COMMENTS ON

THE ENVIRONMENT IMPACT ASSESSMENT OF THE KARCHAM WANGTOO HEP

IN HIMACHAL PRADESH

Cake winning quote: "The Developmental activity utilising Sutlej waters was started way back, when Bhakra-Nangal Project was executed"

NEERI, Karcham Wangtoo EIA, Feb 2003, Page 1.3

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Comments on Environment Impact Assessment of the Karcham Wangtoo HEP

PROJECT 1000 MW HEP has been awarded to Jaypee Karcham Hydro Corp Ltd, New Delhi on Built Own Transfer basis by the Himachal Pradesh govt. It involves a 98 m high dam on Sutlej river at Karcham (Dist Kinnaur, Himachal Pradesh) to divert the flow of Sutlej into a 17.2 km long underground powerhouse tunnel that will end at Wangtoo. The implementation agreement for the project was entered into in Nov 1999.

The EIA The two volume final report dated Feb 2003 of the "Comprehensive EIA for of the 1000 MW Karcham Wangtoo HEP, Dist Kinnaur, Himachal Pradesh" has been done by National Environmental Engineering Research Institute (NEERI).

General A copy of the EIA could be obtained only on the eve of the public hearing for the KWP first slated for May 28, 2003. On demand by the affected people, the public hearing was postponed to June 18, 2003. This demand arose from the fact that the affected people were not even informed about the public hearing till May 26 2003. The authorities were clearly interested in quickly finishing off the ritual of public hearing. The local people have been raising their voice against the project for some time, and the NEERI EIA team was told about the same, but the EIA finds no mention of this.

The EIA generally seems to a shoddy, biased piece of work done to favour the project proponents. The source of most of the information in the EIA is the report of the project proponents and no attempt seems to have been made to verify or cross check the information. Thus, instead of being an independent assessment of the environment impacts of the project, the EIA turns out to be heavily biased in favour of the project proponents. This contention gets support from the analysis of the EIA as mentioned below.

The problems of the EIA can be divided into two broad categories: Errors of Omission and Commissions.

ERRORS OF OMISSIONS A number of crucial issues are totally left out by the EIA.

- **Cumulative Impacts** Sutlej river is already heavily dammed. The 300 MW Baspa HEP on Baspa river, upstream of the proposed KWP is nearing completion. The 1500 MW Nathpa Jhakri HEP just downstream of the proposed project is in advance stage of implementation. The 120 MW Sanjay Vidyut Pariyojana on Bhab river, a right bank tributary of Sutlej, just upstream of Nathpa is a existing project. Most celebrated dam on the river is the Bhakra dam completed in 1963. Downstream of Bhakra too there are structures on the river, including the Nangal diversion dam and Ropar barrage. The cumulative impact of a number of dams on a river is not simple addition of impacts of individual dams. The EIA, thus, should have looked at the cumulative impacts of the various dams on the river, including the proposed project, but EIA fails to do this.
- **Carrying Capacity Studies** Similarly, the EIA should have looked at the carrying capacity of the immediate environment and Sutlej basin as a whole regarding the impacts of all the various developments happening in the valley, including the proposed project, but EIA fails to do this.
- **Reservoir Induced Seismicity** The individual impact of KWP and cumulative impact of dams in the region on the already seismically active region is not mentioned. The contention of the EIA that this is not required for a run of the river project (a rather stretchable concept) is not supported by the EIA notification.
- **Disaster Management Plan** The EIA does not include a disaster management plan. At one place the EIA report just mentions that DMP is not required for run of the river project, which is not true and is not supported by any legal basis. The EIA notification of MEF is clear that DMP is required for all such projects. On page 9.25, Rs 1.18 crores has been made for some items for "Provision of warning system in case of dam break" as part of "cost for environmental management and monitoring", but without full dam break analysis this is of little meaning.

- **Flood Risk Assessment** The Sutlej river has seen a number of severe events of sharp and high floods, including one in 1988, 1993, 1997, 2000 (see Annexure for one narrative of the flood damages and box below about Parliamentary discussion on Sutlej floods of 2000). The upstream Baspa Project and the downstream NJP were severely damaged by the last two of these events. Not taking this risk into the assessment could prove very costly, as is evident from these experiences. This makes the EIA incomplete. The Design Flood section on p 4.25 does not mention these flood events.

Parliament Question Answer on
The Mysterious Sutlej Floods of August 2000

In response to an unstarred Question (No 3615) by Shri Suresh Chandel, the Union Water Resources Minister Shri Arjun Charan Sethi informed the Parliament on April 7, 2003, as follows:

"Attempts made to ascertain the cause of unprecedented flash flood which occurred in the river Sutlej in August 2000 indicated that there were no corresponding wide spread rains in the upper catchment in the Indian side. It was therefore conjectured that the flash flood could be due to some cloud burst in the upper catchment or a lake burst due to some avalanche in the Tibet region. The National Remote Sensing Agency Hyderabad in its studies suggested that there could be high possibility of cloud burst in Tibet region causing heavy rainfall. Also water accumulation due to some isolated blockades adding to the heavy rainfall is also one possibility of heavy floods. An inter–ministerial team which visited the flash flood sites from 7th August to 9th August observed that the flash flood, more likely, could have been caused by failure of water impounding system in Tibet resulting in a way of water racing down the course of river.

The Govt of India entered into a dialogue with the Govt of China to explore the possibility of transfer of hydrological information for the rivers originating in China so that advance warning is issued and such catastrophic incidents could be avoided. As a consequence to this, a Memorandum of Understanding for sharing of hydrological information for river Brahmaputra has been signed with the Government of China but regarding sharing of data for river Sutlej, presently no such agreement has been arrived at."

- **Peak Precipitation events** The EIA on page 4.15 mentions, "one and two day storm events depositing 40-140 mm of rain have been recorded". In reality, in 1988, between Sept 23 and 26, 436 mm of precipitation is known to have occurred in the Sutlej valley (see *Winning the Future* by B G Verghese, Konark publishers, 1994, p 24). On Sept 26, 1988, 85 mm precipitation is known to have occurred in a span of 45 mints. The impact of such storms on the susceptibility of the soils and slopes in the region, in view of the large number of big projects being constructed in the same area could be very serious. The EIA has not factored this into its assessment. It is clear from this that the EIA team has either not done its work properly or is just trying to underestimate the factors. In either case, EIA is not useful.
- **Downstream flows** It is clear from the EIA that in the non-monsoon months, there will be no flow in the river downstream of the dam. The EIA does not assess or mention the need for minimum downstream flows required in the river from the dam site to the point some 17.5 km downstream where the flow enters the rivers. It does not help by saying that this assessment and provision will be done at a latter stage, as is done in the EIA. That exercise has to be done as part of EIA and integrated into the project operation as that will also have impact on the power benefits from the project.
- **Baseline information on people's resource base** The EIA does not clearly mention the total resource base of the affected people and how all that will be compensated, including the resources of rivers, streams, forest, land and so on.
- **World Commission on Dams Guidelines** The EIA report does not mention the most respected guidelines on dams related issues available today, and accepted across stakeholders, namely those from the WCD and how the project follows or does not follow these guidelines.
- **References** The EIA report does not give specific references for most of the facts and figures given, under the circumstances it becomes difficult to assess the authenticity and to verify the figures.

