

Minutes from the Seventeenth Meeting of

Arctic Monitoring and Assessment Programme Working Group

Boulder, USA, 12 – 14 May, 2003

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Minutes of the 17th AMAP WG meeting, Boulder, Colorado, USA.

May 12-14, 2003

1. Opening of the AMAP WG meeting

The AMAP WG Chair, Helgi Jensson (Iceland), opened the meeting. He welcomed the participants and looked forward to a fruitful meeting to, in particular, strengthen the plans for the preparation of the ACIA policy document and the AMAP assessments on petroleum hydrocarbons and acidification, and to initiate consideration of the AMAP Strategic Plan for the future period.

He informed that Vice-Chair Yuri Tsaturov was unable to attend this meeting due to commitment related to the preparation for the European Ministerial meeting to be held in Kiev, later in May, and also welcomed John Calder as the new Chair of the ASG.

John Calder welcomed the meeting on behalf of NOAA, and wished them a fruitful meeting and pleasant stay in Boulder.

Practical information on behalf of the meeting organizers was given by Jill Reisdorf.

A list of participants at the WG meeting is attached as Annex 1.

2. Approval of the Agenda

Helgi Jensson introduced the draft agenda for the meeting and invited comments. The draft annotated agenda (Annex 2, WG 17/2/1) was adopted without changes.

A list of documents to the meeting is attached as Annex 3.

A list of Actions arising from the meeting is attached as Annex 4.

The Chair proposed that the meeting would be run to include parallel working meetings of those participants who were responsible for the development of a more detailed Outline for the petroleum hydrocarbons and acidifications assessments.

It was agreed that the agenda would be considered in such a manner that the late arrival and/or availability of certain key experts that would be joining the meeting to address certain agenda points, in particular those under agenda item 7, could be accommodated; also to allow some participants to move between the parallel WG and assessment group sessions and still be present for specific agenda items. Changes in the timetable for Tuesday were noted.

3. Progress report from the Chair and the Secretariat.

Lars-Otto Reiersen (AMAP Executive Secretary) reported on progress since the last AMAP WG meeting by introducing document WG 17/3/1 (the progress report presented to the SAOs meeting in Reykjavik in April 2003). The report gives an update on ongoing activities since the Ministerial meeting in October 2002.

In addition it was informed that at the SAO meeting it was made a separation of work between AMAP and ACAP regarding production of Fact Sheets. AMAP is now responsible for production of Fact Sheets related to results from AMAP's work and that ACAP would prepare Fact Sheets related to its work and projects.

The AMAP web side was prepared many years ago and the Secretariat has involved a professional consultant to upgrade the web side to make it more user-friendly.

He also presented two information papers. The first of these (WG 17/3/Info-1) was a press release associated with a meeting sponsored by Euro Chlor/ECETOC on availability, interpretation and use of environmental monitoring data – which emphasized the need for improved reliability of data and the provision of better guidance to ensure harmonized screening between European countries. In this connection, the meeting suggested that the AMAP approach was a good model that might be followed by others.

The second document (WG 17/3/Info-2) was an extract from the UNEP-Chemicals global assessment of persistent toxic substances (PTS). This global assessment had been based on a Regional Based Assessment (RBA) approach, under which AMAP had contributed the material for the Arctic Regional Assessment volume, based on its 1998 assessment report. The extract contained the summary conclusions relating to environmental levels, toxicological and ecotoxicological patterns. The Arctic Regional Assessment volume had been prepared thanks to financial support from Canada, and Hans Martin from Canada had been the responsible person for the writing.

Vitaly Kimstach introduced the document WG 17/3/4, and informed the meeting participants about progress in implementation of the RAIPON/AMAP/GEF project “*PTS, Food Security and Indigenous Peoples of the Russian North*”, Phase 2 and plans for implementation of Phase 3 of the ACAP PCB project. The meeting participants were also informed about cooperation with the Nordic Environment Finance Corporation (NEFCO) concerning the project to update the NEFCO/AMAP report from 1995 regarding identification projects that may improve the environmental and human health situation in northwest Russia. With the reference to the decision of the AMAP WG-16 on participation in the 3rd World Water Forum activities, he informed the meeting participants about the 3rd World Water Forum meeting in Kyoto, Japan (16-21 March) and the related development of the project “Dialogue on Climate Change Adaptation Strategy in Water Management and Flood Preparedness at the Lena Basin” within the framework of the global Dialogue on Water and Climate. The meeting participants were also informed about the situation with the GEF project application “Impacts of Climate Change on Terrestrial and Aquatic Ecosystems and Their Management in Permafrost Regions of Russia (ICAR)” .

Lars-Otto Reiersen informed the meeting participants about the status of the contribution to the EEA’s European Environmental Status report (the Kiev report) that was prepared by the lead authors of the AMAP radioactivity expert group, Russia and Norway. The report has now been published and is available from EEA’s office in Copenhagen.

He also informed about the report on the European Perspective on the Arctic Environment that was being jointly prepared by the EEA and UNEP. This report comprises part of the background information that will be used in the development of the EU Northern Dimension. The report is being prepared by GRID-Arendal, but EEA/UNEP had requested that the AMAP Secretariat contribute material to the pollution and climate change sections, based on material contained in the 1997 and 2002 AMAP assessment reports. The AMAP Secretariat is still discussing with GRID-Arendal and EEA how to best present some of the key issues. The report may be ready by mid summer 2003. The priorities for EUs Northern Dimension, including the Arctic window, shall be in operation from January 1, 2004.

