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**CONVENTION CONCERNING THE PROTECTION OF THE WORLD
CULTURAL AND NATURAL HERITAGE**

**BUREAU OF THE WORLD HERITAGE COMMITTEE
Twenty-fifth extraordinary session**

**Helsinki, Finland
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**Information document: Report of the IUCN/UNESCO Monitoring Mission to Lake
Baikal (Russian Federation), 25 August - 3 September 2001**

SUMMARY

The twenty-fourth session of the World Heritage Committee decided to send an IUCN/UNESCO reactive monitoring mission to Lake Baikal, inscribed on the World Heritage List in 1996, to assess the state of conservation of the site. Following the invitation from the Russian authorities, the mission took place from 25 August to 3 September 2001.

The Bureau may wish to note the recommendations contained in this report in the section “conclusions” and review the potential for a recommendation to the Committee for inscription on the List of World Heritage in Danger. The report concludes that “ Summarizing all information, the World Heritage site Lake Baikal is undoubtedly exposed to a series of threats which all together clearly qualify for an inscription in the World Heritage List in Danger. From a formal point of view, the gas exploitation plans in the Selenga delta must be regarded as a clear case to consider the inscription of Lake Baikal on the World Heritage List in Danger.”

REPORT

on the state of the World Heritage Site „Lake Baikal“, Russian Federation

1 RECENT DEVELOPMENT

Lake Baikal was inscribed in the World Heritage List in December 1996 as a natural property on basis of all four natural criteria. However, before inscription the Bureau expressed valid concerns regarding the conditions of integrity and the Committee underlined – on proposal of IUCN – the importance of five items to the Russian authorities: (1) final passage of the Federal Law on the Protection of Lake Baikal; (2) conversion of the pulp and paper mill at Baikalsk to eliminate it as a pollution source; (3) The reduction of the pollution of the Selenga river; (4) providing more resources to the management of the nature reserves and national parks surrounding the lake; and (5) continuing and further supporting the research and monitoring activities on the Lake.

Since then, the Lake Baikal Basin was under continuous discussion in the Committee and the Bureau, respectively, not at least because of lack of official information from the States Party. Meanwhile information from different other sources highlighted the persistence of the threats and problems mentioned above and reported of additional ones. At the 22nd session of the Bureau in July 1999 the Observer of the Russian Delegation was of the view that the unresolved legal status, continuing and increasing pollution, lack of resources for management and monitoring, and logging and other negative factors seriously threatened Lake Baikal. The Bureau expressed its serious concerns about the problems facing the site and reiterated its requests made at the time of the inscription. The Bureau invited the State Party to provide a detailed report, by 15 September 1999, on measures to mitigate the pollution threats to Lake Baikal, as well as the implementation of the Baikal Law. In November 1999 the Bureau commended the States Party for the adoption of the Baikal Law but urged that the State Party ensure its effective implementation as well as addressing pollution issues associated with the Baikalsk Pulp and Paper Mill. The Bureau requested the State Party to present a state of conservation report by 15 April 2000.

In June 2000 the Bureau took note that no information had been received from the State Party despite a number of letters written concerning the site. The Bureau reiterated its request that the State Party provide an up-to-date report, by 15 September 2000. On its extraordinary session in December 2000 the Bureau again expressed its concern that no updated information was received from the State Party.

While IUCN informed the Bureau in July 1999 that it does not recommend the inclusion of Lake Baikal in the List of World Heritage in Danger at present, it stated during the extraordinary Bureau meeting in Cairns/Australia in December 2000 that it „ notes with concern the recent reports which would indicate serious threats to this site and that a case may exist for inscription on the List of World Heritage in Danger“. The Bureau adopted this opinion and requested the State Party to invite a mission to this site in 2001 to ascertain whether it should be inscribed on the List of World Heritage in Danger.

2 MISSION

This mission was conducted on invitation of the State Party from 25 August to 3 September 2001 by a representative of IUCN, jointly with the Director of the UNESCO Moscow Office, representing the World Heritage Centre. It included meetings with official institutions and other relevant stakeholders, including the World Bank and GEF, and field investigations in Moscow, Irkutsk, Baikalsk, Selenginsk, the Selenga delta, Ust-Barguzin, the Ushkanyi Islands and Ulan-Ude (see annexes 1 and 2).

The mission was perfectly organised and supported by the Director of the Russian Natural Heritage Fund, Mr Alexey Butorin, together with the representative of Greenpeace for Lake Baikal, Mr Roman Poukalov. As a representative of the States Party the Director of the recently established „Center for Preparation and Implementation of International Projects on Technical Assistance“, which is affiliated to the Federal Ministry for Natural Resources, Dr Alexander Averchenkov, joined the mission between 26 and 29 August. Mr Averchenkov is also responsible for GEF projects in Russia. However, no federal representative was present during the second part of the mission along Lake Baikal. Among others, meetings were arranged with representatives of the Federal Ministry of Natural Resources, the governments of the Oblast Irkutsk and the Republic of Buryatia, including its President, the directors of the Baikalsk and the Selenginsk paper mills, the directors of the Baikalsky Zapovednik and the Zabaikalsky National Park, the representative of the World Bank in Russia, and NGOs.

3 RESULTS

3.1 GENERAL CIRCUMSTANCES

The regional authorities and stakeholders excellently supported the mission. All requested information, if necessary also in written form, was delivered to an utmost extent. With very few exceptions, the meetings took place in very friendly and open atmosphere. Although interpretations sometimes differed considerably, the general awareness on the problems and of potential threats to Lake Baikal is on a very high level. This includes the regional governments and politicians and the management of the local enterprises, and especially applies to the Buryat authorities. Despite of serious socio-economic problems the Buryat Republic in reality takes upon itself a

high burden of measures to protect the Lake Baikal while not being able to share the major economic gains from the Lake (e.g. production of electricity). It earnestly seeks for ways of sustainable development, including the comprehensive protection of Lake Baikal. The President of the Buryat Republic presented a draft concept for an overall plan for sustainable development.

Generally, the volume and intensity of activities to protect Lake Baikal considerably grew during the past years. Nevertheless, many of those initiatives did not yet come into force, due to missing by-laws to the Federal Baikal Law and mechanisms to implement and control regulations on location.

The regional authorities and stakeholders are very much aware of the World Heritage status of Lake Baikal. However, it was repeatedly reported, that the significance for local people is comparatively low. There is especially lack of information, how the fact that Lake Baikal is World Heritage Site, can support processes to solve the given problems on location. This is also of relevance for the local opinions on a transfer of the site to the World Heritage List in Danger.

3.2 CURRENT IMPACTS AND POTENTIAL THREATS

The mission primarily focused on the five items mentioned in the nomination sheet. However, additional problems were reported in the meanwhile and others became apparent during the mission. From these, five items were identified to be of outstanding relevance for the integrity of Lake Baikal: (1) The specification of the Federal Baikal Law; (2) Lacking Mechanisms for the implementation of legal regulations, for co-ordination and discussion; (3) Hunting on the Baikal Seals; (4) The Baikalsk Pulp and Paper Mill; (5) Prospected gas exploitation (see item 3.2.2).

3.2.1 THREATS OF CURRENTLY SECONDARY RELEVANCE

(a) Pollution load of the Selenga:

The pollution load of the Selenga river is apparently still considerable. This was confirmed by the Buryat authorities, but no specific data were provided. The Buryat authorities are currently in contact with Mongolian authorities in the frame of a bilateral environmental agreement to control and reduce the sources of pollution. No specific regulations were settled, yet. The pollution load of the Selenga is doubtlessly a valid and substantial source of impact for Lake Baikal. However, the Federal and regional authorities seem to be very much aware of this problem and are obviously on a good way to improve the situation. The efforts should be monitored and decision on further actions should be taken within an appropriate span of time.