ERRORS OF COMMISSIONS

Objective of EIA Study misrepresented The EIA report on page 1-12 states "The objective of study is to ensure that the development options under consideration in the KWP (1000 MW) are environmentally sound and sustainable". This is a misrepresentation of the objective of the EIA study as objective should include full assessment of environmental costs, benefits and impacts of the proposal and its options *to decide* if the project should go ahead and if so in what form. The EIA has to be a decision making tool and not just a step to justify the decision of the project.

- The EIA, the EMP and the inputs from public consultation process has to be part of the Detailed project report and techno economic feasibility of the project. That is clearly not the case here, as EIA says on page 1-2, "The DPR has been submitted to GOHP by M/s JIL indicating the techno-economic feasibility of the project", where EIA, EMP or inputs from the public consultation clearly have no place.
- Similarly, regarding scope of the project, it is stated on page 1-13 that the scope includes comparison of the project impacts with impacts without the project. This is an incorrect presentation. The scope should include looking at all options of future scenarios and not just with and without project.
- Moreover, on page 1-13 it is mentioned that EMP is to include strategies for minimising adverse impacts. This again is wrong presentation as EMP is supposed to include *avoiding*, minimising *and mitigating* the impacts.

Basis for demarcation of study area? The EIA on page 1-12 and elsewhere says that the study area is bound by 15 km upstream of Karcham, nine km upstream on Baspa, five km downstream of Wangtoo and five km on each side of Sutlej and Baspa within Sutlej basin. But no justification is given for this demarcation. The impact of any such big intervention is bound to be there across the valley and the EIA is thus an incomplete exercise.

EIA biased in favour of large hydro projects There are number of instances where EIA shows its biased in favour of large dam projects.

- At a number of places (e.g. page 1-1, 1-3) the EIA claims that "The Govt of India and the Govt of Himachal Pradesh have identified Sutlej river as one of the major sources of hydroelectric power" without giving any reference for source of this contention. One is not aware of such a statement from either of the govts mentioned here.
- The statement on page 1-3: "The Developmental activity utilising Sutlej waters was started way back, when Bhakra-Nangal Project was executed" clearly shows the attitude of the EIA agency in what can be called Development activity. According the NEERI, use of the Sutlej waters for generations by the people staying in the valley is not called development activity and only construction of a large dam is development activity!
- Only known small HEPs in the Sutlej valley are the Rongtong (2 MW), Nogli-I (3 MW), Chaba (2.75 MW), Nauti (4 MW), Rukti (1.5 MW) and Ghanvi (22.5 MW). The potential (as per CEA report of June 1997) of only the Small HEPs in Sutlej basin alone is 313.5 MW, a very miniscule part of which has been harvested and practically no projects being under implementation. This does not include the potential from mini or micro hydro projects, which has not even been assessed. Not mentioning any of these facts shows the bias of the EIA agency in favour of large projects.
- Blanket statements like "the hydropower development in Himachal Pradesh needs a renewed thrust" and "it is more economical for development of hydropower than thermal power" (see page 1-9 and 1-10) are neither justified nor appropriate to come from an EIA agency.
- Statement of P 1-10 that "the river Sutlej has a hydel potential of 9226.75 MW out of which only 1332.75 MW has so far been harnessed" clearly shows the bias of the EIA agency. Similar is the case of para 3.2 (here even the figures are outdated) where EIA is trying to justify the project! This is written as if the very existence of potential is good enough reason to harness it! This goes totally against the very spirit of EIA exercise.

EIA biased in favour of the Project and the Project Sponsors The EIA includes rather large portions about the activities of the project proponents, a lot of which (e.g. activities in hotel and cement business) is irrelevant. Moreover, the way the information is presented (saying e.g. that the project proponents are "leading engineering company", that "it specialises in execution of HEPs") clearly shows the bias of the EIA agency for the project proponent, putting question mark over EIA agency's independence. Some of the information given is even wrong, e.g. saying that Indira Sarovar Project (wrong name, correct name is Indira Sagar Project) in MP is completed, when the project is far from completed.

- The statement on page 3-5 "It is, therefore, essential that the implementation of the project, which is techno-economically viable, is commenced as early as possible" clearly shows the predetermined conclusion and bias of the EIA agency for the project. The EIA agency, that is supposed to assess if the project impacts are acceptable and if the project should go ahead, is saying this at the outset!
- On page 5.1, the EIA says, "In order to use the maximum valley potential…". This is a strange statement as objective should be to assess the optimum benefits and not maximum benefits. In any case, it is not EIA's role to look for maximising of benefits. This again shows the bias of the EIA agency for the project. On that same page EIA goes on to say, "In this stretch of the river, high dams are not appropriate since chances of flooding large populated areas cannot be ruled out. Nevertheless, an acceptable reservoir must have sufficient pondage capacity to produce peaking power for at least four hours per day." On what basis the EIA arrives at these statements is unclear. In any case, is it appropriate for EIA to make such a statement?
- On page 7.2 a patently wrong statement is made by EIA agency, "In all, there was no objection to the Karcham-Wangtoo hydroelectric project aimed at generating electricity and distribution to northern grid and the State Govt". This is wrong because a very large number of affected people had expressed their opposition to the project when EIA team visited the villages. The EIA team also accepts elsewhere that at least 26% of people they interviewed opposed the project.
- On page 8.3 the EIA makes another unjustifiable statement, "The project area does not have any environmentally sensitive areas". Particularly when EIA report elsewhere mentions how the project is in fragile Himalayan region that is prone to seismic activity.
- On page 9.1 EIA says, "In the background of the comprehensive environmental impact assessment studies, public consultation and information campaign has been organised at the earliest stage of the project *to dispel misgivings about the project and to successfully overcome the problem, if any, of non-acceptability*". This precisely *is not* the role of an EIA agency to dispel misgivings and over the problem of non acceptability". Greater evidence of non impartiality of EIA agency would be difficult to find.

Justifications unjustified The EIA report tries to justify the taking up of the project, which it should not be doing in any case. Moreover many of the facts and figures it uses are factually wrong, tendentious misrepresentation, outdated or estimates that have already proved to be wrong.

- The EIA on page 1-9 says that in 1997-8, the peaking shortage in the country was 19%, where as the correct figures is only 11.3%, as given on page 8 of annual report of Union Ministry of Power. This is clearly an attempt to justify the project with the use of **wrong figures**.
- On page 1-9 EIA says the energy requirement in HP is likely to increase from 1487 MU in 1990-1 to 4576 MU in 1999-2000. The correct figure for projection for 1999-2000 as per 16th EPS of CEA is 3113 MU, much lower than the exaggerated figure given by EIA. Similarly on the same page, EIA says that peak load demand in HP would go up from 325 MW to 939 MW in the same period, when the correct figure as per 16th EPS of CEA for peak load demand in 1999-2000 is much lower at 610 MW. Thus, with the use of **wrong figures**, the EIA valiantly tries to justify the project, which it should not be doing in any case.
- The EIA report dated Feb 2003 uses outdated and exaggerated figures to justify the need for KWP. Thus, for example, while the report could have given the figures of actual peak demand, it gives figures from 16th EPS of CEA, which have already proved to be exaggerated, as seen below. Actual peak demand in 1997-98 as ministry of Power Annual report of 2002-03 was 65435 MW.