Simon Wilson presented document WG 17/3/2 which summarizes the status of the preparation of the AMAP 2002 assessment reports. Three of the six envisaged reports (the *Arctic Pollution 2002* SOAER, and the scientific background documents on *Human Health*

and *Climate Influence on Contaminant Pathways*) have been published. Final publication work on the POPs report is currently underway and due to be completed during June. The radioactivity report is currently undergoing final technical/linguistic editing and will be published after the POPs report is completed. The heavy metals report has just undergone a further round of peer review.

Lars-Otto Reiersen informed the WG that the finances provided by the countries for the report production were adequate and that no financial problems were anticipated with regard to completion of the report production work. He further mentioned that sufficient funds were available within the budget to undertake financing of the final technical/linguistic editing of the heavy metals report if this were desired.

The AMAP Chair pointed out that, so far, three of the five scientific reports have been edited by the same consultant, and that this had a number of advantages with respect to harmonization in the style of the reports. It was considered that the heavy metals report might therefore benefit from using the same editor.

Suzanne Marcy (USA), the lead coordinator for the metals report responded that she had made plans to use an in-house EPA editor, but welcomed the offer to use the editor who had handled the other scientific reports as long as this had no financial implications for the lead country.

It was therefore agreed that, after the authors of the heavy metals report had incorporated any changes necessary in response to the peer review comments, the documents would be passed to the consultant editor for final editing. The AMAP Secretariat agreed to contact the editor to make the necessary arrangements for this work.

Simon Wilson informed the meeting participants about plans and ongoing activities to update the AMAP website (document WG17/3/3). The document also indicates the continuing increase in visits to the AMAP website (currently some 14000 unique visits per month). As such, the website constitutes an important component in AMAPs current and future information strategy.

The WG agreed that, once the new website development had been completed, the WG should be notified and invited to provide comments and suggestions for further improvement before the new development is made public.

4. Statements from Observers

None of the observers present at the meeting wished to make a statement.

5. The ACIA process

Lars-Otto Reiersen gave a short introduction to the ACIA process. The papers 17/5/1, 2, 3 & 4 were presented. A cross-fertilization meeting had been held in Durham, New Hampshire, USA. Most of the scientific chapters have made good progress, however, a few chapters need major rework. A strategy has been agreed to achieve that. All the scientific chapters will July 4th be circulated to external review and to AMAP, CAFF and IASC for national review among contributing scientists. Comments should be returned by October 1st. The production of all the graphics will be made by Paul Grabhorn, and this is well under way. He will also be responsible for the lay-out. The Secretariat will provide the HoDs with names of all external reviewers.

The first draft of the overview document will also be circulated early July for comments. Susan Joy Hassol, the author of this document will prepare it as story lines where she intends to combine results from several of the scientific chapters.

At Durham it was also arranged a scoping workshop for the preparation of the policy document. A draft outline for the policy paper was produced, 17/5/2. Heads of Delegation to AMAP and CAFF were asked to present comments through their national representative to the drafting team. Observing countries and organizations were asked to present their comments to the AMAP Chair that will take them further to the Policy Drafting Team (PDT). The representative for WWF gave some comments to the presented list of content.

A dissemination strategy for the ACIA is under preparation and it is the Assessment Steering Committee (ASC) that is responsible for the development. The group will look into several possibilities, e.g. production of TV-film, fact sheets, and use of internet, etc. The communication strategy will be presented to AMAP and CAFF WGs for their endorsement.

The production of the scientific report, cost for scientists involvement, professional writer for the overview document, graphical production and lay-out is covered by a special contribution from USA and in kind contribution from all Arctic countries and Permanent Participants. However, the printing cost for the reports to be produced is not covered. Several options exist, e.g. voluntarily contribution and a cost per report based on the total cost divided on the number of ordered (as done for the AMAP 2002 reports). There is also an option to ask a professional company to make the printing and they may sell the reports on the open market. If this option is chosen the copyright for the graphics, electronic versions etc. are important that AMAP and CAFF keep. AMAP and CAFF secretariats will prepare a proposal to the SAO meeting regarding options for covering the printing costs. The HoDs will be consulted in this process.

A special ACIA Symposium is under preparation. Based on experiences from the two international AMAP Symposia, there is an intention to arrange the ACIA symposium the week prior to the AC ministerial meeting in Iceland. Countries and organizations will be contacted and kindly requested for financial contributions (sponsorship). (After the AMAP WG it has been held a meeting in Iceland, and Iceland has decided that they would like to host the Symposium, the ACIA Symposium will be held in Reykjavik, tentatively October 4 - 8, 2004). Pål Prestrud, Vice Chair of the ACIA, will be in charge of the organizing committee for the ACIA Symposium. The Lead Authors will be the Scientific committee. The ACIA Symposium will be open for scientific papers related to climate- and UV changes in the Arctic.