(b) Planned gas and oil pipeline to China:

Related plans were confirmed by the Chair of the Duma of the Oblast Irkutsk as well as by an official agreement signed a few days after the mission between the two

countries during an official visit of the Chinese Prime Minister to Russia. Currently there are obviously several planning options, including one approaching Lake Baikal at its southernmost shores. This variant would imply considerable risks due to seismic activities in this area. The plans are not yet in a state to be substantially discussed and they may be irrelevant due to the recently approved degree on forbidden activities (see below). However, this matter needs further careful observation, especially with regard to the gas exploration in the Selenga delta (see below), for the distances between this area and a southern track of a pipeline are low.

(c) Railways passing through the area and Free Trade Zone at the BAM :

The track of the Trans-Siberian railroad approaches Lake Baikal at its southern and south-eastern shores. The train frequency is considerably and there are no specific emergency contingency plans. However, the risk of such incidents is estimated to be rather low as the track is managed comparatively well. It is doubtful, whether emergency plans would substantially lower environmental risks, as the infrastructure of emergency bodies is locally evidently very low.

No new information was available about the railroad track passing along the northern border of Lake Baikal (BAM = Baikal–Amur-Magistrale). Evidently train frequency is now very low down to one train per day.

With regard to plans to create Free Trade Zones along the BAM, it seems unlikely that such a project will be implemented in the near future and then evidently in a sufficient distance East of the Baikal Basin.

(d) Pollution from the town of Severobaikalsk (Northwest border)

According to the most recent official report of the Buryat government on the ecological situation in this region and despite recent technical improvements of wastewater treatment the pollution caused by wastewater from this city has not yet been resolved. For 1999 still 790,6 tons of uncleaned city wastewater containing, i.a. superficially active synthetical matter, chlorides, petrol products organic waste solid matter are reported to be led into the Tya River. Also atmospheric pollution is reported.

(e) Atmospheric pollution:

Forest diseases are reported from Baikalsky Zapovednik, linked to emissions of the industrial plants in the town of Irkutsk, but direct proof is still missing. Atmospheric pollution is also considered as one of the reasons for the decline of the Baikal seal population (indirect decrease of immunity of the animals). However, here again, the relevance is not yet sufficiently proofed. There are regular monitoring programmes on air pollution of the Oblast of Irkutsk and the Republic of Buryatia, which results are available, but the interpretation regarding ecological effects is still poor. The overall

industrial development of the Baikal region is comparatively low. If there should be relevant impacts on the atmosphere they should originate from sources away from the region and it will be very difficult to identify them.

(f) Fishing:

Fish is harvested to a considerable amount. However, related activities are almost exclusively conducted by local people and for the local consumption and marketing, especially since former state fishing enterprises ceased to work. Fishing is legally regulated, and even if it is carried out illegally to a certain extent it should be considered that it is one of the few sources for local people to gain some cash income. There is no evidence that the current fishing practices impact the existing fish populations, including the Omul, substantially.

(g) State of the reserves:

While the situation of the reserves and their staff was almost desperate two years ago, it now improved a lot, due to recent GEF projects, the Baikal Fund of the Federal Government and the improved income situation of the Russian government due to high petrol prices. The Baikalsky Zapovednik and the Zabaikalsky National Park are now able to conduct substantial management steps to improve the state of protection. The plans, which are pursued are goal-oriented and on a high international level. Tourism is assessed as an important option, but the authorities are fully aware of the threats of unregulated tourism and take measures to prevent threats. Public awareness is defined as one of the most prominent targets of the reserve authorities. The visited reserves keep a protection standard which is clearly beyond the international average.

Nevertheless, the income of the reserve staff is clearly insufficient (between 30 and 50 US \$ a month). International funding did not improve this situation and efforts of the federal and regional authorities are urgently necessary.

(h) Wood cuttings:

Official sources state that there are only „sanitary cuttings“ in the direct watershed of the Baikal, necessary because of natural disasters such as fire and insect calamities. The Republic of Buryatia recently enforced a degree for the origin declaration of wood exported out of this region. It was proofed that the related procedures are really at work but similar regulations in neighbouring regions are needed to ensure effectiveness. According to official sources, the amount of wood extraction from Buryat forest adjacent to Lake Baikal declined by more than 80 % during the past decade.

However, on the other hand, there is valid information (including satellite imaging) that considerable clear-cuttings went on after the inscription of Lake Baikal in 1996. On the road to Ust-Barguzin trucks loaded with high quality wood regularly passed

and it is not totally clear where they came from. Illegal wood extraction may play a relevant role, which highlights the needs for a stabilized economic basis for the local people and administrations.

The mission did not succeed in getting really convincing material on this matter. Further information is urgently necessary.

(i) Artificial changes of the water table:

In the past, significant artificial changes of the water level of Lake Baikal, caused by the Irkutsk dam and hydro power station, obviously resulted in severe impact to the species and ecosystems, including the dying of forests due to inundation (e.g. north of Ust-Barguzin) and damage on spawning grounds of fish. During recent years the fluctuations of the water table were more moderate and the recent decree on the management of the water level provides a clear and sufficient legal base to prevent heavy damage.

3.2.2 PRIORITY ISSUES

(a) Baikal Law:

By March 1999 a special Federal Baikal Law came into force. This law is undoubtedly an important step forward in the protection of Lake Baikal. However, the regulations of this frame law are general and consequently rather vague and need further specifications by by-laws and regional jurisdiction. Several decrees are foreseen, but only two of the five most important ones were put into force until July 2001. These are the order No 234 of 26th March 2001 „On regulation of the water level at Lake Baikal“ regarding the Irkutsk Hydro Power Plant, which restricts the allowed water level variation to one meter (between 457 and 456 m a.s.l.) and a special decree focusing on the ecological zonation of 6th September 2000. According to an official Buryat document, about 20 Federal normative acts, another 20 on inter-department and inter-regional level, and 30 on the level of administration bodies are necessary.

The only new information on this law is that the recently restructured Ministry of Natural Resources (which has integrated the former State Commission on Ecology) was given the lead responsibility to fulfil this task in co-operation with the authorities of the Buryat Republic, Irkutsk Oblast, Tschitinski Oblast and Ust-Ordinski Autonomous Okrug. The concrete borders of the three zones foreseen in the Baikal Law are still undefined. It is being discussed to create the border of the central zone (core zone) along the first mountain range. However, it remains open, how this approach is used e.g. in depressions like the Selenga delta.

During the mission, on 30 August, a further decree „On the list of activities banned in the central ecological zone“ came into force (annex 3). This decree closes an important gap in the legislation on Lake Baikal. Among others, gas and oil exploitation is forbidden in the core zone. However, as long as the zones are not

properly defined it remains open, to which extend this decree will really unfold regulative power. So far no draft versions have been prepared for the order „On implementation of norms of maximum permissible impacts on the ecological system of Lake Baikal“ to Art. 13 of the Baikal Law and the order „On max. permitted volume of storage and emission of harmful substances, their utilization and waste deposits, endangering the ecological system of Lake Baikal“ to Art. 14 of Baikal Law.

During the past years there are undoubtedly accelerated and promising efforts to improve the legal situation in the Baikal Basin on federal as well as on regional level. Nevertheless the legal situation is insufficient up to date. The mission was convincingly assured that the authorities are willing to proceed the way outlined by the Baikal Law, but the restructuring of the Ministry for Natural Resources and problems in co-ordination hampered greater success until now. Therefore the acting authorities should be encouraged to continue on their way, but the efforts should be re-assessed after a defined time span (approx. 1 year).

(b) Mechanisms for implementation :

In 2000 the Baikal Commission, an intergovernmental body of the federal and regional authorities, and scientific institutions was abolished. Although often sluggish in taking relevant decisions, the Commission proved to be a very important instrument to mediate between the different authorities and stakeholders in the Baikal region. Both governments of the Oblast Irkutsk and the Buryat Republic stated that the discontinuance of the Baikal Commission caused a serious gap in the harmonisation, co-ordination and implementation of protection and developmental measures at Lake Baikal.

