The Antarctic and Southern Ocean Coalition

SUBGLACIAL LAKE RESEARCH AND ENVIRONMENTAL IMPACT ASSESSMENT UNDER THE ANTARCTIC PROTOCOL

A document prepared by ASOC for the SCAR Workshop on Subglacial Lake Research

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Abstract

This document discusses the application of Annex I on Environmental Impact Assessment of the Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol) in relation to subglacial lake research.

It is argued here that best practice on Environmental Impact Assessment should be applied to ensure that the environmental protection principles of the Madrid Protocol are followed. Environmental Impact Assessment (EIA) is a *process* that informs decisions before they are taken. It is not just the EIA document, and it is not simply a rubberstamping of a *fait accompli*.

In ASOC's judgment proposals to drill into Lake Vostok or any other subglacial lake require the highest level of EIA under the Madrid Protocol—a Comprehensive Environmental Evaluation (CEE). The CEE process has to precede any decision to penetrate Lake Vostok or any other subglacial lake.

1. INTRODUCTION

This document discusses the application of Annex I on Environmental Impact Assessment of the Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol) in relation to subglacial lake research.

The interest in subglacial lakes coincided with the early stages of implementation of the Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol). Given that both are new processes, the Antarctic and Southern Ocean Coalition (ASOC)[1] argues for a cautious and staged approach to the study of the subglacial lakes. This requires that a more broad and robust case than one based simply on scientific interest (see below) is made for penetrating a subglacial lake. If and when the first lake is penetrated, it should only be at the end of a process where (i) the scientific benefits and objectives have been clearly identified, (ii) drilling and associated technologies and methodologies tested beforehand, (iii) the potential environmental impacts assessed for their acceptability through best EIA practice and (iv) where accepted, the impact should be thereafter minimized through the rigorous application of relevant provisions of the Madrid Protocol.

[1] The Antarctic and Southern Coalition (ASOC) is a global network of conservation organizations formed in 1977. The main aim of ASOC's activities is nature conservation in Antarctica. ASOC has observer status at the annual Antarctic Treaty Consultative Meetings and meetings of the Convention for the Conservation of Antarctic Marine Living Resources.

The pertinent Madrid Protocol provisions include those on Environmental Impact Assessment (Annex I), waste management (Annex III) and protected areas (Annex V). Subglacial lake research, as any other activity in Antarctica, must meet the environmental principles, technical standards and spirit of the Madrid Protocol, which is directed to protecting "..the Antarctic environment and dependent and associated ecosystems and the intrinsic value of Antarctica, including its wilderness and aesthetic values and its value as an area for the conduct of scientific research."[2].

As any attempt to penetrate an Antarctic subglacial lake is likely to involve a multinational, large-scale proposal with high international public profile, it is particularly important that it clearly meet the highest expectations of propriety and environmental standards.

It is argued here that best practice on Environmental Impact Assessment should be applied to subglacial lake research to ensure that the environmental protection principles of the Madrid Protocol are followed.

2. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REQUIREMENTS UNDER THE PROTOCOL

Environmental Impact Assessment (EIA) is the process of identifying, predicting and evaluating the relevant effects of development proposals, and examining possible mitigation measures, prior to major decisions being taken and commitments made.[3] In the Antarctic context, the EIA is defined as a process having the ultimate objective of providing decision makers with an indication of the likely consequences of a proposed activity.[4]

The Antarctic EIA process involves:

(1) Scoping the activity in the environment in which it is proposed. This involves evaluating potential impacts, proposing corrective or mitigating measures and monitoring programs, determining the appropriate level for the EIA (PA/PEE, IEE or CEE) [5] and writing the EIA document. These stages are all generally done by, or on behalf of, the proponent – although national authorities or prior legal guidance may specify the required EIA level;

(2) Review of the EIA document and any other relevant materials or considerations by national authorities. In the case of a Comprehensive Environmental Evaluation (CEE) the EIA document is also circulated for comment to Antarctic Treaty Parties, the Committee for Environmental Protection (CEP) and made publicly available.