(MW)

	Peak Demand Projected	Actual Peak Demand	Projected Rise above 1997-98 level	Actual Rise above 1997-98 level	% Exaggeration in projected Demand
1999-2000	75012	72269	9577	6834	40.14
2000-01	79856	78037	14421	12602	14.43
2001-02	85132	78441	19697	13006	51.45
2002-03	90510	81492	25075	16057	56.16

It is clear from the above that the figures projected by 16th EPS of CEA are already proved to be highly exaggerated and the EIA report could have used actual demand figures to give clear picture instead of using outdated figures to justify the project.

- As a matter of fact, the CEA projections of power demands have consistently proved to be overestimations. To give another instance, in 1987, CEA projected that in 1995-6 (see the World Bank's Staff Appraisal Report for NJP, p 23), peak load demand in Northern Region will be 25600 MW (Actual peak demand was 15937 MW and that figure of peak load demand is yet to be reached even in 2003) and energy demand will be 131 000 MU when actual demand in 1995-6 was 105836 MU.
- The EIA repeatedly says that KWP is required to correct the hydro-thermal balance in the power sector and that more hydro project like KWP are required for this. What it does not state is that for at least half the year KWP will be working as base load station and not peak load station. Secondly, as far as Himachal Pradesh is concerned, out of total installed capacity in HP of 764.8 MW (as per Annual Report of Ministry of Power for 2002-3, possibly includes only HP share of the central sector stations), Hydro constitutes 634.57 MW. This means the hydro-thermal power sector balance in HP is hugely in favour of Hydro and HP does not need more hydropower station for its own consumption. Moreover, as the World Bank's Project Implementation Report of the NJP (Sept 2002) makes it clear, HP is power surplus most of the time of the year and is a power exporter.

Benefits misrepresented, over estimated Throughout the EIA report (e.g. on page 3-7) it said that KWP "will operate as a peaking station". If one looks at the water availability situation and power generation claims from KWP, it is clear that the project plans to operate at full capacity as long as water is available for the same, which means it will operate as base load station during April-Sept period. And operate as peaking station only in the six non-monsoon months during Oct to March. Without such an operation the project cannot generate the 4228.5 MU as claimed. In fact, the NJP, just downstream of KWP is to operate as base load station during April-Sept and peak load station during Oct-March. By giving wrong representation of the operation of the project, the EIA agency has either shown its ignorance or bias or both.

- It is stated on page 3-8 that the project is designed to provide peak power for four hours based on assumption that minimum flow at 90% dependability will be 87.03 cumecs. In reality, if we look at the 90% dependable 10 day flow data given in Table 4.13, we see that the flow goes below 87.03 cumecs for three months between Dec 20 and March 20. Thus during these three months, the project won't be able to supply even the 4 hour peak generation. This is not even stated in the EIA.
- On page 3-15 it is mentioned that power station will be shut down in monsoon months when river is carrying heavy silt load. However, it is not mentioned how long this will be required and what impact this will have on the power generation at the project. Not including this will clearly show power generation higher than what is likely to be the real power generation.
- The World Bank's Staff Appraisal Report for the immediately downstream Nathpa Jhakri HEP says on page 37, "Heavy sediment loads carried by the Sutlej river, particularly during monsoon, may result in frequency and costs of equipment and works maintenance higher than average. Excessive siltation of the forebay pond might also restrict full load operating time". The same will be applicable to KWP, but the EIA makes not mention of this risk and the consequent reduction in project benefits.

Will KWP drown Baspa II components in monsoon? "The maximum pond level for the reservoir has been kept at EL 1810 m, wchi is the tailwater level of Baspa II" as stated on page 3-7. Now nowhere in the EIA is it stated what will the maximum water level at the dam during monsoon in general and during highest flood peaks. It cannot be the same as max pond level of EL 1810 m, as water is bound to need space above that level to flow over the dam. Moreover, water will be flowing in a sloping profile as we go upstream from the dam, thus if the water level at upstream points will be higher than the maximum water level, which is called the backwater effects. The Baspa II tailrace is around 1.6 km from the KWP dam axis. Thus if max pond level at dam site is EL 1810 m, than the level of water upstream will be higher. Does this mean, the KWP will drown components of Baspa II in monsoon? The EIA does not throw any light on this question and creates doubts if the KWP is properly designed.

The doubt is further strengthened as the water profile behind the dam at EL 1810 m in figures 3.4 and 3.5 are shown horizontal, which is not the case generally and water profile generally is sloping up in the upstream direction. Those figures in fact show that at the upstream most point of the reservoir, the silt level will be right at EL 1810 m. This may not be case all across the river bed at the point as shown in figures 3.4 and 3.5, but this further raises the doubt if the water level would go above 1810 m during monsoon and during peak flood points.

Impact of Baspa operation and impact on NJP benefits The EIA does not mention as to what will be impact of operation of Baspa on the water inflow into KWP in non-monsoon months, nor does it mention what will be the impact of KWP operation on the NJP benefits. On the contrary, the EIA claims (page 1-3) that "the project upstream as well as downstream of it are also run of the river schemes, which will not affect the water availability and utilisation for KWP", which is wrong.

Questionable Hydrology: Hydrology figures are at the very basis of the viability of hydropower projects. Unfortunately, the EIA agency has, like in case of all other information, depended on project proponents for this information. However, in view of available information, the figures given in the EIA seems doubtful. Firstly, the 90% dependability inflow figure at Karcham as given in the report is 98741 cumec-day or 8531.2 MCM. The catchment at Karcham is 48755 sq km. The 90% dependability inflow figure given at Nathpa as given in the World Bank's Staff Appraisal Report for the Nathpa Jhakri Project on the other hand is 7690 MCM. Now the point to note is that NJP is a downstream project and NJP's catchment area at 49820 sq km is larger than and inclusive of the KWP catchment. Moreover, the World Bank figure is based on 56 years of hydrology data, when KWP figure is based on just 34 year data as given in table 4.14. Thus the hydrology figures given in the EIA are highly doubtful and this raises the question about the authenticity of the data and also viability of the project. The fact that EIA team is just reproducing the project proponent's data without verifying or cross checking with independent sources once again raises doubts about the objectiveness of the EIA.

- Moreover, at different places in the EIA, hydrology figures given are for different sets of years. So while the 90% and 50% dependability figures given are from 34 year data, the monthly discharge given in table 4.15 is for 28 year data. And very strangely, the data given in table 4.13 and table 4.15 for 90% and 50% dependability years do not even match. This raises further doubts about the authenticity of the data.
- Then in Annex 3.1, the 90% dependability figure given at 141 144 cumec day, that is 12217.9 MCM does not match with the one given in table 4.14. Similarly, the 50% dependability figure given at 112 543 cumec day in Annex 3.1 does not mach with the one given in table 4.14. And the strangest this about these figures in Annex 3.1 is that the 50% dependability figure is lower than 90% dependability figure, a mathematical impossibility! The hydrology figures given in the whole EIA, thus stands totally discredited and that puts a big question mark over the very viability of the project.