6. AMAP Strategic Plan for 2004 and onwards

Lars-Otto Reiersen introduced the background to the request from SAOs/Ministers at the October 2002 meeting in Inari AMAP update its Strategic Plan for the period after 2004. He reminded the WG that the existing AMAP Strategic Plan 1998-2003 is described in the AMAP Report 1999:6 (document WG 17/6/1). Two major assessment rounds have been completed (in 1997/1998 and 2002/2003). Together, these assessments provide a comprehensive documentation of the existing knowledge on the pollution status of the Arctic as of the present time, and it is unlikely that these will need to be updated on a similar scale during the coming ten years. It was noted that one option, for the future, might be to produce assessments of more limited scope, for example concerning temporal trends (where a few additional years of data can result in improved statistical reliability), 'new' chemicals, follow-up of ongoing project activities (e.g. PTS project, ACAP project support), and work on

source related issues, etc. The 1998-2003 plan includes the preparation of the ACIA in 2004, and the assessments of acidification and petroleum hydrocarbons that will now be delivered in 2006, however, with regard to its overall strategy for the future, AMAP is at a crossroads.

To promote debate on this agenda item, the Secretariat had prepared a discussion paper – *AMAP – Where do we go from here?* (WG 17/6/4) outlining some of the main issues, as seen from the Secretariat's point of view, that may need to be taken into account in the development of the future Strategic Plan.

One desirable aspect of a new Strategic Plan would be a shorter response time in responding to Ministers requests, or providing information on currently relevant issues. This would require mechanisms to short-circuit the presently rather slow assessment funding cycle (e.g. a trust fund solution). Also, a rapid preparation of new products/information might have implications for the current system of delivery to Ministerial meetings that only takes place every second year.

Another important linkage to bear in mind in the development of the Strategic Plan would be the possible contribution that AMAP might be requested to make to the effectiveness evaluations of the Stockholm Convention and UN ECE Protocols, that will begin respectively 4- and 3-years after entry into force of these agreements, thus as early as 2006 in the case of the UN ECE Protocols.

In the following discussion Sweden supported a number of the issues raised in the introductory comments – specifically that delivery of new large assessments in a few years time would not be feasible using the existing pool of experts. Production of smaller more focused assessments on topical issues such as mercury, mitigation of effects, certain new POPs, etc., would be a possible solution. They also stressed the need to ensure that such products retain their scientific integrity, for example by 'lifting out consideration of policy issues' into a second parallel process (as is being done for ACIA).

Several participants noted that parts of the AMAP phase 2 assessment process had been more 'political' than had been the case during the phase 1 assessments. It was agreed that the objective for the assessment groups is to produce an objective scientific assessment, free of political considerations. The AMAP WG introduces politics to some extent when preparing their recommendations for Actions, but it is then up to the Ministers to decide whether to adopt the WG proposals and recommendations.

Canada also referred to the issue of how to maintain enthusiasm of scientists for the work of preparing AMAP assessment products and agreed with Sweden that it would be difficult to produce a new report in 5 years time, and suggest rather a 10 years time till the next comprehensive report. They also noted the need for improved strategic objectives. A strategic analysis should be done (based on AMAPs mandate and instructions from Ministers and AMAPs two reports). One change could be the set up of smaller and more focused network than today's comprehensive circumpolar monitoring network to better be able to answer specific questions. Another way of giving quick responses could be by arranging theme workshops and conclude from them.

The 'strategic objectives' contained in the document outlining proposed future activities by the AMAP human health expert group (WG 17/6/2) combines part of the AMAP mandate with issues that relate to the mandate of the SDWG – emphasizing the need for improved inter-group coordination. The possible use of workshop as a possibility to address emerging issues was also raised.

Finland noted that the concept of a small issue-focused assessment report does not necessarily imply a short delivery time. The acidification assessment was given of an example of this.

Responding on the matter of the need to maintain a comprehensive circumpolar monitoring network, Denmark stated that its participation in AMAP is based very much on the premise that AMAP is an agreed international programme in which all eight Arctic countries are actively participating. A circumpolar (core) monitoring programme has been developed under AMAP, and Denmark would strongly support maintaining this, and not support developing a strategy that would provide countries with a justification for reducing the network. The Danish delegation invited the United States and Russia to present their views on this issue.

The United States noted that, to date, most US involvement in AMAP has comprised the delivery of information from ongoing national activities where these overlap with AMAP need. A new strategic plan with defined objectives might provide an opportunity for reversing this situation such that national activities were developed more to meet the objectives identified by AMAP. USA meant that the WG needed a brief strategic statement as a basis for countries to discuss their contribution to AMAP. There are still data gaps in the Arctic both related to pollution and climate, and AMAP should play a role to gather these data.

The representative of WWF stated that AMAP had prepared and present high standard assessments based on science and by that set the standards for other international assessments. AMAP should continue with this, so the proposals for action were based on science. Several priorities areas viewed from WWF were presented.

Tone Bergan, represented the lead countries on radioactivity, and gave a short presentation on possible priorities for the work ahead. This input will be used in the work to develop a new strategic plan and update of the AMAP monitoring and assessment programmes.

