reports. The expert body also mentioned that-“….The river bed profiles at Phata-Byung, Singoli-Bhatwari, Vishnuprayag and Srinagar HEPs have changed significantly. This requires a fresh analysis of the project hydrology and redesigning them if necessary. MoEF needs to conduct a formal review of the environmental damages at all the HEPs in Uttarakhand and prepare guidelines for restoration. Till then none of the projects should begin power production….”

ii. **Keeping in view the eco-sensitivity of Gangotri valley, three hydro projects were canceled and declaration of a stretch from Gaumukh to Uttarkashi as an Eco Sensitive Zone was proposed, which was later notified on 18.12.2012**.

 This was in tune with the point emphasized by planning commission task force report (G.B. Mukherji, 2010) for Indian Himalayan Region. It expressed the opinion in general that**-“… It also seems logical and essential to demarcate zones in the higher Himalayan region that are naturally unstable. In these areas, no hydropower projects should be allowed to be developed…..”.**

iii. Considering the eco-sensitivity of the river valleys of Uttarakhand, expert body has also recommended designation of Eco-Sensitive Zones for all rivers of Uttarakhand. Moreover, Chapter-9 of the Expert Body report is about the recommendations for Himalayan Policy in context of Uttarakhand. The problems, challenges, crisis and solutions in the context of Uttarakhand have been described in the draft of Himalayan Policy. This chapter talks about the wider future aspects and recommendations that have been made in view of proper balanced utilization of resources (Land, water, forest, Wilderness of Himalayas). This policy document also emphasizes the need of review of ongoing hydro projects, a systematic decommissioning of existing risky projects and Green Bonus for the green-developmental activities in river valleys for conservation of the ecological services provided by these Himalayan river valleys to the Nation.

1. Due to time limitations the EB was not able to address many other important aspects of the Himalayan region for which MoEF&CC feels that the following studies need to be carried out before proceeding with the under-construction and existing projects.

 **(23) Opinion on Hydro-geological Studies:**

1. The Himalaya is enriched with spring water sources which are important sources of drinking water & irrigation for local communities. Many anthropogenic activities (road construction, hydro power projects, etc) entail deforestation, blasting and tunneling have lead to adverse impacts on natural water springs. Therefore, the EB strongly recommends that a detailed study of the impacts of hydropower projects in terms of deforestation/tunneling/ blasting/reservoir formation on the hydrogeology of the area should be carried out.
2. A study on the role of large artificial reservoirs on local climate change and precipitation patterns with special reference to the Tehri dam reservoir.
3. Recent studies have highlighted serious concern about the Indian deltas, which are shrinking due to changes in river courses. The Ganga-Brahmaputra delta is also noted in this category. This seems to be a major issue in near future therefore EB recommend that the studies should be carried out regarding the impacts on sediment transportation due to projects existing on Himalayan rivers.

**(24) Opinion on Ecological Carrying Capacity study:**

i. “Ecological carrying capacity” of the heavily devastated Kedarnath (Mandakini) Valley. As it was observed that the 3 hydro project (Rambara, Phata-Byung, Singoli-Bhatwadi) sites was badly hit during the June-2013 disaster. Rambara (76Mw) project was proposed near the small town Rambara, just 7 Km. downstream of Kedarnath, this entire town was completely washed away with hundreds of death of the pilgrims staying over there, the geomorphology has completely changed and therefore the trekking route to Kedarnath was to be changed by govt. authorities. Under Construction Phata-Byung (76 Mw) and Singoli-Bhatwadi (99 Mw) projects were heavily damaged, river bed profile is completely changed due to heavy deposition of debris on the river bed. Many critical landslides and flash flood areas have been reported all along the Mandakini Valley from Kedarnath to Rudraprayag.

ii. Ecological carrying capacity of Bhagirathi, Alaknanda, Yamuna and Kali river valleys, needs to be assessed as these valleys are similarly affected and have faced repeated disasters in past few years.

**(25) Opinion on Socio-Cultural Impact assessment:**

 Issues pertaining to the cultural impacts of HEPs were raised in the written representations received from various communities but could not be adequately addressed by the EB due to lack of time. The impacts on age-old traditions associated with the flow of Ganga, impacts on holy sites, historical places and related socio-cultural degradation also need to be assessed to understand the development holistically. Therefore EB recommends that the Ministry of Culture along with the local representatives and spiritual leaders should undertake a comprehensive study of the cultural impacts of HEPs in the spiritually rich state of Uttarakhand.

**H.**

**26. Proceedings of Conference of 1916 at Hardwar :**

 This Ministry would also like to refer to the Conference held at Hardwar on the 18th & 19th December, 1916 wherein eminent people like Pandit Madan Mohan Malviya, leading citizen and the then Secretary of Government of PWD etc. participated regarding the new Ganges Canal Works, Hardwar. During the conference the major issue decided were that construction of the new Ganges Canal Works would guarantee uninterrupted flow of the Ganges and continuous thread of the stream would not be interfered with.