(3) A decision by the appropriate national authority on the acceptability of the proposal, and/or any modifications to the proposal that are required.[6]

EIA is a *process* that informs decisions before they are taken. It is not just the EIA document, and it is not simply a rubberstamping of a *fait accompli*.

IEE or CEE?

Article 8 of the Protocol provides three categories of environmental impact assessment (PA/PEE, IEE and CEE), depending on the level of environmental impact (*less than*, *equal to* and *more than* minor or transitory). The interpretation of the term minor and transitory impact is not exact, so

[2] The Protocol on Environmental Protection to the Antarctic Treaty: Art. 3(1).
[3] IAIA (International Association for Impact Assessment) (1996): Principles of environmental impact assessment best practice. http://www.iaia.org
[4] COMNAP (Council of Managers of National Antarctic Program Operators) (1999): Guidelines for Environmental Impact Assessment in Antarctica. Hobart, Australia: COMNAP, ATCM. p.2.
[5] PA/PEE—Preliminary Assessment/Preliminary Environmental Evaluation; IEE—Initial Environmental Evaluation; CEE—Comprehensive Environmental Evaluation.
[6] COMNAP, op.cit. p.6.

decisions are made on a case-by-case and site specific basis.[7] However, standard practice between ATCPs also guides this decision—noting that there is a degree of flexibility as to how the impact of a proposed activity is interpreted. At times a decision is made to err towards the protection of the environment (thus implementing a higher level of EIA). Other times Parties have applied a minimalist interpretation of the Protocol requirements (and thus have required a lower level EIA).

In the case of subglacial lake research there is no precedent to guide a decision. However, the drilling component or components of the project most certainly warrants a CEE. The roots of the present EIA obligations (and Annex) are in the 1987 *Recommendations on Human Impact on the Antarctic Environment*: Rec XIV-2 on *Environmental Impact Assessment* and Rec XIV-3 on *Safeguards for Scientific Drilling*. The discussions leading up to these Recommendations identified construction of new bases, major infrastructure such as airstrip construction and scientific drilling as activities likely to require Comprehensive Environmental Evaluation (CEE) – indeed Rec XIV-3 specifically mandates this. Although XIV-3 was primarily directed towards hard-rock drilling, the use of hydrocarbons as drilling fluids in most ice-drilling operations, the environmental risks associated with these activities and the substantial infrastructure and logistics entailedhave reinforced the appreciation of CEE as the appropriate EIA level.

Subsequent to the Protocol's entry into force, CEE has become the established norm for Antarctic drilling projects of all types. Projects subject to CEE have included: the Cape Roberts Drilling Project led by New Zealand (1992 and 1994), Dome-C station and the scientific ice-core drilling project undertaken by France and Italy (1994), and the EPICA ice-core project led by Germany (1999). In 2001 Japan submitted an Initial Environmental Evaluation (IEE) for a drilling project at Dome Fuji[8]. Whilst this document was accepted by the ATCM as a *comprehensive* IEE, it raised some questions—and eyebrows—as to whether this was the appropriate level of EIA required under the Protocol.[9]

A CEE…when? How?

Drilling at Lake Vostok was in fact initiated in 1990, prior to the adoption of the Protocol, and despite Recommendations XIV-2 and XIV-3 no EIA was prepared then. Subsequently (and simultaneously with the Protocol's entry into force) Russia has drilled to within a very short distance of the lake's surface—still with no EIA presented to the ATCM. The need for a CEE has been explicitly recognised by the Antarctic Treaty System (ATS) at least since 1998, and specifically by Russia, one of the Parties more involved in research at Lake Vostok and the leading state in the field of deep drilling, on several occasions.[10,11,12,13]

During the CEP IV meeting that took place concurrently with ATCM XXIV, Russia submitted a document outlining a proposed technology to drill into the Lake, and its evaluation by an Expert Commission. This Commission concluded that the proposal complied with Russian legislation implementing the Protocol, and that the envisaged environmental impact of the project in the process of penetrating the subglacial Lake Vostok was permissible.[14] Russia also stated that a CEE