Summing-up, the Chair identified the following as some of the key issues that need to be taken into account in the development of the AMAP Strategic Plan for 2004+:

- The type of deliverable(s) –the preference being for small focused reports on specific issues, in the short-term at least;
- The need to keep science and policy apart (but retain the linkages);
- The need to develop the old strategic plan by revisiting the existing mandate and combining this lessons learned from the work on our two reports and with the WG views on AMAP future role with respect to assessment of issues such as contaminants in non-human media, diet and health, introduction of new climate parameters, new chemicals, baseline information, etc., in each case defining questions such as where, when, with whom, etc.;
- The need to maintain the key elements of the AMAP core programme (this being self-evident assuming that the monitoring of trends and effects is still a part of the future strategic plan);
- Establishment of a timetable for the further development of the AMAP Strategic Plan for 2004+.

In connection with the latter point, the Chair noted that, while additional meetings were undesirable, there might be a need for a meeting in the winter specifically to address the issue of the future AMAP Strategic Plan. This could be addressed at the normal 2004 WG meeting, however that meeting also has to deal with approval of the ACIA policy document.

It was therefore proposed by the Chair, and agreed by the WG, that the Secretariat, in cooperation with key individuals, be asked to continue to develop proposals for the future AMAP Strategic Plan, taking into account the issues noted in document WG 17/6/4. To facilitate this work, the Lead countries for the 1998-2002 assessments were requested to provide input to this process from their lead authors/experts, based on both past experiences and looking forward to future goals, and priorities, etc. The permanent participants would also be requested to contribute to this work. The deadline for this input on the Strategic Plan would be August 2003. Canada and Denmark volunteered to assist the Secretariat in the work to compile these inputs and to prepare a paper to be circulated to the HoDs in September 2003 for comments by October 2003. On the basis of this consultation, the WG/Board would decide what to communicate to SAOs at their autumn meeting regarding progress in, and plans for development of the AMAP Strategic Plan 2004+, an if necessary request relevant decisions from the SAOs, etc.

HoDs were requested to nominate experts to participate in this preliminary work, and to confirm with their lead country experts that they would be involved in providing input to this process.

7. The 2006 Assessments on Petroleum Hydrocarbons and Acidification & Arctic Haze

Petroleum Hydrocarbons

Hein Rune Skjoldal (Norway) presented a draft discussion paper on the 2006 AMAP assessment of petroleum hydrocarbons (document WG 17/7/2), to be prepared under the co-leadership of Norway and Russia. This document outlined proposals for a wide-ranging assessment, with multiple stakeholder involvement and requiring collaboration with other Arctic Council Working Groups. Following initial discussions, a sub-group of oil/gas experts that were participating in the meeting was convened to work in parallel to further elaborate the plans for the petroleum hydrocarbons assessment.

Based on the sub-group discussions, a revised proposal was presented (Annex 5). Some of the key points presented were as follows:

- The sub-group had developed a plan for a comprehensive assessment, covering *'Assessment of the environmental impacts of oil and gas developments in the Arctic and of pollution of petroleum hydrocarbons and PAHs from other sources. The sub-group suggested that the assessment would also include possible effects on human health and social and economic consequences.'* the following chapters:
 - 1 Introduction
 - 2 Oil and gas developments in the Arctic
 - 3 Sources and inputs of petroleum hydrocarbons and PAHs in the Arctic
 - 4 Concentrations and fate of petroleum hydrocarbons and PAHs in the Arctic environment
 - 5 Biological effects
 - 6 Environmental status and impacts on habitats and ecosystems in the Arctic
 - 7 Social and economic consequences of petroleum development in the Arctic
 - 8 Conclusions and recommendations
- In particular the latter parts concerning 'social and economic consequences' represent a scope that lies outside the current mandate of AMAP, but is consistent with the request from the (US) SAO that the assessment also address these issues.

- The draft work plan includes a conference on oil and gas developments in the Arctic - to review new results on industry developments, plans and future scenarios, including technological aspects, regulations, emergency contingency planning, environmental impacts and risks, and social and economic consequences. This conference should involve all stakeholders, including industry, permanent participants, other AC WGs, etc. and was provisionally scheduled for summer 2005.

The United States welcomed the wide scope of the plan as presented, emphasising that this assessment would attract a great deal of attention and it was therefore important that it included all aspects of the issue and involved all stakeholders in its preparation, etc.

Simon Wilson suggested that the petroleum hydrocarbons assessment would need to cover both 'actual' and 'potential' sources/pollution threats (i.e. cover both actual oil and gas developments and potential future developments), possibly in a similar manner to which the radioactivity assessments treat these two aspects. Hein Rune Skjoldal agreed that this was the case.

Concerning the proposed revised timetable, Simon Wilson also noted that this only covered production of the scientific assessment report and did not account for the possible production of a popular summary report (SOAER version) with recommendations, etc., as had been included in the draft acidification assessment planning. It is possible that an SOAER type deliverable might be produced, including both the updated 2006 acidification and petroleum hydrocarbon assessments, with implications for timetabling of both assessments, etc. It was agreed that this should be taken into account in the further planning of the assessment.

Pavel Sulyandziga (RAIPON) and Vice Chair of the Sustainable Development WG (SDWG) emphasized that the assessment as presented would require a great deal of cooperation, including involvement of other Arctic Council working groups, and he would like to see a special letter to the SDWG specifying the proposal.