Contradictory claims about downstream releases On page 3-9 of the EIA it is stated that "in non-monsoon period al the discharge of the river Sutlej will be diverted to the head race tunnel". This means that there will be *no water* release downstream of the dam.

- On page 6.13 EIA claims, "However, a minimum flow of water as approved by MEF shall be maintained immediately downstream of the dam during lean season to maintain the riverine ecology with

incorporation of operational mechanism in the dam design so as to allow minimum flow downstream of the dam." But what is the minimum flow required and what is the mechanism in place to assure that? The answer to second part of this question is not given, whereas the answer to the first part, it is admitted below, is yet to be found!

- On page 6.13 EIA says, "The project proponent would sponsor a project, to study the optimum quantity of water to be released to maintain the downstream ecology, to be conducted by the NEERI, Nagpur and the HPSEB&PCB and the outcome of the study would be applied for this project". While this is admission of the fact that no study of the releases required for the downstream ecology has been done, what is shocking is that EIA does not say that this should have been done as part of EIA or before the EIA. How can the EIA be complete without this? Moreover, it seems NEERI, the EIA agency, is mobilising further contracts for itself while doing the EIA, clearly an unethical practice, to say the least.
- On page 6.14 EIA says about the discharge of silt slurry from the desilting chambers, "The silt slurry contains suspended solids of 500 to 10 000 mg/L in a flow of 100 cumecs. The water with such high-suspended solids has little light penetration with the reduction in the photosynthetic activities. The Sutlej river will have turbidity level upto the point of confluence of tail race discharge and may result in an adverse impact on the aquatic ecology." The next sentence is quite illogical to follow from here, "Hence, the impact due to the disposal of silt slurry from the desilting chambers in the river Sutlej is expected to be marginal during non-monsoon in view of contribution of khads flow between dam and tail race discharge point." Particularly when the cumulative discharge from ALL the khads till tail race tunnel is just 5.52 cumecs. What is stranger is that while in most of the document the water flow is given in cumecs, the khad flows on page 6.13, all of a sudden is given in cusecs, possibly to give an appearance of bigger figure flows?
- In Case of the downstream NJP, though that project also said that minimum downstream flows will be maintained, thirteen years after the World Bank load was given, the mechanism to ensure was not in place. This is what the Project Implementation Report of Sept. 2002 said, "NJPC is holding consultative meetings with the local communities to ensure that their needs in the deep unpopulated gorge of the river have been understood, and to establish a plan for the operation of the sluice gates in the event that they ever need to be opened to augment the streams and maintain a minimum level of flow in the river bed".

Can KWP regulate flood discharges of Sutlej? The EIA on page 6.12 claims, "However, the flood discharge during the monsoon months will be regulated due to construction of the dam". Then again on page 8.6 this claim is repeated, "Due to reservoir impoundment flood peaks in river Sutlej will get moderated". This is a shocking statement when the EIA elsewhere has accepted that there is little space in KWP reservoir to in any way affect flood discharges. How can a 5.5 MCM reservoir have impact on floods that reservoir space is equivalent of a few minutes of flow when river is in floods and when the reservoir is to be always kept full in monsoon to achieve maximum power production, as is evident from projected power generation figures in the EIA?

Questionable assumptions about Siltation Looking at the figures 3.4 and 3.5 and various statements in the EIA, it is clear that EIA assumes that the silt profile from farthest point of the reservoir to the dam axis will be in a straight-line. However, this is rarely the case. The coarser silt settling in the upstream portion will mean that the silt profile will be more like a curve rather than a straight-line. This would also mean that more of the live storage will be taken up by the silt than assumed, affecting the project performance during the non-monsoon months at least.

- On page 3-9 it is stated, "In non-monsoon period, the river flow will be comparatively clear and flushing the sediment through the sedimentation chamber will not be required". It is not clear what is the basis of this assumption, but if this is proved to be wrong, as is the case at least during the initial snow melt period in the summer when flow rate too is low, the project will not perform as planned and benefits will be lower that projected.
- On page 4.25 it is stated "Thus, it can be concluded with the implementation of proper flushing arrangements of desilting chamber, the reservoir is not expected to have major sedimentation risks". This again is an assumption, the correctness of which will decide the proper operation of the project.

- The Assumption of EIA that the Sutlej carries little silt in non monsoon months is suspect. The dbout gets strength from this quote from the World Bank Project Implementation Report for NJP (Sept 2002), "…Bank staff advised that in view of the heavy, silk-laden water that the Sutluj River carries for most of the year…"

Catchment Area Treatment It is stated on page 6.14 that CAT will be done by the project proponents in the direct draining catchment. But the trouble is that the silt is contributed by whole catchment and not just direct draining catchment. In fact, since indirectly draining catchment area is much larger in proportion, the treatment of directly draining area, *even if* done, will have little impact on the silt load. As far as Baspa catchment is concerned, the Baspa II dam will be releasing all the silt going into that dam, into the KWP.

- Nowhere in the EIA report is it made clear as to how much land will be treated in what way, what is the basis of the decision and how it will be assured that what is necessary and promised is done?
- Moreover, there has been many frauds in the past of the CAT being done on paper and nothing happening on ground. Without clearly defined and transparent mechanism, there is little possibility of CAT being done. By not giving any of the details of CAT, the EIA agency has again abdicated its responsibility and once again shown the bias towards the project.
- The way CAT is habitually not implemented is evident from the nearby World Bank Funded NJP. The project for which WB signed agreements in 1989, had still not implemented catchment Area Treatment in September 2002 as per the Project Implementation Report that says, "Implementation of the catchments area treatment plan remains a major challenge".

Eutrophication and Green House Gas Emissions While the EIA accepts creation of anaerobic conditions in the lower layers of the reservoir and higher nutrient availability leading to aquatic plant growth on page 6.15, the EIA, typically, goes on to conclude that the magnitude of the impact will "not expected to be significant" and it would be marginal. This use of word marginal in the EIA when talking about impacts is quite frequent and without basis or justification in most places, as in this case.

Doubts about Reservoir stability Zones of debris accumulation and clearly visible sites of land slides on both banks of Baspa river (see page 4.6) and Sutlej river (see page 4.8) within KWP reservoir raises questions if the reservoir will be stable. Moreover the change in microclimate with the coming of reservoir and also with the project related activities would only add to the instability and possibilities of landslides into the reservoir. On page 4.9, the EIA does mention that the landslide at Urni in the past blocked the path of the river in the past. Increased activities on the road through the debris would only further destabilise the surrounding slopes. The EIA report does not clarify what will be implications of all this on the project and surroundings.