Currently, the lack of an intergovernmental and interregional body for communication and harmonization turns out to be one of the most important deficiencies for an effective protection of the World Heritage Site. This does not only apply for the implementation of legal regulations and the harmonization of socio-economic development, but also for a comprehensive monitoring of the state of the Baikal region according to the legal definitions. An overall management plan as required in the Operational Guidelines of the World Heritage Convention, is still missing. A huge amount of scientific data is evidently created at present. But there is no institution to harmonize, combine and comparatively analyze and assess these data, nor are there any mechanisms that could derive practical guidelines from these data.

The World Heritage Site Lake Baikal (8.8 million ha!) as well as the target zones of the Baikal Law comprise an extremely complex area, concerning ecological and landscape features as well as administrative responsibilities. It is quite clear, that an institution is needed urgently to mediate between diverging interests, to define management measures and to comprehensively guide and analyze research and monitoring. The need for such an institution is clearly recognized by the regional authorities. Under the given circumstances of a federal state – and this is by far not exclusive for Russia – it turns out to be difficult to establish such an institution. Nevertheless, the success of most future efforts to protect Lake Baikal will depend on the existence and competence of such an institution. Therefore, all options should be

considered to support the implementation of such an institution, including international help.

(c) Hunting on Baikal Seals:

The Baikal Seal is only one of numerous endemic species of the Lake Baikal. Nevertheless, its fate requires specific attention, as the Baikal Seal is a „flagship species“ of Lake Baikal and – taking a position at the end of the food chains – an important indicator for the state of the Baikal ecosystems.

There is more than one report, which indirectly indicates changes in the Baikal ecosystem. Alarming data on a fundamental change in the composition of phytoplankton, shifting from endemic to common species, in the southern areas of Lake Baikal during recent years are reported. There are also worrying data on population decline of the amphipod *Epichura*, which holds a functional key position in the ecosystem and substantially contributes to the stability and self-recruitment of the limnic ecosystems.

Different sources, including international scientific ones, also report on a continuous decline of the Baikal seal population during the past two decades. A census from 1994, which estimated the total stock of Baikal Seals of about 104,000, is out of discussion. For the period of 1998 to 2000, a Check research group in co-operation with Greenpeace and the local reserve managers, using the same counting technique as in 1994, estimated the total population size of 40,000 to 60,000 animals. The Institute of Geochemistry of the Academy of Sciences, Irkutsk, estimated the population size of 67,000 +/- 12 % experimental tolerance for the year 2000. In contrast, the Buryat authorities estimate the current seal population up to 120,000. This figure is orally disseminated by the Eastern Siberian Fishing Centre in Ulan-Ude, but not confirmed in its latest written report. The Centre is a part of the Buryat Ministry of Agriculture, which is also responsible for hunting licenses. However, it is worth to be mentioned, that the number of licenses in Buryatia to hunt seals was reduced from formerly 6,000 to now 3,500 in 2001, officially because there is not enough request for licenses. However, there is also information that requests of hunters for licenses were by far not met during the past years.

There had been epidemic diseases of seals in the years 1997 to 1999. The Limnological Institute in Irkutsk counted 1,500 dead seals in 1997. For the last 100 years there is no report on such epidemic diseases, despite of continuous scientific control. While formerly there had been several summer resting places around the lake, recently apparently only the Ushkanyi Islands north-west of Ust-Barguzin are still used.

The Buryat authorities did not confirm a general decline of the seal population. However there can be little doubt on this fact. Nevertheless it was not possible to identify a single causal reason for this development. In general, the set of information resembles very much comparable data on the decline of mammal and bird species at the end of the food chain, where the phenomenon is interpreted as a complex of high accumulation of poisonous substances (a high load of heavy metals in the

atmosphere is reported by officials from the center part of Lake Baikal and the analysis of the liver of a dead seal revealed a cryosol level 300times beyond the normal level), loss of immunity to natural diseases, habitat deterioration, and human pretation.

In contrast to the international discussion, illegal poaching on seals seems to play only a minor role. But the skills of the legal hunters are clearly insufficient, causing a high rate of wounded and finally dying animals, which do not count for the license rates. Therefore, the real number of killed seals is obviously higher by magnitude than the official license rates.

To improve the situation, instant reaction is indispensable. This must include an improved, co-ordinated monitoring of the seal population as well as a better training and surveillance of the hunters. The latter is exclusively in the responsibility of the regional authorities.

(d) Baikalsk Pulp & Paper Mill:

The BPPM started working in 1966 as a producer of a strategic variety of cellulose. Since the early 90ies the fate of the plant (closure or re-profiling) remained unresolved due to lacking governmental decisions. Consequently production and waste treatment did not change significantly since, except some decrease in air pollution initiated by the management of the plant. Sothe emissions still amount to 50,000 tons into the water of Lake Baikal and 20,000 tons into the atmosphere per year.

However, there are recent plans, which may result in a breakthrough . A comprehensive concept 'On the socio-economic development of the town of Baikalsk and the re-profiling of the BPPM' (2000-2010) had been presented by the Irkutsk Oblast government in April 2000, which was generally accepted as a possible compromise but needed further elaboration. In early 2001 a reviewed version has been finalized and been assessed by the Federal State Ecological Expertise by 5 July 2001.

The programme foresees a 3-step procedure to re-profile the mill. The first phase includes the implementation of a closed wastewater cycle. This implies the restriction to produce unbleached cellulose, as organo-chlorine components, which are necessary for bleached cellulose, cannot be eliminated even by closed wastewater cycles. The second and third phase foresee the development of paper and cardboard production capacities while not excluding the continuation of pulp production as such. Only the first phase has been cleared by the State environmental impact assessment, while a substantial redesign of phases 2 and 3 has been requested and already ordered by the federal government.

While the breakthrough is generally welcome, however, even phase one of this program has been criticised for the continuation and even proposed increase of pulp production by 20 % up to 200,000 tons (the actual capacity of the plant) in 2004. The main concern is, that the ecological situation might get even worse in case the re-profiling stops after the first phase (further information see annex 4).

According to the director of the mill, Mr Steinberg, the costs for the closed wastewater cycle only are estimated at 33 mn US \$. Realization will take approximately 4 years, but could be speeded up to 1 ½ years, if international financial support is provided. For this the Russian government is currently in negotiations with the World Bank. The representative of the World Bank responsible for this project proposal, Mr Tsirkunov, was present at the meeting with the director of the mill.

Solid waste from the factory consists of ashes from coal burning and sludges (lignin). This waste is stored in 10 open dumps of approx. 550 ha in an area of 800 ha in the vicinity of Baikalsk. All dumps are isolated by clay layers of more than 1 m, but only the new dumps No 8 to 10 additionally dispose on a polyethylene sheet for isolation. According to the management of the plant the total recultivation of the dumps, which has already started, will need another 14 years until completion.

The federal and regional authorities as well as the management of the plant convincingly explained that they are determined to diminish the impacts of the BPPM to the environment. In addition, the Chairperson of the Ecological Committee of the State Duma (Parliament), Mr. Grachev, officially requested UNESCO shortly after the mission to support phase one and urge the World Bank to provide the necessary credits, which could otherwise not be found in Russia. He confirmed the determination of the Parliament and the President to implement this programme.

However, the situation is extremely complex and solutions need co-operation at all levels, including federal and international. Relevant aspects are:

- According to the plant management the BPPM directly or indirectly generates about 100,000 jobs. The town of Baikalsk was founded in 1964 and the BPPM is still the almost exclusive employer. Alternatives for cash income, like tourism, fishing or fruit processing, are of secondary relevance. The level of unemployment is high. The mill now engages about 2,000 labourers and generates another 1,400 associated jobs. Ten years before it had been 5,600, but many of them had social functions for the town.
- The plant is providing almost totally the tax income of the town and district and in addition providing yearly about \$ 2 million subsidies to the town. Still, there are many social functions delivered by the mill, like heating, hot water, and waste treatment. This is one of the reasons why the dumps cannot be closed within short.
- Because of the uncertainties over the last decade no serious modernisation of the machinery took place and even running maintenance remained at low level. It is extremely difficult to attract investors, as the State has decided again in 1999 to keep its 49% of the shares because of the strategic status of the plant. On our request the management and the Federal authorities declared however, that this position might be changed again, if the programme is becoming implemented.