Jan Idar Solbakken (Saami Council) supported this view and stated that to accommodate this, the assessment might need to be organized along the lines of the ACIA assessment. The WG fully agreed that it was the SAOs and not AMAP that should decide on the roles of the other WGs in the assessment – and that this was an issue that would need urgent consideration.

Samantha Smith (WWF) commented that the possible involvement of the SDWG in the process should not be taken as implying that oil and gas development in the Arctic was a sustainable activity. This comment was supported by the representatives of the Permanent Participants.

Denmark also referred to the ambitious scope of the proposed assessment, and noted that it was on the edge of, if not exceeding the current AMAP mandate – consequently, the SAOs would need to be consulted about how to proceed. They also noted that contingency planning was missing and should be added into the draft outline. Norway supported this view. If these issues (in particular chapter 7) were to be included it would be critical to have the relevant AC WGs to take the responsibility for them.

Sweden commented that one critical aspect of the proposed assessment would be Chapter 8, the 'recommendations for actions', and the WG would need to consider the extent to which these should comprise part of the scientific report or be treated separately in a Ministerial report (or policy document, etc.).

It was generally agreed by the WG that chapters 1-4 of the proposed assessment could be handled by AMAP and fall within the existing AMAP mandate (with possible input from other WGs on certain parts). Chapters 5 and 6 could be delivered, but would require more

involvement of other Arctic Council WGs (primarily CAFF, and possibly EPPR in connection with their activity on vulnerability mapping, etc.). Chapter 7, however, was seen as being outside of the competence and mandate of AMAP, and probably also the other Arctic Council WGs. Pavel Sulyandziga (RAIPON) stated that without Chapter 7, the assessment would be incomplete. The SDWG was identified as a possible contributor to this part of the assessment, but this would require careful consideration by SAOs. Chapter 7 would be both politically sensitive and expensive/time consuming to put together – SAOs would need to consider whether it was necessary, and if so provide the necessary direction to other WGs, including allocation of necessary resources, etc.

The United States raised the possibility that publication of the Conference Proceedings as a separate (possibly peer reviewed) volume might solve possible problems associated with the need to avoid the perception that the assessment was ‘industry sponsored’. The Conference Proceedings could represent the multi-stakeholder input, and the AMAP assessment the independent scientific assessment.

Canada supported the idea that the proposed assessment content is considered as a framework under which AMAP will address Chapters 1-4 and the SAOs be consulted to decide whether and how to deal with the other parts. One option might be to prepare a series of assessments where volume I (chapters 1-4) could be prepared by AMAP (possibly together with EPPR); volume II (chapters 5-6) could be prepared jointly by AMAP and CAFF, and volume III (chapter 7) might be prepared partly by SDWG and/or others.

The Chair reminded the WG that the inclusion of Chapter 7 in particular was a direct response to a request from the last SAO meeting. He proposed that a letter to Chairs of the other Arctic Council WGs be drafted outlining the issues discussed, and presenting the possible need for involvement of other WGs – with the Canadian proposal as an option for practical implementation. The letter could request their comments and if appropriate their commitments to participate in different parts of the assessment. A second letter could be drafted to the SAOs presenting the need for their decisions regarding certain parts of the planned assessment.

Canada noted that such a letter should emphasize that the outline developed by AMAP was only a draft, and that with respect to chapters 5 and 6, what was needed from CAFF in particular was not just collaboration in preparing parts of the assessment, but rather a full-partnership. One way to proceed would be to remove chapter 7 entirely from the draft outline and note in the letter that the issue of addressing socio-economic aspects had been discussed but considered to be outside the competence of AMAP, and that AMAP would be consulting the SAOs on this matter.

Denmark additionally proposed moving the assessment of human health issues from chapter 7 to chapter 5 or 6, as this could be handled by the AMAP human health group within the existing mandate, and could logically be accommodated in chapter 5 or 6.

The United States responded that, the proposal was acceptable, however they would not like to see a fragmented assessment – the proposed assessment outline should still be seen as a whole, rather than a selection list from which certain components could be omitted. The view that without chapter 7, the assessment would be incomplete was supported by the representative from RAIPON.

It was finally agreed that the AMAP Chair would prepare a letter to the Chairs of the other Arctic Council groups, outlining the discussions within AMAP and emphasizing that the outline prepared by the AMAP sub-group is a draft only. This letter would include the ‘outline’ for content of the proposed assessment, however under chapter 7 only the title

would be retained – the text detailing the proposed content of chapter 7 would be incorporated in the text of the letter. In its place, in the outline under chapter 7, wording along the following lines would be introduced: “the topic of socio-economic consequences of oil/gas development in the Arctic is a subject that is beyond the scope of AMAP”. The letter would then continue to elaborate on this matter, and the points raised during the discussions. The item under Chapter 7 concerning assessment of human health impacts of oil/gas pollution/development would be moved to Chapter 5 or 6 in the outline. The Chairs of CAFF and EPPR in particular would be invited to comment on the outline and the possible involvement of their groups in preparing chapters 1-6 of the assessment. The letter would also be addressed to the Chair of the SAOs, to explain the issues and to invite the SAOs to consider how to proceed. The Chair would also take up these discussions during meetings with the CAFF Chair (during the upcoming ACIA policy document drafting meeting), and at the informal meetings of WG Chairs. The lead of the oil assessment will be done by Norway, Russia & USA.