- In fact the EIA goes on to mention on page 4-9 that "The whole area is unstable and may slide during continuous rains and under earthquake conditions and block the road for considerable period". However, the EIA does not draw out the implications of this, nor does it mention the impact of this on the project decision and surroundings.
- **Impact on surrounding communities not assessed** The impacts of increased instability and landslides on the surrounding communities are neither assessed nor any mitigation measures mentioned. The project activities are bound to lead to increased landslides, as has happened in case of NJP and Baspa II projects in the nearby areas. The area with severe erosion intensities and also with severe and very severe landslide potential zones are just near the project site, as mentioned on page 4.46 and 4.47.

Engineering geology and Seismology The EIA is clearly trying to underestimate the significance of seismic factor. Firstly it is known, as listed on page 4.9-10 and table 4.1 that the region has been an active seismic zone having experienced earthquake of upto 8 on Ritcher scale. Moreover, in 1975, Kinnaur itself experienced an earthquake of 6.8. The EIA also notes on page 4.11 that the concentration of seismic events in the NS direction in the region is very much pronounced. And yet the EIA without any substantiation says that the effective peak ground horizontal acceleration of 0.115 g may be assumed for the project.

- The height of the dam mentioned in Annex 4.1 on engineering geology is 90 m, when the dam height above deepest foundation level is 98 m. This raises questions if the assessment of engineering geology is correct.
- The recommendations of engineering geology on page 6.31 and in Annex 4.1 includes suggestions of further exploration to be done *before* construction is started. Again on page 6.31 it is mentioned, "it is desirable to carry out dynamic analysis for the final design in order to estimate deformations due to probable future earthquakes". This clearly means that the EIA on this aspect too is incomplete and as such EIA could not have given a go ahead to the project.
- On page 6.31 it is mentioned that "Maximum Credible Earthquake for the site to be of magnitude 5.0 at an epicentral distance of 150 km from the site focal depth as 150 km". However, what is the basis for this conclusion when the site is known to have experienced an earthquake of 6.8 just 28 years ago?
- Moreover, the EIA report does not mention or assess the impact of KWP and other HEPs and its building activities on the seismic activity in the region.
- As per World Bank Project Implementation Report for NJP (Sept 2002), in case of NJP, "Anti-seismic design of the dam has been carried out according to Indian norms, using an acceleration of 0.29g at crest level". Why should the norms be any different for KWP?

Seismic and Geology Apsects:
Comments by Sreedhar Ramamurthi, Academy of Mountain Environics, New Delhi

1) The road disruption will be a significant impact to people upstream. The Highway even if temporarily disrupted will cause real losses to apple growers. The EIA does not even mention such impacts.
2} Blasting for tunnels will definitely affect the existing structures in the adjoining settlements. House etc may develop cracks, fractures. It has been the case in several projects. The EIA should have included this aspect and also possible cautionary measures and also compensatory measures.
3) Muck disposal will affect significant area of the region, for example the 6838823 cu m of muck estimates (p 4.38) even dumping to a height of 10 m will mean a huge amount of land almost 68 sq km. Even if one were to believe that the project authorities will use some of the debris as claimed, the project would still need an additional area of 33.37 sq km over and above area mentioned in table 4.37. Even the area mentioned in table 4.37 may not be able to accommodate all the debris mentioned there as in some case the areas are expected to accommodate much more than 10 m height of debris.
4) The question of seismicity has been glossed. The seismic records from Wadia Institute for Himalayan Geology has been indicating a swarm of EQs in the region. The project proponents will need to give more info on specific studies undertaken in the region.

Whole sections lifted from another document? Some sections in the report give an impression that they are straight away lifted from another document. For example, section 1.4 on page 9-10 gives an impression that this is lifted from a document of early nineties. For example, the section says that construction of Baspa II and Nathpa Jhakri has been taken up *recently*, when these projects have been taken up many years back and in fact elsewhere claimed in the report that they are nearing completion!

Incorrect figures, contradictions

- On page 3-2 EIA mentions that total hydropower potential of HP is 18715 MW. This is wrong on two counts. Firstly, this does not include the potential from micro, mini and small HEPs, which is not even properly assessed. As per CEA study of June 1997, the total potential of just small HEPs in HP is 1186 MW. Secondly, as per HPSEB website, the total hydro potential of HP is 20376 MW.
- Regarding hydro potential of Sutlej basin, the EIA says on page 1.10 that the figure is 9226.75 MW, where as on page 3.2 it says the potential is 6272 MW. HPSEB website says the potential is 8633.75 MW, out of which 1350.75 MW has been harnessed.

SOCIAL ASPECTS

Some serious problems with the way social issues are dealt in the EIA include the following.

- **Land required for the project** While it is stated on page 4.36 that that 155.29 Ha land will be required for the project, on page 4.37 it is stated that an additional 184.1 Ha will be required for the project, which will include forest and govt land, but it is not clear how much for forest and govt land this will include. Moreover, nothing is known about the user status of this additional land and what will be the impact on people of use of this land. The in-principle forest clearance letter mentions that the project proponent "will take all measures to contain subsidence over 31.1414 Ha forest land required for underground works", but EIA has nothing as to what will be the impact of project on this or other land. Thus, the EIA is at best vague and confusing about the land required for the project.
- **Violation of in-principle forest clearance** Moreover, while conditional forest clearance clearly says that the project authorities will do their best to contain subsidence over the additional 31. 1414 Ha of land, the EIA on page 4.37 mentions that additional land will be used for levelling by filling muck etc. Thus the EIA already clearly mentions the intentions of th project authorities of violating the conditions of in-principal forest clearance!
- **Land acquisition before clearances** It is mentioned on page 1-11 of the EIA that notification under section 4, 6 and 7 of the land acquisition act has already been issued, even before the project gets environmental clearance. Does this mean that the EIA, the public hearing and the environmental clearance process are only conducted for the sake of conducting them and they do not have any bearing on the decision of going ahead with the project, which is a foregone conclusion? This is action is totally against the spirit of the process and is unacceptable.
- **Contradictory FRL figures** While most of the report gives 1810 m as FRL of the project, on page 3.37 the same is mentioned *twice* as 1812 m. Two metres of additional reservoir height would mean very significant increase in the land going under submergence and report does not give this at various levels.
- **Maximum Water Level not stated** The EIA report does not state the maximum water level that will be attained behind the dam and how much land will be submerged at that level and how many people will be affected.
- **Contradictory submergence figures** On page 3.30 it is mentioned that total land to go under submergence is 55.97 ha, whereas on page 3.7 the figure given is 58.8 Ha. Such contradictions do not inspire much confidence in the EIA report. Moreover the source of this information is project proponent, who would have vested interest in underestimating the figures. Such dependence on the project proponent for crucial impacts of the project go against the independence and objectivity required in impact assessment.
- **Schedule areas** The EIA does not even mention that the Kinnaur villages being under schedule areas, no decision like the taken up of the project can be taken without the affected villages giving their consent through gramsabha decisions and that no gramsabha can take a decision unless they are told about full impacts of the project. As a matter of fact the EIA and EMP should have been provided in Hindi to the affected villages.
- **Socio-economic Survey** The Socio economic survey mentioned on page 4.57 is highly inadequate and does not even mention that several villages had given memorandum to the NEERI team that they are against the project and were in fact agitating against the project.
- **R&R Package** The R&R package mentioned in the EIA is vague and confusing at best. In any case the provisions therein are hardly just and minimum required provisions should follow the existing provisions like those in Sardar Sarovar Project, where each affected family (family defined as in SSP policy) would get a minimum of 2 Ha of irrigated land.
- **No clear picture on families affected** At various places in the EIA different figures are given regarding the number of families that may be affected due to the project. For example on page 6.4 it is stated, "31 families would be affected due to land, house and shop acquisition totalling to 77 PAPs. When the land acquisition takes place six families would be rendered homeless".
- **"No R&R involved"?** On page 6.5 of EIA it is stated, "No site is identified since the private landowners are not oustees but are only affected persons as they have their land and houses elsewhere. Hence no R&R of PAPs is involved due to land acquisition. In addition, no infrastructure facilities will be provided since, the project proponent would pay the cost and compensation only". This is indeed a shocking statement that no R&R is involved and no infrastructure facilities will be provided. If that is the case then why is all the discussion given at various places about the R&R package?