- Conversion to unbleached cellulose as foreseen in phase 1 of the programme would imply considerable reduction in cost effectiveness and competition with the paper mill in nearby Selenginsk. This factory was dedicated to produce unbleached cellulose, meaning a rather low cost effectiveness, from the beginning. Because of economic pressure it consequently started using low quality wood and waste paper as raw material, and re-profiled its production during the past 10 years and now offers a respectable spectrum of final products like packing material. The Selenginsk mill is private owned (about 2000 shareholders, mostly employees). It is doubtful whether the regional forest resources will deliver a sufficient amount of cost effective raw material (low quality wood) for both factories.

Summarizing these facts, a total stop of pulp production and the conversion of the BPPM to the production of paper or furniture seems to be the best solution. This was confirmed by leading politicians and officers of the Oblast Irkutsk, e.g. the Chair of the Duma, Mr Borovskij. However, such a concept needs time and investment and may be only a mid-term solution. Closure of the factory, however, as also discussed, will raise not only considerable socio-economic but also ecological problems, because under the present circumstances there would be no guarantee that the plant site will be sufficiently cleared.

Although far away from an optimal solution, the stepwise improvement of production and waste treatment as foreseen in the plan of the Irkutsk Oblast is the most promising option to diminish the environmental impacts by the BPPM within short. Compared to the past, the plans and negotiations are now on a good way. There are still some doubts whether a closed wastewater cycle can be realized for a factory of this dimension. However, the closed wastewater cycle at Selenginsk apparently works satisfactory and the representative of the World Bank confirmed that a detailed feasibility study will be conducted before a loan is granted.

The BPPM is undoubtedly a considerable threat to Lake Baikal, which in principle meets the conditions of the paragraphs 81 ff. of the Operational Guidelines. Polluted areas of almost 100 km² are recorded by scientific studies and the general changes of phytoplankton composition in the southern areas of the lake may be related to emissions of the BPPM. The waste dumps bear potential risks, although the probability of a leakage is not considered to be very high. Nevertheless, in view of the fact that administration and management is now apparently willing to improve the situation, another limited span of time of two years should be conceded to realize the plans. This should be linked to the following conditions:

- Positive decision of the World Bank to support the process financially;
- Clear schedule for the implementation of the first phase and redesign of the further phases;
- Separation of the waste treatment of the factory and the town of Baikalsk;
- Improved and accelerated treatment of the waste in the open dumps;
- Definition of the borders of the zones according to the Baikal Law;
- Introduction of an independent monitoring, including valid indicators;

- Improved coordination between Federal and regional governments, and the shareholders and the management of the BPPM.

(e) Gas exploitation in the Selenga delta:

A proposal for evaluating the perspective of gas and oil exploration in the Ust-Selenga Depression (which includes the Selenga delta) was worked out by the State Committee for Natural Resources of the Republic of Buryatia and GFUP BuryatGeoCentre in 1998 and approved by 25th March 1998. In winter 1999/2000 the first six boreholes for sampling were drilled with a depth up to 192 m and a diameter of 76-132 mm. They are located in the southern Selenga delta (Istok-Golutai area), not far from the border of a RAMSAR site with one borehole right at the shore. This drilling was approved by a positive State Environmental Impact Assessment (order No. 134 of 02 April 1999, State Committee for the Environment of the Republic of Buryatia).

The second part of the project implies two deep drilling holes up to 3,500 m depth and drilling along a stretch of 120 km from Bojarsk to Cap Tolstoi at width of 5 to 20 km within the Selenga littoral. For this stage a new Environmental Impact assessment is in process. In April 2000 the OAO Buryat Gas Company received a license for gas and oil exploration in the Ust-Selenginsk depression valid for 25 years, but at 27th February the KPR RB denied the State Environmental Impact Assessment for the second stage. Furthermore, the Procurator of Buryatia protested against the issued exploration license. The topic is moved for decision to the Federal Ministry of Natural Resources.

Natural gas emissions of considerable amount (about 60,000 to 100,000 m³/year) are reported from the Selenga delta region since centuries. There are also oil emissions north of the Selenga, but they are of minor volume. The first scientific drillings and geophysical studies were conducted in 1903, followed by further drilling investigations in 1937 and in the 50ies. There had also been some geophysical studies. However, the source of the gas emissions is apparently still unclear. There are two geological domes beneath the Selenga delta and they are considered to bear gas. The thickness of the overlying sediments is also not clear, but the potential gas resources are expected at a depth of more than 3,000 m, which is far beneath the bottom of Lake Baikal. According to official sources, if at all, the domes bear dry gas and no oil.

The scientific drillings of winter 1999/2000 obviously caused no permanent impacts to the environment. No solid constructions remained. The boreholes are re-filled with natural sediment from location. According to Russian legislation, the application for the second phase comprises a combined license for scientific and for industrial purposes. It was argued, that only such a license would motive the tender to pay for the considerable costs of the deep drillings. The costs for one deep drilling borehole were estimated to 70 mln Rubel (about 2.4 mln US \$).

The Head of the Buryat State Committee for Natural Resources, Mr Bachtin, explained that the potential gas fields bear a considerable risk to the ecological

integrity of Lake Baikal and the welfare of the people living there. The potential gas fields are located in a highly active seismic zone. In case of a heavy earthquake gas could escape from the deposits and could result in an environmental disaster of giant dimension. For reasons of ecological safety the gas therefore should be removed. He also explained that the maximum capacity of gas deposits only in the Selenga delta is estimated of 500 billion m³. If the energy supply of all industry in Buryatia is converted to natural gas, 2.5 billion m³ are needed per year.

There is obviously no current threat emerging from gas exploitation activities in the Selenga delta. The application for the second license is stopped. Moreover, the order „On the list of activities banned in the central ecological zone“ of 30 August 2001 forbids gas and oil exploitation in the central zone of the Baikal Law. However, the government of the Republic of Buryatia clearly stated to pursue their plans. The borders of the central zone are still not fixed and it is especially difficult to find a reasonable border in the Selenga delta, due to its homogeneous topography. We were also informed on modern angle drilling techniques, which allow for boreholes origins several kilometres away from the deposits. It was not possible to get a clear statement on this issue from the Federal Ministry for Natural Resources. Should a second drilling license be granted, in or outside the central zone, but targeting gas resources at the shore of or beneath Lake Baikal, this could crucially change the situation from one day to another. The ecological risks of such drilling plans are considered to be very high. An important RAMSAR area is in sight of one of the potential drilling fields. Significant constructions, including pipelines, will be necessary for industrial exploitation. It is totally unclear which measures shall be taken to avoid environmental spills (especially if the presumption that there are no oil components is incorrect) and no emergency contingency plans were presented.

It cannot be neglected that the development of the Republic of Buryatia currently heavily suffers from energy deficiencies. There are sufficient energy sources in the Baikal region but, as the President of the Republic of Buryatia pointed out, these resources are distributed not properly. The Hydro Power Station in Irkutsk profits from the natural resources of Lake Baikal, which are to a great deal protected by the Buryat Republic (e.g. by a policy aiming on watershed protection). The electricity prices in the Oblast Irkutsk are extraordinarily low, due to State regulations. However, if this electricity is exported to Buryatia, the four times higher federal prize is relevant, resulting in considerable economic disparition between enterprises in the Irkutsk Oblast and the Buryat Republic.

The seek of Buryatia for fair energy supply is understandable. The issue again highlights the necessity of a harmonized planning and a mediating body for the whole Baikal region. It also emphasizes the need of a more comprehensive developmental plan for the region, along with the principles of „sustainable development“. The Baikal region almost perfectly meets the features of a Biosphere Reserve of the MAB programme of UNESCO. Relevant stakeholders, including the President of Buryatia, would support such an approach.