[7] COMNAP, op.cit. p.2.
[8] Japan (2001): IEE for deep ice core drilling activity at Dome Fuji Station. XXIV ATCM/IP 53.
[9] CEP IV Final Report, paragraphs 32-34
[10] XXII ATCM Final Report, paragraph 127.
[11] CEP I Final Report, paragraph 32
[12] CEP II Final Report, paragraphs 42 and 43.
[13] XXIV ATCM Final Report, paragraph 49
[14] Russia (2001): Expert conclusion for the Project "Justification and development of the ecologically clean technology for penetrating the subglacial Lake Vostok (Antarctica)". XXIV ATVCM/WP 29.

would be produced for the next ATCM (Warsaw, Poland, September 2002)[15] and made public its plans to drill 50m further down towards Lake Vostok.

In ASOC's judgment proposals to drill into Lake Vostok or any other subglacial lake require the highest level of EIA under the Madrid Protocol—a CEE. The consultation process associated with CEEs seems particularly appropriate for projects of a multinational nature and high public profile. Clearly the CEE process has to precede any decision to penetrate Lake Vostok or any other subglacial lake. An earlier decision would be premature.

ASOC considers that a CEE for a proposal to penetrate a subglacial lake should address:

1. The purposes of the proposal, and whether these are consistent with the environmental obligations of the Protocol and the special status Parties to the Antarctic Treaty and its Protocol have accorded the region;
2. Alternative technologies available, including those available outside of the proposing country/s;
3. Timing considerations such as whether safer technology is likely to be developed in the foreseeable future;
4. Alternatives for the research itself, such as using a smaller lake or carrying out more targeted projects tailored to the specific needs of different scientific disciplines;
5. Consideration of a moratorium on drilling into the particular preferred lake (e.g. Lake Vostok) for some period.

In the particular case of Lake Vostok, consideration should also be given to designation of appropriate protected area status under Annex V of the Protocol.

3. CONCLUSIONS

There are no clear mechanisms in the Protocol to address the restrictions that environmental protection requirements pose on the type and level of proposed activities other than generically (e.g. in Arts. 2 and 3). With the exception of some specific prohibitions and limitations for activities that require permits, EIA is the only codified "gatekeeper" to Antarctica, and the only (limited) mechanism to establish whether an activity merits being carried out in Antarctica or not.

Thus it is of paramount importance that the EIA process is conducted conscientiously and with application of the principles of best practice on EIA as accepted both in the Antarctic community and by professional practice elsewhere.

ASOC is concerned because alongside the ongoing discussion on research programs and plans for further drilling we see a developing sense of *fait accompli* about drilling into Lake Vostok—before any EIA has been produced. This would be a most serious failure of State Parties and the international science community in regard to the obligations under the Protocol—and a dreadful precedent for subsequent EIA practice in Antarctica.

[15] ATCM XXIV Final Report, paragraph 49.

APPENDIX A

SOME QUOTES FROM ATCM AND CEP FINAL REPORTS CONCERNING LAKE VOSTOK

XX ATCM Final Report (1996)

(108) Further investigations of the subglacial Lake Vostok were reported by Russia (XX ATCM/INF 83), which had undertaken detailed seismic and radio-echo sounding investigations as suggested by the SCAR workshop. The importance of this multi-disciplinary project was recognised by the Meeting, which encouraged international co-operation in the future investigation undertaken in this project. SCAR reported that the workshop had stressed that before any sampling of the lake could be considered, both technical developments and an Environmental Impact Assessment would have to be undertaken. Several Delegations considered that the value of future studies could be compromised if the lake were to be accidentally polluted as a consequence of planned ice coring above it. The Meeting urged Russia to take the necessary steps to ensure that the planned ice coring is stopped at a safe distance above the reported lake so that there is no risk of polluting it.

The United Kingdom drew attention to the extensive discussion regarding this project as an example of the value of discussing major science issues at the next ATCMs.

CEP I Final Report (1998)

(32) Several information papers were introduced that contributed to the discussion. (…) The Russian Federation introduced Information Paper (XXII ATCM/IP 68) on the environmental impact of the Deep Drilling Project at Vostok Station. The issue of whether to continue drilling into the large sub-glacial lake underneath Vostok Station raised a number of questions related both to science and to environmental impact assessment. The Russian Federation indicated that it intends to produce a draft Comprehensive Environmental Evaluation for the proposed drilling into the sub-glacial lake before the next CEP, as called for in Annex I, Article 3, para. 4 of the Protocol.