- The Monitoring and implementation committee for R&R suggested on page 9.4 has no place for affected people!
- **Disruption of Drinking Water Sources** The EIA states on page 4.52 that "Disruption of drinking water sources along head race tunnel alignment" could be one of the relevant factors, but there is no mention anywhere as to how many people are at risk in this way, what measures are planned to avoid this and what will be the obligation of the project proponents if the drinking water sources are disrupted. Again on page 6.13-14, it is stated, "However, the reconnaissance survey of water resources in villages along the head race tunnel alignment by the team consisting of Panchayat members, officials of I&PH Dept, and the project proponent is essential before commencement of the project work". However, should not this be done as part of EIA? How can EIA be complete without assessment of all such work?
- **Possible impacts not mentioned** The EIA does not even mention, assess or discuss some of the possible impact of the project on the people, including the impact due to noise, dust and vibrations due to use of explosives, due to possible landslides, due to dumping of debris, impact on apple farms due to change in micro climate, etc.

Biological Impact Assessment:
Comments by Seema Bhatt

At the outset it should be stated that the Biological Environment section of the EIA is rather poor. The EIA does not properly assess the impact of the project on biological environment. Many of the statements made are fairly arbitrary with no data to support them.

Section 1.9. The Scope of Work does not include assessment as to how the project will impact the livelihoods of people who depend on the area for sustenance. Also, the Section discusses (under Terrestrial) the assessment of potential impacts on protected areas, but not on the overall biodiversity of the region.

On page 4.37 it is mentioned that "The forest area involved in this project does not cover extensive forest or trees or endangered species". This statement is of EIA is contradicted at a latter stage (e.g. on page 6.24) when it is stated that the project will involved clear felling of 1191 trees.

Page 4-48. The report indicates that species of the study area are "neither endemic nor rare or endangered". However this is no justification for destroying the same. The area still represents a significant ecosystem and the impacts of the project needs to be assessed and clearly stated. There are people who depend on the area. Also there are important medicinal plants of tremendous value in the area, which incidentally the report does not even mention.

Page 4.49. The report states that the Rupi-Bhaba wildlife sanctuary is 3.5 km away and hence will not be impacted by the area of operation. There is no basis for making such a statement. Animals do move. They donot necessarily stay within the sanctuary area and any disturbance in the area will have an impact on them. Further, on the same page, the report lists some very important faunal species but goes on to state that these will not be impacted by the project without any backup data. Moreover the statement that sanctuary does not fall within the study area is not correct as study area includes 5 km on either side of Sutlej and Baspa rivers as mentioned in the EIA.

On page 4.49 it is mentioned that the area of Rupi-Bhaba Wildlife Sanctuary was reduced from 650 sq km to 503 sq km on Sept 7, 2001, just when the EIA was underway. Why was this done and does the excluded area lie around the project site? The EIA does not answer this crucial question.

On page 4.51 it is mentioned, "the checklist of the fishes available in the river has not yet been prepared." However, this exactly what the EIA should do and state what fishes are available in the river. Then on page 4.52 it is stated, "In view of rocky bottom of the river bed and high flow of the river water, sediment

samples could not be collected. In general, invertebrates population is not expected much in such kind of habitat". This is an assumption and an EIA cannot be a statement of assumption!

Further, on page 4.52 it is stated, "However, the biomonitoring studies of the Sutlej river will be conducted from the HPSEP&PCB, Shimla to establish the baseline status and the project proponent would sponsor the studies". But such studies should actually be part of EIA and without which EIA cannot even be considered complete.

Page 6.19, the EIA says, "The debris generated during road construction will be used for filling and levelling the road surface. The extra material which remains unutilised may roll down along the slope and gets accumulated on slopes. This in turn is likely to damage the flora along the slopes". Should this practice of allowing the excess debris to roll down the slopes be accepted in fragile, land slide prone areas? The uncritical acceptance by EIA agency of this environmentally damaging practice of the project proponent again shows the callousness of the EIA agency and its bias in favour of the project proponent.

Page 6.21 There is a statement that says, "the real loss of forest species does not arise as the area is devoid of vegetation". This statement is highly questionable and shows the utter lack of understanding of EIA team. As a matter of fact, the EIA report further on contradicts that statement.

Page 6.23 The statement "The diversion of forest land of 136.2833 ha has been cleared by MEF, GOI for various activities of the project" is incorrect and misleading. MEF has not given clearance for this, only an in principle clearance has been given.

Page 6.23 It is stated at the very outset of this section that prediction of impacts on biological environment is a complex exercise. Long term studies are required to carry out such studies. There are enough studies that have been carried out the world over to study these kinds of impacts. The EIA report is incomplete without proper assessment of the impacts on biological environment.

Page 6.25 Compensatory afforestation as a suggested mitigatory measure, cannot compensate for the loss of microfauna and flora and other kinds of biodiversity associated with the trees to be felled. This needs to be clearly stated.

Page 6.26 The water reservoir which will be created may attract birds but that is no replacement for the inhabitant fauna that will disappear as a result of the project.

Page 9.12 The EIA notes, "The bio-monitoring studies of dam upstream and downstream of Sutlej river will be conducted by HPSSEP&PCB at the cost of Rs 3 lakhs to determine baseline status". But this studies should have been done before or during EIA and not afterwards. Another instance that shows how incomplete the EIA is.

On page 9.12-13 the EIA report suggests creation of a committee for compliance of EMP, where again there is no place for either the affected people or for non govt organisation and other independent experts.

Options Assessment: A farce One of the important component of an EIA report is to assess the various options available and show which is the least cost option. This comes under the EIA because it is part of the terms of EIA to look for ways of avoiding the permanent environmental impacts of the project. Chapter 5 of the report is supposed to fulfil this part of the EIA, one hopes. But the content of the Chapter 5 is complete farce of this objective. It does not attempt to state what are the benefits of the that society really needs and what are the options for satisfying those justifiable needs and which is the least cost options. Moreover, it needs to be assessed if the option chosen fits into sustainable development matrix and if the process of selection is transparent and participatory.