However, this all cannot balance the considerable potential threats of the planned gas exploitation to the integrity of the World Heritage Site Lake Baikal. The gas exploitation plans clearly meet paragraph 83 (ii) of the Operational Guidelines of the

World Heritage Convention, where is stated: „ Potential danger – The property is faced with major threats which could have deleterious effects on its inherent characteristics. Such threats are, for example ... (b) planned resettlements or developmental projects within the property or so situated that the impacts threaten the property;“

4 Conclusions

Compared to the past, the authorities undoubtedly developed their efforts to protect the World Heritage Site Lake Baikal, even if progress is sometimes rather slow. A major step was the adoption of the Baikal Law, but also the recent adoption of a decree on „forbidden activities“ and efforts to re-profile the BPPM are worth to be recognized. At the regional and local level the awareness on the necessity to adequately protect Lake Baikal is strikingly high. These efforts should be appreciated.

On the other hand there is quite a series of existing and potential threats to the integrity of Lake Baikal, which are partially caused by direct impacts, partially by indirect effects resulting from planning and administration deficiencies. For an area of 8.8 million ha, inhabited by many people, this is quite a normal feature. To properly assess the given situation, the mere registration of impacts as such therefore does not meet the requirements. It is necessary to assess the impacts in term of quantities and relevance for the integrity of the property. However, many of the available data are not precise enough to allow for related decisions.

During the mission five issues of major concern were identified. Undoubtedly, considerable administrative and organisational deficiencies persist. They are enhanced by the federal structure of Russia. In this context, the liquidation of the Baikal Commission is not understandable. The re-institution of an official body, mediating between the different subjects and stakeholders, holds a key position for the further development of Lake Baikal. This must include a harmonized monitoring of the state of the property. In principle, the concentration of federal duties to one ministry, the Federal Ministry for Natural Resources, is welcomed, but its relation to the regional subjects needs further deliberations. Moreover, the specification of the Baikal Law is still delayed. Especially the definition of the borders of the zones is urgently needed as a basis for a lot of subsequent decisions. No reasons were identified during this mission, why this definition is still pending.

The hunting practice on Baikal seals and the emissions from the Baikalsk Pulp and Paper Mill clearly meet para 83, No (i) of the Operational Guidelines. However, in the case of seal hunting the responsibility exclusively is at the regional authorities. These are aware of the facts, but effective control of the hunters may be almost impossible. Efforts to improve the training of hunters are therefore the only solution and such efforts should be encouraged by international support. The impacts of the BPPM are well known since long and the delay of effective counteractions can hardly be understood. Nevertheless, authorities and management now started to earnestly deal with the problems and formal actions by the Committee may be the right signal at the wrong time. On the contrary, the Committee or UNESCO might consider to take

official steps to convince the World Bank of its belief that a closed wastewater cycle should be built and financially supported. So it seems reasonable to grant the local stakeholders another span of time to realize the current plans, if they agree to respect the conditions mentioned above.

All these threats already existed by the date of the inscription of Lake Baikal to the World Heritage List. The World Heritage Committee nevertheless inscribed Lake Baikal and accepted therefore some kind of responsibility for the solution of the problems by doing this. Such support by the WHC is needed and welcomed. In contrast, the gas exploitation plans in the Selenga delta are new and were launched after the inscription of Lake Baikal. They are therefore of another quality. There are no current impacts, but the plans undoubtedly meet the regulations of paragraph 83 (ii) of the Operational Guidelines. If the gas exploitation plans are realized as stated, this would clearly mean a substantial threat to the integrity of Lake Baikal and would be in clear contrast to the spirit of the Baikal Law. It should be recalled that the World Heritage Committee repeatedly dealt with comparative mining activities during the past years.

The planned gas exploitation activities are therefore a clear case to include Lake Baikal into the World Heritage List in Danger. However, the following aspects should be considered before taking decision: (1) an official statement of the States Party is still missing. It was not possible to get a comment during the meeting on 3 September, but the representative of the State Committee for Natural Resources indicated that a written comment may be provided before the next World Heritage Committee meeting in Helsinki; (2) Knowledge on the consequences of an inscription in the „in Danger“ list are still very poor on the regional and local level. Such a decision therefore might be misunderstood; (3) Inscription in the „in Danger“ list may cause negative economic consequences, e.g. for a factory of mineral water from Lake Baikal and for tourism.

Summarizing all information, the World Heritage Site Lake Baikal is undoubtedly exposed to a series of threats which all together clearly qualify for an inscription in the World Heritage List in Danger. From a formal point of view, the gas exploitation plans in the Selenga delta must be regarded as a clear case to consider the inscription of Lake Baikal on the World Heritage List in Danger.

Annex 1: Programme of the mission, delivered by the organizers and implemented with some exceptions

Plan of Baikal mission.

IUCN expert
Ministry of Nature Resources of Russian Federation
Greenpeace Russia
Natural Heritage Protection Fund
Irkutsk region Natural Resources Committee
Committee of Natural Resources of Buryatia (3)

Estimated schedule – arrival: August 27 ¹⁾, departure: September 2 ⁵⁾.

August 27

- 11.00 – meeting with the Governor (Vice Governor) of the Irkutsk region ²⁾
- 12.00 – meeting with the Chairperson of the Irkutsk region Natural Resources Committee or Director of the Limnology Institute
- 13.00 – Lunch
- 14.00 – 17.00 – bus trip to the town of Baikalsk
- 18.00 – 20.00 – examination of the territory and premises of the Baikalsk Pulp and Paper Mill (BP&PM)
- 20.00 – dinner, leisure time and accommodation in Hotel “*At the Lake*”(U Oзера)

August 28

- 10.00 – examination of BP&PM slime ponds, ski resort and alternative production facilities ³⁾ in Baikalsk
- 12.00 – 13.30 – bus trip to the settlement of Tankhoy
- 13.30 – 15.00 – lunch
- 15.00 – 19.00 – visit to the museum of the Baikal nature preserve, foot trip to the first winter hut; meeting with the nature preserve management
- 20.00 – dinner and night rest in the settlement of Novosnezhnaya, sauna

August 29

- 08.00 – breakfast
- 09.00 – departure from Novosnezhnaya and trip to the delta of the Selenga river
- 11.00 – 12.00 – examination of gas wells in the Selenga’s delta
- 12.00 - 13.00 - Visit to the Selenginsky pulp-and-cardboard mill, meeting with the mill management
- 13.30 – bus trip to Ust-Barguzin through the passage in Tataurovo, lunch on the way
- 15.00 – examination of forest cuttings ³⁾ in the Pribaikalskiy reserve (the Republic of Buryatia, the area of the settlement of Kika), bus trip to Goryachinsk
- 20.00 – night rest in Goryachinsk, springs

August 30

- 08.00 – breakfast
- 09.00 – departure to the settlement of Ust-Barguzin
- 11.00 – meeting with the management of the Zabaikalsky National Park
- 13.00 – (home-made) lunch in Ust-Barguzin
- 14.30 – departure by the ‘Yaroslavets’ ship to Ushkanyi Islands
- 17.30 – 20.00 – arrival to Ushkanyi Islands, trip round the islands watching Baikal seals and counting dead seals filling out report forms
- 20.00 – dinner aboard the ship, trip by foot to Zmeinaya Bay (Bay of Snakes)
- 22.00 – visit to hot springs

- 01.00 – night rest, trip to Ust-Barguzin

August 31

- 10.00 – breakfast aboard the ship
- 11.00 – departure from Ust-Barguzin to Ulan-Ude by car
- lunch on the way
- 17.00 – arrival in Ulan-Ude, accommodation in hotel '*Buryatia*'
- 20.00 – traditional dinner, sauna

September 1

- 10.00 – meeting with the President of Buryatia
- 12.00 – meeting with a representative of the Committee of Natural Resources of Buryatia
- 13.00 – lunch
- 14.30 - examination of water canal of Ulan-Ude ³⁾
- 16.00 – 20.00 – Departure to Ivolginsky Datsan, excursion, souvenirs, leisure ³⁾
- 20.00 – farewell dinner

September 2

- 11.00 – departure to the airport
- 13.00 - Flight to Moscow ⁴⁾

1) = arrival at Moscow at 25th August, meetings with Greenpeace and UNESCO office at 26th.