ATCM XXII Final Report (1998)

(127) The Russian Federation submitted an Information Paper (XXII ATCM/IP64) describing research conducted at subglacial Lake Vostok. The Russian Federation also introduced Information Paper (XXII ATCM/IP68) on deep drilling activities at Vostok Station. The Meeting thanked Russia for its interesting Information Papers. The discovery of the subglacial Lake Vostok represents a unique event and offers the opportunity of further promising scientific research. The Meeting was encouraged to learn of the very careful and precautionary approach that the Russian Federation has taken. It was also noted that a Comprehensive Environmental Evaluation (CEE) is being prepared, and that the drilling has been halted pending that CEE. The Russian Federation will prepare regular updates on science and technological developments regarding the Lake Vostok project which will be discussed with SCAR.

CEP II Final Report (1999)

(42) Russia presented Information Paper (XXIII ATCM/IP73), on the current and projected environmental situation at deep borehole 5G1, at the Vostok Station. Russia is proceeding with great care and in full compliance with the Protocol, and there has been cooperation with SCAR to ensure such compliance. The paper noted that a CEE would be prepared before any penetration into Lake Vostok, but that at the moment adequate technology was not available and therefore the CEE could not be completed.

(43) The Committee took note of the report and commended Russia on the care with which it was protecting the environment of Lake Vostok. The Committee also acknowledged that this activity raised a series of environmental, scientific, and technical concerns, and accordingly Russia should continue to proceed with great care. The Committee acknowledged the concern expressed that the testing of new technologies could affect the unique conditions at Lake Vostok and that such testing should preferably take place at less sensitive sites. SCAR informed the Meeting that it will hold the next workshop in a continuing series, to develop science and logistic plans for Lake Vostok, on 26 - 28 September 1999 in Cambridge, UK

ATCM XXIII Final Report (1999)

(140) At the request of several delegations, the Russian Federation presented Information Paper (XXIII ATCM/IP77) outlining activities of the Russian Antarctic Expedition in respect of studies of subglacial Lake Vostok. The Russian Federation noted that during 1998-1999 radar observations were carried out using modern digital equipment specifically designed for that purpose and that their measurements complemented earlier seismic studies. The measurements covered a large area around the Vostok Station and will allow the identification of spatial features of subglacial terrain structure, including, thickness of the ice sheet, water column and bottom sediments as well as the contour in the southern part and along the longitudinal axis of the lake.

(141) SCAR noted the importance of the continuing studies of subglacia1 Lake Vostok by the Russian Federation and announced that in September 1999. SCAR will sponsor an international workshop with the aim of assisting the development of a science plan for future studies of Lake Vostok.

CEP IV Final Report (2001)[16]

(26) The Russian Federation presented Working Paper (XXIV ATCM/WP29) containing a preliminary expert conclusion from the Russian State Ecological Expert Committee for proposed ecologically clean technology for penetrating the subglacial lake Vostok. The Committee thanked Russia for this comprehensive information on a project of very high scientific and public interest and noted that a draft CEE would be submitted for the project at later stage. Various comments were made on that project including: the need for an analysis of the levels of contamination that are acceptable to safeguard the scientific and environmental values of the Lake; the issue of field trials, including at other locations than Lake Vostok, and the planned timetable. On the latter Russia noted that there were still some uncertainties, in part related to funding. Russia requested comments from Parties on their Working Paper by the end of the year, and several Parties offered to provide them.

XXIV Antarctic Treaty Consultative Meeting (2001)

(49) France noted the CEP's discussion on Russia's proposals for further drilling operations above the subglacial lake Vostok (paragraph 26 of the CEP Report). France questioned Russia on the timetable for the production of the CEE. Russia confirmed that this would be prepared in time for ATCM XXV.

[16] Latest draft of CEP IV Final Report as posted in the CEP website (http://cep.npolar.no//cephome.htm) at the time of writing this document.