Chapter five does none of this, and in stead lists what options were looked at for the components of the project by the project proponents in the Detailed Project Report without any analysis or comment. This is clearly not what is meant by options assessment and the whole chapter is farce.

In Chapter 10 of EIA on "Economic Assessment", particularly chapter 10.4, there is an attempt to show the costs and benefits of environmental impacts and show how good the project is. This is most unfortunate as it is being done not by project proponents but by an EIA agency. Here the EIA agency tries to compare the emissions from a coal fired plant of equivalent capacity. This is most inappropriate and unscientific. If the project's optimality is to be gauged, than first of all, one has to see what justifiable benefits projects generated, what justifiable needs it fulfil, at what total costs and if the project is an optimum way of achieving it. In respect of the last aspect, there should be an assessment of the scope of increasing the generation efficiency of existing infrastructure, scope for reducing the T&D losses, scope for increasing the end use efficiencies, scope for alternative generation options and so on. The EIA report asks none of these questions, and once again shows the bias in favour of the project.

The first para of Chapter 11 also falls under the same category as chapter 5 and 10. Firstly, here no attempt is made to show that the project is NOT going to work as peaking energy source for at least half the year. Moreover, none of the options are looked at even managing the peak. The bias of the EIA agency for the project and its ignorance of crucial environmental issues is once again apparent.

Project Risks The EIA should have included a section on project risks. The large hydro projects rarely generate projected benefits due to many reasons. Hydrology, Geology, Siltation, Seismic aspects, Flood damages, time overruns, cost overruns are some of the risk areas that would affect the performance of projects like KWP.

To give one instance, as per the World Bank's Project Implementation Report for NJP dated Sept 2002, "HPSEB's net generation, which was 1,481 MU during 1998-99, declined to 1198 MU during 1999-2000, 1150 MU during 2000-2001 and 1146 MU during 2001-2002. These reductions in self-generation were the results of lower than usual discharges at HPSEB hydropower stations caused by poor monsoon rains, and the shutdown, which was needed to carryout de-silting at the Bhaba hydropower station. These reductions resulted into substantial losses of revenue, about Rs.560 million in FY2000, Rs.750 million in FY2001, and Rs.750 million inFY2002". The risks of hydrology, siltation and flood damages are as relevant to KWP. Bhaba HEP is in fact in the same region as the KWP.

What happened at NJP when work on it was started in 1993 shows the kind of geological risks that the project could face, "In July 1993, as the civil works contracts were being awarded, a fall of 12 million cubic meters of rock occurred on the right bank at the proposed location of the dam. This slide covered the proposed location of the inlet of the river diversionary tunnel, which would be required in order to divert the river, when in seasonal (winter) low flow mode, to enable the dam foundations to be laid. NJPC had to re-locate the dam axis and the inlet, which almost doubled the length of the diversion tunnel. Removal of the landslide took six months". (NJP Project Implementation Report, World Bank, Sept 2002)

The World Bank thus describes another instance of geological risk at NJP, "Construction of the 27 krn long headrace tunnel connecting the reservoir to the underground power station took about eight years instead of the five years envisaged at appraisal. This was mainly because of the difficult rock (including shifting underground sand, and squeezing rocks) and underground conditions (hot water from local geo-thermals) that were met with along the route. At appraisal the risk of meeting such conditions was identified as "at an acceptable level', when indeed it should have been identified as a 'practical certainty", given the location of the scheme in the young Himalayan rock formations. Massive, costly and time-consuming rock-bolting exercises had to be performed to retain the steep, unstable rock slopes at the site of the dam and tunnel intake, and at the tailrace. Several hundred 45 meter-long 200 ton capacity rock anchors had to be installed". (NJP Project Implementation Report, World Bank, Sept 2002)

The kind of risks from silt in the river that KWP may face is evident from the risk that NJP may face from the same quarter, as described by the World Bank Project Implementation Report for NJP (092002), "Some uncertainty still exists regarding the risks of abrasion to the turbines from water-borne solids, but at worst these would lead to higher costs/lower output rather than endanger the viability of the plant".

The kind of risks from floods that KWP can face is indicated by the experience of NJP, "In August 1997, an unprecedented flash rainstorm brought chaos to the site, with fifteen fatalities, and access cut off to much of the dam site and its quarries for many months. (ii) On the night of August 1, 2000, the long since completed underground powerhouse cavem was inundated to its crown by river water from very heavy flash floods, (estimated to be one in 65,000-year flood flow) caused by torrential rainfalls in the upstream reaches of the Satluj River, linked possibly with the overflow of a glacial lake in China. Nathpa Ihakri, as is the intemational practice for such schemes, had been designed to withstand a one in 10,000 year flood. Twenty contractors staff were drowned. The equipment and plant, which had already been installed, was entirely destroyed and had to be re-manufactured, in Europe and elsewhere overseas". (NJP Project Implementation Report, World Bank, Sept 2002)

The kind of risks of access to project site, particularly during monsoon that KWP can face is reflected in the World Bank's Project Implementation Report of Sept 2002 for NJP, "The main hindrance to operational reliability is represented by the access road from Jhakri to the Nathpa dam site. As a matter of fact, access to the dam site cannot be guaranteed during the monsoons, especially in the case of emergencies, because the road can easily be interrupted at several locations by mud and! Or rock slides of different magnitude". This is particularly important as throughout EIA, it is assumed that the roads upto Nathpa is good enough for KWP access and use.

The kind of time-overrun risk is evident from the experience at NJP. This project was to be completed by June 1995 as per World Bank Staff Appraisal Report of 1989. In June 2003, full eight years after the first projected completion date, the project completion is still not in sight.

The kind of cost overrun risk is evident from the experience at NJP. The initial project cost was Rs 16 B when the project was taken up in late 1980s. Today estimated cost goes about Rs 100 B, that is cost escalation is over 625%.

Conclusion From the above analysis it is clear that the EIA of KWP done by NEERI is biased, inadequate in scope or work, shoddy in what it has written and totally in violation of the letter and spirit of the environment impact assessment. Under the circumstances, the not only this EIA should be rejected, an independent enquiry should be conducted as to how come such an EIA got to be done and submitted at all and should NEERI be allowed to conduct future EIAs. In the meanwhile, fresh EIA needs to be done by a confidence inspiring independent agency. As is the legal necessity, in the meanwhile, no work should be allowed on the KWP.

Secondly, if the data on hydrology, geology, sedimentation, local logistics and flood peaks as given in the EIA and sourced from KWP DPR is the basis of the project, than these issues raise fundamental question on the viability of the KWP in present form. HPSEB, HP govt, CEA and other agencies need to make the DPR public and also revisit the viability of the project and make necessary changes in the project decision and design.

SANDRP June 14 2003

ANNEXURE FLOOD FURY OF SUTLEJ: **Dark Night in the Sutlej Valley**

The Vedic river Shutudri has rejuvenated as Sutlej in modern times. Originating as Langchen Khabab from the southern slopes of Mount Kailash, it travels through the mystic region where once Bonpo flourished and enters into the Indian territory near Khab, a narrow man made cut into massive rock structure.