2) = instead, meeting with the Chair of the Irkutsk Duma

3) = not to take place, due to dense time-table

4) = on 3 September additional meeting with the Federal Ministry for Natural Resources, Moscow.

Annex 2: Meetings and representatives contacted

26 August:

- * U. Graebener, collaborator of the UNESCO Moscow Office
- * Iwan Blokow, head of programmes of Greenpeace, Moscow
- * Michail Kreindlin, Ministry for Natural Resources, Dept. of Protected Areas, Moscow

27 August:

- * Mr Borowskij, Chair of the Duma of the Oblast Irkutsk
- * Mr Gratchev, Director of the Limnological Institute of the Siberian Branch of the Academy of Sciences, Irkutsk
- * Mr. A. Malevskij, Chair of the Committee for Natural Resources of the Irkutsk Oblast, and collaborators
- * Mr A. Averchenkov, Head of the Center for Technical Assistance at the Federal Ministry for Natural Resources
- * Mr A. Steinberg, President of the Baikalsk Pulp and Paper Mill, jointly with:
- * Mr. V. Tsirkuniv, Senior Environmental Specialist at the Moscow office of the World Bank
- * Mr. V. Gudovichev, Representative of the Pulp and Paper Industry of Russia
- * Mr. M. Yulkin, Director of the Environmental Investment Center Moscow

28 August:

- * Deputy Director of the BPPM for Ecology
- * Mr. A. Vasyanovich, Head of Department for Nature Use of the Irkutsk Oblast Administration
- * Mr. A. Dyakov, Head of Department of Ecological Security of the Oblast Irkutsk, Greenpeace
- * The director of Baikalsky Zapovednik and collaborators
- * Ms L. Katkova, Director GEF/World Bank branch for the Baikal Region

29 August:

- * Representatives of the Department of Ecological Security of the Buryat State Committee for Natural resources and
- * Main Engineer of OAO Buryat Gas Company
- * Mr. V. Heidebrecht, Director of the Selenginsk paper factory,

30 August:

- * Mr V. Melnikov, Director of the Zabaikalsky National Park,

31 August:

- * Mr Melnikov, Director of the Zabaikalsky NP, jointly with

* Representatives of the government of Buryatia (State Committee for Natural Resources) [on seals and on the needs of protected areas]

1 September:

- * Mr. L. Potapov, President of the Republic of Buryatia, and
- * Mr. V. Gulgonov, Head of the Presidential Administration of Buryatia and Head of the former Buryatian State Committee for Ecology
- * Mr V. Bachtin, Head of the Buryat Committee for Natural Resources (Minister), and Head of all branches of the Committee [two meetings]
- * Mr. A. Seredkin, Head of the Institute for Forest Protection, Ulan-Ude,
- * Ms Christine Laskow, Consultant of the UNESCO Moscow office on problems of Selenga river.

3 September:

- * Mr Tsyplenkov, Director of Greenpeace Russia, and Mr. I. Blokov, Programme Director
- Mr Amirchanov, Head of the Department of Ecology of the Federal * Ministry for Natural Resources, ,
- * Ms Kleimenova, Personal Assistant to the Minister and Head of the PR unit of the Ministry, ,
- * Mr. Brovchak, Staff Member of the Department of Ecology and former Secretary of the former Baikal Commission and
- * Mr Averchenkov head of the Center for Technical assistance,.

(after the mission)

- * Mr. V. Grachev, Chairperson of the Committee for Ecology of the State Duma (Federal Parliament)

Annex 3:

DECREE OF THE GOVERNMENT OF THE RUSSIAN FEDERATION
30 August 2001 #643, Moscow

On approval of the list of forbidden activities in the central ecological zone of Baikal natural territory

In accordance with the Federal law "On protection of Lake Baikal" the Government of the Russian Federation decrees:

To approve the enclosed list of forbidden activities in the central ecological zone of Baikal natural territory.

*Prime-Minister of the Russian Federation
M. Kasianov*

Forestry using means for plant protection, dangerous for the ecosystem of lake Baikal; use of aviation in combating forest pests.

Wooding, especially in cedar forests, with the exception of care felling and selective sanitary felling.

Harvesting galipot.

Gas and crude oil production.

Autunite/radioactive minerals extraction.

Metal ore extraction.

Mining activities and open pits exploitation for:

Exploration and exploitation of new deposits, not wounded before by exploitation works;

Recovery of sand, pebble, gravel and detritus in the water area of Baikal, in its protective lakeside, in the beds of spawning rivers and their protective riversides, with the exception of dredging.

Furs manufacturing and dyeing.

Leather manufacturing and tanning.

Cellulose, paper, cardboard and derivative ware production without internal-drainage systems of water use.

Chemical recovery, production of products of oil distillation, radioactive substances and derivative products.

Production based on chemical synthesis.

Production of rubber and plastic.

Production of other non-metal mineral products.

Metal production.

Production of autonomous power supply sources.

Electricity production with capacity more than 100 megawatt, electricity supply outside central ecological zone of Baikal natural territory. Electricity production in nuclear power plants.

Construction buildings not assigned for life-support or ecological safety of existing objects, construction buildings on intact natural territories of Baikal area.

Plants' reconstruction and reprofiling without applying internal-drainage systems.

Road and railroad construction, which requires waste of timberlands, with the exception of road construction necessary for the functioning of household and economic objects, located in the central ecological zone of Baikal natural territory.

Construction of oil, gas and other products' pipelines, with the exception of gas pipelines for local supply.

Allocation of recreation objects, tourist stations and transit transport parking outside recreation areas.

Construction of manufacture buildings, with the exception of buildings of water transport.

Wholesale trade of solid, liquid and gas fuel.

Use internal water transport:

- for barging oil products, agricultural fertilizers, pesticides, poisonous substances out of hermetic containers;

- in 3 kilometer area around spawning zone of valuable fish species, except of using transport for protection, monitoring, urgent wrecking;

- for timber haulage.

Timber rafting.

Research using genetic engineering technologies; activities which may lead to genetic transformations; acclimatization in the ecosystem of Baikal natural territory of alien biological species; nuclear explosions.

Activities in the field of defense, connected with testing, liquidation and burial of armament systems, weapons, ammunitions, chemicals and explosives.

Warehousing, burial and neutralization of dangerous industrial waste; industrial waste and consumption residue neutralization by incineration; sewage disposal without purification to the normative level, sewage disposal containing harmful substances without maximum concentration limit fixed for fishery water objects; sewage and drainage water disposal in the area of spawning and wintering of valuable and protected fish species.

Housing and communal services in exploitation of sanatoria, recreation and health resorts without providing sewage purification to fixed standards.

Blasting operations in the water area of lake Baikal and protective lakeside of its water conservation zone.

[compiled and translated from Russian by S.V. Smirnoff, UNESCO Moscow Office]

Annex 4: Summary “Complex programme on reprofiling of Baikalsk PPM and diversification of city of Baikalsk” (full version, Juli 2000, provided by I. Dumova)

The “Complex programme on reprofiling Baikalsk PPM and diversification of the city of Baikalsk”, Irkutsk Oblast, July 2000, commissioned by the Ministry of Industry, Science and Technology of the Russian Federation, was prepared according to the order No. 574 on 28 March 2000. It was developed by the Irkutsk Scientific Center (Academy of Science), Department for Regional, Social and Economic Problems, “Sibgiprobum” (Siberian Institut for Paper Industry) and AG “VNIIB”.

The overall goal of the programme is to ensure socio-economic development of the city of Baikalsk by means of a reprofiled BPPM, and to increase independence from the mill with respect to infrastructure and economy. Furthermore, the ecological impact of the BPPM shall be sharply decreased due to modernisation with recent environmental technology and the change of the production profile. The duration of the programme is 2000-2010 and its implementation is planned in three stages.