Acidification & Arctic Haze

John Derome (Finland) presented a draft working plan for the preparation of the 2006 AMAP assessment of acidification and Arctic haze (WG 17/7/1). He stressed that this was only a preliminary proposal that would be developed during the course of the WG meeting.

Although few additional experts on acidification and Arctic haze were present at the meeting, some consultations were held, and an updated Working Plan and timetable for the production of the acidification and Arctic haze assessment was produced (WG 17/7/1-2). John Derome noted that the acidification and Arctic haze is essentially a sub-regional assessment focusing mainly on the Kola peninsula, the Taymir/Norilsk area, and the Far East Siberia/Chukotka peninsula area.

Most countries expressed that they would provide an active input to the assessment, but we should also ensure that EMEP and UN-ECE was involved in the work. The Lead country Finland and the Secretariat will ensure this.

Following discussions, some amendments to this plan were made and the final version is presented in Annex 6. As an immediate requirement, countries were requested to nominate their experts to take part in the assessment to the lead country (Finland) and the Secretariat by the end of June. The practical work of preparing the assessment would begin with an assessment group meeting provisionally scheduled for October 2003.

8. Tentative plans for the AMAP WG report to the Ministerial meeting in 2004

The Secretariat presented a draft list of priorities for the Ministerial meeting. The main report from AMAP will be the joint assessment on climate, the ACIA reports. In addition we will have the report from the RAIPON/AMAP/GEF PTS project, and maybe we will prepare and present an interim report on mercury since this has been seen as an emerging problem in the Arctic.

In the following discussion the proposal for an update note on mercury was discussed. Although several ongoing research activities and conferences will be held, we may not have enough new information to present in 2004, but may delay it for the 2006 Ministerial meeting. It was agreed that no decision be taken at the present time, but the Secretariat was asked to prepare a request to be sent to the HoDs in June asking for ongoing mercury activities that may be of relevance for preparation of an interim report in 2004 or 2006. Based on the responses the Secretariat will prepare and circulate an overview document.

If during the period before the next WG meeting a scientific finding arises that warrants a fast action, then a paper could be prepared to SAOs and Ministers recommending necessary actions. The possibility of including a mercury assessment in the deliverables for 2006 could be taken up during the development of the AMAP Strategic Plan for 2004+.

9. National Implementation Plans for 2003-2004

Countries were invited to present information on their AMAP national implementation plans (NIPs) for the period 2003-2004, and any related information on monitoring and research activities of interest to AMAP.

Jonas Rodhe (Sweden) reported that the Swedish NIP is based essentially on the Swedish national monitoring programme and that no major changes to this are expected. The national NIP document is being updated and will be provided to the Secretariat within the next month or so. Reference was also made to the *Beringa* 2005 cruise that is being planned as a follow-up to the Tundra 1999 expedition.

Gunnar Jonsson (Iceland) presented the Icelandic NIP (document WG 17/9/7). He also informed about a project to monitor mercury in air that was being implemented in late autumn 2003 in collaboration with Canada; a project in collaboration with Norway to monitor Hg in freshwater fish; and ozone and UV monitoring in Iceland.

Ole K. Jensen (Denmark) informed that Denmark was awaiting development of the AMAP Strategic Plan before finalising its NIP for the coming period, a preliminary NIP for Greenland and the Faeroe Islands is presented in document WG 17/9/8. He did however inform that a new (11 million DKR) human health project has already been implemented in Greenland to run until 2005 to follow-up on the AMAP phase 2 activities, together with new (3.1 million DKR) human health studies ongoing on the Faeroe Islands. In addition, several other ongoing activities were noted, including a large study of mercury trends based on historical samples from polar bears, new ice core studies, a sledge dog/polar bear contaminants study, and air transport modeling work by the Danish modeling group at NERI.

Gunnar Futsæter (Norway) informed that Norway is working on a new NIP, focussing on POPs and mercury, and on screening for 'new' contaminants. The monitoring of radionuclides has been improved and will continue. In addition, research and monitoring of climate change issues will be carried out. In support of the oil assessment, samples for hydrocarbon analysis will be collected this summer in the Barents Sea. In relation to the acidification assessment, however, he noted that reduced resources for monitoring had resulted in cuts to the Norwegian acidification monitoring programme. Three new reports by the National Research Council, including a report detailing terrestrial and marine climate time series, were presented.

Yuri Platonov (Russia) presented document WG 17/9/9-1, detailing progress in implementation of Russian NIP projects by Roshydromet in 2002, and document WG 17/9/9-2 presenting 5 new proposed projects concerning (i) background monitoring of metals, acidifying components and POPs at an ice drift station, (ii) monitoring contamination around Russian mine sites on Svalbard, (iii) studies of hydrocarbons in the Pechora region, (iv) monitoring POPs in the Lower Pechora basin, and (v) monitoring POPs in the Chukotka peninsula region.