For about three hundred kms the river meanders untamed and then abruptly merges in its water. A phenomenon made possible by engineering feat, the Bhakra Dam *a temple of modern India*, due to which a huge artificial water body was formed drowning the town of Bilaspur and its fertile valleys. Over the years, the big reservoir known as Gobind Sagar has become a lake of sorrow. On the early morning of August 1, 2000 when it was still dark, Sutlej deposited more than 200 people with their material possessions in its deep waters. Before anyone could realize what was happening, a 15 m high tide of roaring river hit the first row of houses along the bank. It was followed by more torrents of water affecting homes even at a distance of 25 m from the river. The water turned and twisted at every bend of the river causing whirls that sucked in huge concrete structures along the river.

The Hindustan -Tibet road (NH 22) takes a right turn from Sainj on the left bank of Sutlej river. One after another the bridges over Sutlej were conspicuously missing. Nogli, that was yet to recover from the flash flood of 1997, bore the brunt of the Sutlej. Signboard and flags of Ratan Guest House on the edge of road stood witness that there existed a building few days ago. This small township, that caters the need of remote hill villages, was saved by a patch of trees and by an embankment on the sides of the Nogli Khad where it meets the Sutlej. On both sides of Nogli town the NH 22 was sinking and may slide down into Sutlej in near future. The gaping crevices were being filled with soil by bulldozers.

After 5 km abruptly the frontal view of Rampur appears that was once the capital of the princely state of Bashahr, perhaps the largest in area among the Simla Hill States. At present the right bank of Rampur comprises of Broh (Bron) and Jagatkhana on the left bank is the main bazaar. Rampur is famous for Lavi Fair that reminds of socio-cultural and trade relations with Tibet. The gushing waters of the Sutlej washed away all the newly built concrete structures of Broh and Jagatkhana filled many of them with silt. Timely warning from the people up in the Sutlej valley saved hundreds of lives. However, the river carried a number of people who could not be woken up at midnight to Govind Sagar. All the bridges linking the two sides of Rampur town were washed except one.

On August 12, near Gandhi Park in Rampur, a building stood on a loose mass of soil that was constantly hit by the river current. After six days the structure at that site splashed the river water with a thud diverting course of Sutlej towards Jagatkhana. Six people died and several houses were damaged. Construction of buildings in the river basin is a wrong model of learning for the common people. Rampur bazaar and the old village of Nirath are an example of traditional wisdom for a construction site. Will modern engineers learn any lesson?

Rampur to Wangtu: A Death Trap From Rampur to Wangtu the area is very fragile and valley becomes narrow, both sides steeper in gradient. In most of the year this stretch of land turns brown, only in July and August it has greenery. Extensive felling of trees started as early as 1850 in the Sutlej valley by British contractors who took benefit of the poor condition of the hill chiefs. The deforestation and consequent erosion had never stopped since then. It is important to note that wherever there were small patches of trees either on the banks of river or up in the hills the erosion is minimum.

Over the past several years a number of hydroelectric projects had come up in the stretch between Rampur and Wangtu. Schemes at Ghanvi (22 MW) and Bhaba (120 MW) are complete. For the last decade or so work on a 1500 MW scheme, the Nathpa Jhakri Hydroelectric Project, is going on. It is one of the largest hydroelectric projects of the country whose cost may escalate beyond RS. 10 000 crores. Even the cost of much controversial and 260.5 m high Tehri Dam is below that.

Thus nearly 80-km stretch of valley is under much human pressure, causing ever more damage to its ecosystem. Work is in progress on three more hydroelectric projects, Baspa-I (150 MW), Baspa-II (300 MW) and Karchham-Wangtu (600 MW[1]), very near up in the Sutlej valley.

There is a great danger in the valley due to seismic changes, induced or natural. It has been totally ignored by the planners of HEPs. These human activities are crucial to estimate the damage caused by natural disasters that are recurring every three-year in this small region between Rampur and Wangtu.

Nathpa: 1993 During July-August 1993, a landslide from the right bank of Sutlej obstructed the flow of Sutlej near Nathpa, 185 km from Shimla, creating an artificial lake. Water of the lake entered through the outlet of 120 MW Bhaba HEP causing it heavy losses. After great effort the rocks blocking Sutlej were blown into pieces by dynamites making passage for dammed up water. During this period people in the low lying areas of the Sutlej below that spot spent sleepless nights. A central government team from New Delhi assessed the loss at Bhaba HEP around Rs. 25-lakh daily due to stoppage of power generation.

Nathpa Jhakri Power Corporation had already started work at the site of the 1993 landslide. It included massive tampering, externally as well as internally, with the rock structure. Presently the base of the 60-m high dam was being laid there to divert the Sutlej into a tunnel. However, it has been considerably damaged in the flash flood.

Panvi, Andhra and Nogli: 1997 On the evening of August 11, 1997, the Panvi Khud, a small nullah originating up in the Shatul Ghati brought tons of debris with it and blocked the mighty Sutlej for several days. Six major bridges left no trace cutting the Kinnaur from rest of the country and eroding about 6 km of the NH 22. Big boulders and gravel buried the small habitation and 11 persons at Wangtu. A big lake was formed at Wangtu due to blockage of the Sutlej. For several days people made their way to Kinnaur by crossing the artificial lake by boat.

On the same night at 8 p.m. the Andhra Khud flowing on the backside of the same mountain range washed away a roadside township of Chirgaon with more than 300 inhabitants. A considerable loss did occur on the same night by the Nogli Khud originating from the same ridge. Andhra HEP (17 MW) and Nogli Power House (2.5 MW) suffered heavy losses and did not generate electricity for about one year.

Mt. Kailash: 2000 The third incident that brought a high column of water on the August 1, 2000 occurred far away at the origin of Sutlej in Mt. Kailash, the abode of Shiva. However, the major loss took place in the region between Rampur and Wangtu. The damage may run into several hundred crores as direct loss to the Nathpa Jhakri Hydroelectric Project. The other major loss is the delay in completion of the project that is estimated about one year. Each day the state would loss Rs. 5 crore if there is delay in the completion of the project by Dec 2001[2]. Total cost of the project has gone up to Rs. 10 000 crore.

Sutlej laughs at the big hoardings that enumerate the safety measures taken under this scheme. Authorities claim that this project has one of the world' s largest silt filtering underground environment. How is it functioning today is a big question. Engineers today are reluctant to talk about such claims. The whole area that used to be noisy by heavy machinery and large number of work force from distant places, working under extremely hazardous conditions, bore a deserted look after the flash flood.

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(Discussion on http://www.mtnforum.org/apmn/wk2.2.htm, Feb 2001)

[1] Note that till almost early 1999, the KWP was to be a 600 MW project. At some stage it became 900 MW and now 1000 MW. How this installed capacity kept going up and if this capacity if viable can be assessed only if the full hydrology and other crucial details are made public. The figures given in the EIA a farce as shown above. And if these are the basis for the whole project, then that same description is applicable for the project too.

[2] The NJP is still incomplete in June 2003.