Stage I (2000-2005) (total cost 66 mio US \$)

A) Reprofiling of BPPM (cost together with C: 53 mio. US\$)

- construction of a closed water cycle
- reconstruction of production lines, cold air desiccation, dry removal of bark
- several measures to reduce emissions (especially dimethylsulfide and methylmercaptane)
- increasing the production of unbleached pulp up to 200 000 t
- ceasing the production of bleached pulp by 2003

B) Baikalsk (12 mio US \$, + 578 jobs*)

- construction of an independent municipal waste water treatment
- establishment of support mechanisms for alternative economics (eg. a business center)
- development of tourism infrastructure
- development of wood industry(sawmill, wood products, wood chemicals) in cooperation with four wood harvesting companies BPPM holds shares on the territory of BPPM

* of those 578 new jobs, 428 are related to BPPM eg. Wood processing and recultivation

C) Environmental measures (necessary regardless of the future of BPPM)

- recultivation of the lignin-sludge basins
- reclamation of the ground water contamination
-

Stage II (2004-2008) (163 mio US \$)

A) Reprofiling of BPPM

- further intensification of the production of end products and diversification of the assortment (paper bags, package paper, cardboard, sanitary paper products)

B) Baikalsk (+130 jobs)

- consolidation of the alternative economy, production of furniture
- production of bottled baikal water/drinks and herbs/garden/forest products (cedar oil, berries) (ca. 95 jobs)

C) Environmental measures (necessary regardless of the future of BPPM)

- gasification or electrification of the power and heating plant (2006), closing the utilization of hard coal

Stage III (2008-2010) (125 mio US \$)

Reprofiling of BPPM

Transformation of BPPM into a paper plant

- determination of pulp production, usage of bought pulp and possible waste paper as raw material
- intensification of paper production, further diversification of the production variety (print and office paper...)

Baikalsk

Stabile alternative economy, no unemployment (overall additional 700 jobs)

Stage II and III are not strictly determined yet and will be further developed during the course of stage I and its economical development. The proposed paper plant would require new buildings and a new waste water treatment facility for the industrial water, while the further usage of the closed water cycle is not examined yet. In respect to a new environmental friendly pulp production technology the possibility of keeping pulp production also in stage III is not excluded

Production profile of BPPM

	1999 ¹	Stage I (until 2003/ 2005)	Stage II	Stage III
Work places	2612	2490	2770	2450
Unbleached pulp t/a	60 000	75 000/ 207 000	207 000	(71 000)*
Bleached/viscose pulp t/a	50 000	80 000/ --	(40 000)*	(107 000)*
Cardboard t/a	No data	10 000	70 000	70 000
Package paper, sacks t/a	-	-	18 500	18 500
Sanitary paper prod.t/a	-	-	14 000	14 000
Tall oil/terpentine	8 000	12 000	12 000	12 000
Wood consumption m³/a	1100 000	1066 000	1066 000	-
Fresh water supply m³/d (total/BPPM)***	120 000	12 000/4000	12 000/4000	10000/23 50
Waste water m³/d	110 000	21 000**	21 000**	2 000

¹ according to TACIS; ()* bought pulp, **volume discharged into the closed water cycle,

***warm water supply for Baikalsk: 7000m³/d

Water supply/Waste water treatment

Closed water cycle/cleaning of industrial water

The technical water used in the pulp production, the collected rain water and the contaminated groundwater will be regenerated together by biological and chemical (regeneration of salt and chemicals) means. The volume of waste water discharged into this system is estimated at 21000 m³/d with a daily production of 14 t of sludge. To refill the losses on evaporation and steam production, a freshwater supply of about 4000 m³/d will be necessary.

Municipial waste water treatment plant for Baikalsk

A separate treatment facility for the waste water of Baikalsk and common waste water of BPPM territory ¹⁾ is planned with a capacity of 12 000 m³/day, of which 10 800 m³/d comes from the town and 1200 m³/d from the mill. It is proposed to implement a multiple-step technology including mechanical, biomechanical (bioreactor), absorption and UV-treatment of the waste water, which finally will be discharged into Lake Baikal through the existing discharger at 40 m depth.

Costs: ca. 1,5 mio US\$

Heat and Power Plant of BPPM

Overall, 1,4 mio. Gcal/a will be required for the supply of steam and hot water by the mill and the town (hot water, ca. 7000 m³/d), of which the town consumes about 1/6 (250 000 Gcal/a). There is no plan to separate the energy supply of the town and the BPPM. So far, HPP burns hard coal together with the dried lignin sludge²⁾, while the remaining ash and slag is stored in the existing sludge basins.

Gasification of HPP (ca. 5,4 mio US\$) is planned along with the construction of the gas pipeline from Koviktinski gas field via Irkutsk, Buryatia-Mongolia- to China, which is expected to be finished in 2006. Alternatively, electrification is discussed which would be more expensive (8,9 mio US \$) and would require a new 500/220 KW power line from Irkutsk.

Estimated pollution reduction

The main pollution reduction would be reached after stage I, especially with respect to chlorine and chlororganica due to the decrease of bleached pulp production, reduction of fresh water supply (from 120 000 m³/d down to 4000 m³/d) and waste water, as well as 95 % reduction of dimethylsulfate and methylmercaptane by reconstruction of the production line and improved emission technology. A second major reduction of emissions into the atmosphere can be expected with the gasification of HPP during stage II.

Wood and energy consumption seems to remain on constant levels.

Recultivation of lignin-sludge basins and utilisation of lignin and coal ashes ³⁾ (2000-2004, 10 mio US\$)

Overall, there exist 10 basins built in 1966-70 which are covering 82 ha and are filled with 3,5 mio. m³ sludge. All sites except for No. 8 and No.9 (30% resp. 60%) were filled up completely with lignin-sludge until 1988. Since 1988 this sludge was dried and burned in the heat and power plant, or partly sold as drilling liquid (until 1991). Recently, it is estimated that up to 1500 t/a could be used as drilling liquid at the Koviktinski gas field again.

According to "Project technical recultivation of the lignin sludge basins No.1-7 of BPPM", 1999, it is planned to dry and densify the sludge (liquid content up to 95%). For this purpose, lignin and coal ash/slag from the HPP, municipal and construction waste will be dumped into the basins, then mechanically densified and finally planted with pines and fir-trees.

The newly produced lignin and waste water sludge will be dried and burned in the HPP.

Ground water reclamation⁴⁾ (2000-2005) (2 mio US\$)

Below the territory of BPPM groundwater contamination occurs with respect to sulfate, hydrocarbonate, increased temperature, phenols, terpentine and other components. Usual practice to stop the pollution front and plum is to pump out the groundwater through a special treatment facility and finally discharging it back into the aquifer.

Here it is planned to treat the contaminated ground water together with the industrial waste water of the BPPM. There is however no information given if and how this water will be returned into the aquifer. So far 10 groundwater wells have been drilled and 3 more a planned.

To prevent new ground water contamination it is planned to run all pipes, equipped with protection shields, above the ground.

Remarks to ecological critical issues (see footprints)

- 1) the unsharp separation of the municipal wastewater and common waste water of the BPPM territory is one of the most criticized issue and is considered a possible loophole for hidden discharge of wastewater from the closed cycle.
- 2) the burning of lignin-sludge, especially from chlorine-bleached pulp, is in general considered as one of the main sources for dioxin emissions. To reduce their formation, the temperature has to be > 1000 °C. According to TACIS the burning temperature of HPP is about 700 °C and therefore insufficient.
- 3) Hence the given information is very scarce (pollutants, depth, basin construction, sealing...) it is hard to judge on the given recultivation concept, which looks rather unusual and is lacking a treatment of the drainage water.
- 4) The given information is again too scarce (pollutant concentration, plum area, flow...) to justify the given concept. The treatment together with the industrial waste water of the BPPM may contain several drawbacks. Assuming that the same amount of pumped ground water will be returned into the aquifer, it will have a completely different hydrochemical composition and temperature. Furthermore, there is a risk of new ground water contamination in case of uncontrolled discharge of insufficient treated water. It may also serve as another loophole for the closed cycle. If there is no return, a ground water deficit and lowering of the ground water level might occur.
- 5) The programme lacks the ecological and economical evaluation of wood harvesting, amount and transport (see also comments TACIS)

There is no clear concept or financing for an independent and sufficient environmental control. Since the whole programm is subject to the economical and financial situation and the given time frame is only a recommendation, there is no mechanism to ensure and enforce the implementation of the full programme.