The Secretariat informed that, with respect to air monitoring sites in Russia operated through bi-/multi-lateral cooperation's, funding had been secured to continue the monitoring of mercury, but not POPs, at the Amderma site. The U.S. initiatives to support POPs monitoring

at Pewek and mercury monitoring at Lavrentiya were continuing. John Calder (USA) reported that the first data from Pewek (with analyses performed by the Typhoon laboratory in Russia and a laboratory in Canada) had just been received. At Lavrentiya data collection has been ongoing, however these data have not yet been released and efforts are underway to obtain the necessary permissions from the Russian authorities. Countries were requested to investigate possibilities for finding funding to continue the POPs monitoring at Amderma.

Outi Mähönen (Finland) informed that the Finnish NIP would be updated by the end of 2003, however no major changes were expected – most of the NIP being based on continuing long-term monitoring programmes. The main changes will concern ‘supporting studies’. She mentioned in particular that, from 2006, the EU Water Framework Directive would become relevant, with 3 basin studies for freshwater/groundwater being conducted under bi- or trilateral cooperation’s in the Arctic area of Finland. In addition, an application had been submitted to the EU to fund a joint project in the Finnish-Norwegian-Russian border area. Finally, the Pechenga-Nikel recovery project, and the Long-term Ecological Research project (LITER) were noted as being of relevance for AMAP.

John Calder (USA) reported that no NIP document had been prepared by the United States, however they were intending to describe the U.S. NIP by registrations of relevant projects/programmes in the AMAP Project Directory (PD). He noted that, over the next few years, a number of projects on acidification/Arctic haze, mercury and POPs were being planned in Alaska. Human health studies are also being implemented, including a cord-blood study covering the Aleutian and Komandor Islands. In relation to climate change, several projects/studies were described; including *in situ* sea ice measurements, satellite remote sensing of land ice volumes, oceanographic Arctic/sub-arctic flux measurements, a recalibration and reanalysis programme for old observations (Arctic System Reanalysis), the Barrow climate observation programme, and new moorings in the Bering Sea.

David Stone (Canada) presented a brief overview of the history of the relationship between the Canadian Northern Contaminants Programme (NCP) and the AMAP programme, during the first and second phases of both programmes. At present, due to lack of funding commitments, the fate of the NCP-phase 3 is uncertain, and for this reason Canada do not currently have a defined AMAP NIP. However, he did report that the NCP would run through 2003 based on available core funding (3.4 million CAD) and that discussion were ongoing regarding the period 2004 onward. A main focus of any future NCP activities will be meeting obligations to international agreements, such as the Stockholm Convention and UN ECE LRTAP POPs and Heavy Metals Protocols regarding verification of the effectiveness and efficiency of these agreements, including also providing information relevant to the possible addition of ‘new’ POPs under these agreements and the possible development of a new global agreement on mercury. A future NCP will also address issues identified during previous years, including exposure of indigenous peoples and the need for health or dietary advice, national mitigation measures, and continuation of time trend studies (also linked to the Stockholm Convention, etc.). Canada does not expect to have a great deal of new information from monitoring activities for input to the petroleum hydrocarbons or acidification assessments. The oil/gas industry in northern areas has been dormant for several years. Possible developments include a new pipeline from Inuvik to Alberta (Norman Wells) and development of 3 gas fields in the Mackenzie delta; however this is not yet certain.

Frits Steenhuisen (Netherlands) informed the meeting that although Netherlands did not have any official AMAP NIP, there were a number of research projects in the Netherlands that were relevant to AMAP. He also informed that a new Dutch ‘polar programme’ had been established that would combine the previously separated Arctic and Antarctic research

activities of the Netherlands (a document describing this programme was available at the meeting). On the basis of this new programme, the Netherlands would prepare an updated list of Arctic projects in the autumn and provide this to AMAP, with updated registrations appearing also in the AMAP PD.

Steve Brooks (USA) personated the plans for the Barrow mercury workshop/campaign January – June 2004 (17/9/6). He informed that the Barrow spring 2004 mercury study planning is going well and that they had seven research groups registered. However, they had one remaining study gap: they would like to determine the chemical composition of "Reactive Gaseous Mercury" (HgBr₂, HgCl₂, HgBrCl, HgBrOH, HgO...) in-situ. They believed that a "soft ionization mass spectrometry" system and associated expertise would be needed.

Other AMAP groups with interest in mercury were invited to participate in Barrow this spring (March 1-May 15, 2004). In particular, any group with expertise and equipment in soft ionization mass spectrometry, for the determination of the chemical composition of oxidized gaseous mercury species in ambient air were invited (Annex 8).

AMAPs 10 Key monitoring areas

The Secretariat summed up the activities within the 10 Key monitoring areas.

Area 1 - Northern Fennoscandian and Kola Peninsula area: All four countries have activities in this area and there are several projects under way for 2003 - 2004. Pallas is the joint atmospheric station within the area. Coordination meeting among the four countries was held in Pasvik in February, and a special report on ongoing activities was presented (17/9/3 and update 3-1). The Secretariat expressed its appreciation to the National AMAP Delegations of Finland, Norway, Russia and Sweden for their constructive position in preparation and running this meeting.