**I. PRAYERS**

**27.** Considering VARIOUS Reports that suggested that the Hydroelectric Power Projects as existed and under-construction have caused environmental degradation and aggravated the impact of floods as brought out in the EB Report and that 7 rivers namely Assi-Ganga,Birahi Ganga, Nayar, Rishi Ganga, Bal Ganga, Bhyunder Ganga and Dhauli Ganga need to be maintained as pristine and that the upper reaches above 2200 metres are extremely prone to landslides and are hot spots for sediments and that the Himalayas in Uttarakhand fall in seismic Zone IV &V, this Ministry suggests way forward and prays before this Hon’ble Court as under:

(i) The Government is very concerned at the disaster of Uttarakhand. It’s a great cause of pain, anguish and outrage that so many lives have been lost and properties damaged. Any decision on developmental projects especially hydropower projects should therefore, be on very strong and sound footings with scientific back up. Government recognizes the pressing need for rejuvenation of Ganga which is on the top most agenda of the Prime Minister and the Union Government. To maintain *aviral dhara* in the form of environmental flow is sacrosanct to ensure its ecological integrity and wholesomeness. Further damage to the river and surrounding bio-diversity will be detrimental in reviving and rejuvenating the Ganga River. In view of this Hon’ble Court’s directives to review the HEPs, this Ministry has undertaken the exercise and had a series of meetings with the developers. But, the suggested changes have not been found to be adequate

(ii) Three months time allotted to the EB was not found adequate. The EB with some additional members may carry out a cumulative impact assessment and carrying capacity study of these rivers to optimally work out and suggest as to how many HEPs, at which locations, their design and with what capacity could be allowed in a sustainable manner. The Study shall also factor further the 2013 tragedy, geological & tectonic instability, river fragmentation, possible damage caused by the existing HEPs both in the environment and lives and livelihood of the local population, effect of tunneling and blasting vis-a-vis shrinking of water springs, frequent cloudburst in the upper reaches of Ganga on account of climate change effect.

(iii) MoEF&CC proposes that an expert team comprising of members of already constituted Exert Body with a seismologist from Wadia Institute of Himalayan Geology, a social scientist from Tata Institute of Social Science, Mumbai, a climatologist and a glaciologist to jointly conduct a detailed study to establish the following impact:

1. Status of and vulnerability of the Himalayan Mountain in Uttarakhand from the point of view of seismological instability and fragility of the mountain.
2. Glacial movement including the status of paraglacial valley and there likely impacts on structures, constructed, under construction and planned.
3. Possibility of cloud burst in the light of changing climate and global warming.
4. Detailed social and economic impact of the existing, under construction and likely social impact from the planned HEPs in the state.
5. To establish and identify such locations / areas in the state which need to be designated as ‘no go’ areas with respect to HEP constructions taking into account the fragility, bio-diversity and tectonic status of Himalayas.
6. To advise location, size and design of future HEPs.
7. To advise suitable modification in design in the existing and under construction projects to ensure Ganga river rejuvenation and their least impact on environmental degradation.
8. Ecological carrying capacity of the disaster affected valleys of Uttarakhand.
9. Hydro-geological & Micro climate change studies including impacts on sediment transportation.
10. Setting up guidelines for disaster preparedness of Hydro Electric Projects in disaster prone Himalayan river valleys.

(iv) In order to have a thorough, comprehensive study and critical examination of the HEPS, this Group may be allowed a time period of at least 12 months. A comprehensive ToR would be prepared for this and this Hon’ble Court will be kept informed about the progress on bi-monthly basis.

(v) As far as six HEPs namely;Jhala koti (12.5 MW), Lata Tapovan (171 MW), Bhyunder ganga (24 MW), Kotlibhel 1A ( 195 MW), Alkananda Badrinath (300 MW) and Khirao ganga (4.5 MW) which have got certain clearances such as EC or/and FC may be referred to the above mentioned Committee to give reports on priority within three months on issues relating adequate longitudinal connectivity to ensure uninterrupted and continuous flow of biota, sediment and adequate water, detailed month wise e-flow provisions, detailed safety measures required during tunneling, muck disposal and transportation etc. and also cover measures to mitigate bio-diversity impact and overall design modifications to ensure the above. Status of these six projects is **appended**.

(vi) The team may submit the report directly to the Supreme Court, if so desired.

**DEPONENT**

**VERIFICATION:**

Verified at new Delhi on this 5th day of December, 2014, I, B. B. Barman, the above named Deponent do hereby solemnly affirm and state that the contents of Para 1 to 27 of my aforementioned affidavit are true and correct of my knowledge and belief, as well as the information received and nothing material has been concealed therefrom.

**DEPONENT**