Economic Justification of the Reprofiting Programme

The following economic arguments are presented in justification of the reprofiting Programme:

- 1) Low consumption of paper and cardboard in Russia (14-16kg/year) in comparison with the developed countries (35-36kg/year). This can be seen as the proof of existing of a potential internal market for such products in Russia.
- 2) Relatively low percentage of high-end paper products in the structure of paper industry in Russia in comparison to the industries of such leading countries as Finland or Sweden.
- 3) Growing imports of high-end paper products in Russia.

The following annual demand is expected on the proposed products of the BPPM in the Eastern Siberia Region (according to the 1998 study by Sibgiprobym, Siberian Institute for Paper Industry):

Sanitary paper	18 800 t
Package paper/paper bags	42 300 t / 83.2 mio
Box cardboard	67 000 t
Corrugated cardboard	25,6 mio sq. m
Office paper	23 200 t

The following economic targets are established, for the three stages of the Programme:

Target	Stage 1	Stage 2	Stage 3
Operating profit (mio US\$)	20.5	35.8	18.7
Profit margin (%)	48.8	49.0	17.6
Investment amount (mio US\$)	57.2	222.4	351.6
Investment return time (years)	3.6	6.3	5.8

Financing of the programme (most recent information should be obtained)

As financial sources are selling of half of the state shares (totally 50%; ≈15-20 mio. US\$), a fund of Worldbank within the program No.3806-Ru for environmental protection (≈ 25 mio US\$), profit of production sales (see above) and grants/technical assistance in discussion.

According to latest local news 33 mio US\$ are mentioned for stage 1.

Programme Administration and Control (P. Laskov)

- 1) The main "management institution" is the Coordination Council, comprising representatives from the BPPM, the administration of Sludjanka district and of the Baikalsk etc. The purpose of the Coordination Council is development of recommendations on the implementation of the Programme, and coordination of the work of various levels of administrative institutions.
- 2) "Operational work" of the Coordination Council is carried out by the expert commission whose recommendations are adopted with consideration of efficient utilization of budget funds and socio-economic importance of the project.
- 3) Operational management of the South Baikal Ecological-Economic Zone (EEZ) is conducted by the Direction led by the Mayor of Sludjanka.

- 4) Implementation of the Programme is carried out by local administrations. "Centers for responsibility and development" are to be created, to realize the general policy developed by the Council, under the operational management of the Direction.
- 5) The State Commissioner, the administrations of the Irkutsk Region and of the Sludjanka District, develop legislative initiatives, at local and federal levels, drafts of ministerial regulations, and corrections of targets, timing, contractors and resources.
- 6) Additional control over financial resources is exercised by the Finance Ministry of Russian Federation. Terms and amounts of funding are determined by the Programme.
- 7) The State Commissioner, based on operational information, has the right to adjust, on annual basis, the targets, composition of contractors, and the financing of the Programme measures. In the case of insufficient or untimely resource allocation, the State Commissioner can apply for extension of the Programme to the Government of Russian Federation.

Remarks on administration and control

- 1) The general idea of centralized coordination of the implementation of the Programme via the Coordination Council is sound. However, no effective control mechanisms are given for the Council under the Programme. Moreover, its recommendations are subject to "considerations of efficient utilization of budget funds", which may lead to severe limitations of their implementation in practice.
- 2) There is no clear description of reporting mechanisms; in particular, of the relations between the Council and the Direction.
- 3) Financial control of the Finance Ministry may lead to significant dependence of the implementation of the Programme on federal government.
- 4) The provisions on adjustment of the Programme may, in fact, mean that its implementation will be delayed and its targets will be changed.

Sources:

- 1) Complex programme on reprofiling Baikalsk PPM and diversification of the city of Baikalsk", Irkutsk-Moscow, July 2000, 186p
- 2) Abstract on the first stage of the "Complex programme on reprofiling Baikalsk PPM and diversification of the city of Baikalsk", Irkutsk, February 2001, 19p
- 3) Material of agreement "Complex programme on reprofiling Baikalsk PPM and diversification of the city of Baikalsk", Irkutsk 2001, 207 p.
- 4) DTV-Atlas "Oekologie, 1998 Muenchen

Abstract about the TACIS programme "Analyse of the development of pulp and paper mills in Baikal region: Baikalsk Pulp and Paper Mill"

This TACIS programme ran from 1997-1999 and was carried out by Jakko Poury Consulting, Finland. Overall 8 reports were published (see list below) and their main conclusions are, as far as they are relevant for the recent discussion of reprofiling BPPM summarised here. Especially the market analyse for pulp and paper products and the study about wood resources are very detailed and worth to consider.

In their work they evaluated and compared the recent state of BPPM and following four reprofiling variants in respect to economical and ecological standards.

- 1) Closing of BPPM

- 2) Modernisation according to recent technology standards with elemental/total chlorine free bleaching without closed water cycle (updated UNIDO-Programme 1995)
- 3) Thermo-mechanical pulp production (aspen wood) and paper production with and without closed water cycle (Programme Grachev 1997)
- 4) Paper production on bought pulp (TACIS)

Since there is no variant with closed water cycle, a direct comparison of the ecological improvement is not of interest, but following aspects might be worth to consider:

General conclusions of TACIS:

- the mill is geographically unfavorable located in respect to market distance, raw material distance, transport infrastructure and concurrence, therefore the economical feasibility is questionable.
- wood supply comes from an average distance of 1 400 km transported by railway, therefore the price for raw material heavily depends on railway costs, furthermore all the wood is bought on the market^{*)} => risk of high raw material prices endangering the rentability
- according to their market analyse, the production of bleached market pulp, sanitary paper and wrapping paper is recommended, while unbleached pulp and white printing paper is less recommended due to high concurrence. They are not recommending the reprofiling to a pure paper plant (lowest rentability)

Similarities to the "programme":

- both studies calculating a pulp production of around 200 000 t/a, which is close to the original capacity of BPPM
- in both studies, modernisation results in a significant decrease of the environmental impact, especially regarding water utilization, waste water discharge as well as emissions

Main difference to the "programme":

- they consider the price and transport costs for raw material (wood or pulp) as critical, while there is no evaluation of it given in the "Programme"
- there are significant differences in the calculated work force for roughly 200 000 t/a pulp production: 1200 (TACIS) vs. 2400 (programme) as well as for the paper plant: 660 vs. 2770 (production 140 000 t/a resp. 100 000 t/a)

*here there is a contradiction between TACIS and the "Programme", according to TACIS BPPM does not own any wood harvesting companies and has therefore to buy all wood on the market, while according to the "programme" they hold major shares of four wood harvesting companies. According to TACIS there are not enough wood resources within a radius of 600 km for BPPM and Selenginsk PPM and therefore recommending technologies to use low quality and waste wood.

List of TACIS reports, all in russian (UNESCO Moscow has no copy)

- 1) Jakko Poury, (1997): Comparison of elemental chlorine free (ECF) and total chlorine free (TCF) bleaching. (general, not very relevant)
- 2) TACIS/Jakko Poury Consulting (04/1999): Ensuring the supply of wood to BPPM (very detailed and good)
- 3) TACIS/Jakko Poury Consulting (05/1999) Preliminary analyse rentability of development variants

- 4) TACIS/Jakko Pory Consulting (05/1999): BPPM- market analyse (very detailed)
- 5) TACIS/Jakko Pory Consulting (07/1999): Ecological Evaluation of BPPM and variant of its development
- 6) TACIS/Jakko Pory Consulting (09/1999) Consequences of closing BPPM for the town of Baikalsk
- 7) TACIS/Jakko Pory Consulting (10/1999) Evaluation of three different variants for further production t BPPM (comprehensive report)
- 8) TACIS/Jakko Pory Consulting (12/1999): BPPM: Evaluation of short-term variants for the produciton of chemical pulp

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