Area 2 - Mouth of Pechora river, Novaya Zemlya, Kara and Pechora Sea area: The main terrestrial and human health project is the PTS project. In addition there is the Hydromet observation in the Kara Sea and the joint funded atmospheric station at Amderma analysing atmospheric mercury.

Area 3 – Norilsk, Taimyr peninsula area: The main activity within this area is the PTS project.

Area 4 – Mouth of Lena river: No special activity is reported to AMAP, although a lot of scientific research is implemented in this area.

Area 5 – Chukotka peninsula: The main terrestrial and human health programme is the PTS project. In addition there are two atmospheric stations funded by contribution from USA, POPs station at Pewek and mercury at Lavrentiya.

Area 6- Northern Alaska, Northern Slope: The main activity goes on at Barrow, the atmospheric observations of POPs and mercury, UV and climate.

Area 7 – Lower Mackenzie river and delta area: No special activity is reported to AMAP.

Area 8 – Canadian Arctic Island and Arctic Archipelago: The atmospheric station at Alert is one of the main long term contributor on POPs, mercury, UV and Climate. In addition there are human health projects.

Area 9 – West Greenland, Baffin Island area: There is an atmospheric station at Nuuk; human health projects both on Canadian and Greenlandic territories.

Area 10 – Svalbard, East Greenland area: The atmospheric station at New Ålesund is another major long term contributor on POPs, mercury, UV and Climate. In addition there are terrestrial and marine projects both at Greenland and Svalbard. Both Russia and Norway are active at Svalbard, and it was suggested to arrange joint Russian-Norwegian monitoring activities in this area. In this connection, attention of the meeting participants was drawn to the environmental situation at Franz Jozef Land. Due to long-term geophysical research and military activities, this archirellago is highly contaminated, and, due to its location in the High Arctic, can become a serious threat to the environment of the whole Arctic region. In this connection, it was suggested to include FJL into the AMAP key monitoring area-10, and to consider a possibility to provide support to Russia in organising there necessary surveys and monitoring.

In addition to the activities within the 10 Key areas there are important activities ongoing at Iceland, and the Faeroe Island, as reported in their NIPs? Summing up the activity within most of the Key areas, it must be stated that it is not bad.

Coordination of work with UNEP-Chemicals

UNEP-Chemicals have presented a draft proposal for Letter of Understanding (LoU) between AMAP and UNEP-Chemicals with respect to follow up of the Stockholm convention (17/9/1). The WG is positive to establish a closer cooperation with UNEP-Chemicals, however, some concerns about some wording was raised. Due to the AMAP data policy we cannot hand over data to other organizations without approval from those that own the data. AMAP may assist UNEP in many ways e.g. by harmonizing programmes, methods, collection of data, providing information, etc. It was further pointed on that the LoU is written as one way traffic – from AMAP to UNEP-Chemicals. Question was raised - what will AMAP get in return of such a cooperation? It was decided that the AMAP secretariat would prepare a letter where we express the support to sign a LoU, but like to change some wording. The draft should be circulated among the HoDs for comments before it was sent to UNEP-Chemicals.

AMAP Project Directory and Thematic Data Centres

Simon Wilson presented document WG 17/9/4, reviewing the status of the AMAP Project Directory (PD). In connection with updating of their NIPs, all countries were requested to:

- ensure that the PD includes descriptions of projects and programmes relevant to AMAP work
- ensure that projects and programmes that constitute their AMAP NIPs are fully and correctly represented, including projects covering contaminants, human health, UV and climate, and
- ensure that descriptions relevant to the ongoing assessments of acidification and petroleum hydrocarbons are included.

He continued by reporting to the WG on the participation of the AMAP Secretariat in the EU sponsored 'ENVINET' project (a network of European Arctic-Alpine research infrastructures). In connection with ENVINET, AMAP has been responsible for development of the ENVINET Site Specific Information on-line database (www.amap.no/envinet), and the on-line ENVINET project directory (<http://pusnes.grida.no/amap/amappd/index.asp?org=2>). This latter PD had been implemented by using the existing AMAP PD systems, such that both AMAP and ENVINET projects are now registered in a common database. Amongst other things, this solution had the advantages of minimising costs and duplication of effort in database development work and project registration work, whilst giving AMAP access to

additional relevant project registrations. Via the respective user interfaces, it is possible to search the combined PD for all projects, or only for those registered under one of the organizations. These on-line database developments were considered to be “extremely useful and of benefit for the scientific community” in the ENVINET mid-term evaluation. Under an EU 6th Framework proposal for an extension to ENVINET, AMAP has been designated as lead for continuing the on-line database development activity, with the result that the AMAP PD system may become the basis for a more comprehensive PD of European environmental research activities. In any such future extension, the system would remain capable of meeting the goals for which it was originally established (i.e. supporting the AMAP assessments); however the AMAP PD is now serving a wider scientific community – to the mutual benefit of all parties. Participation of AMAP Secretariat in the ENVINET project is fully funded through the project budget.

Simon Wilson then presented the status of operations at the AMAP thematic data centres (document WG 17/9/5). This document contains an overview of the data currently archived at the AMAP TDCs, together with notes regarding the funding situation at the TDCs and requests to specific countries regarding additional data submissions. A summary of the main conclusions of this review of the status of the TDCs, including requested actions by countries, is contained in Annex 7. In particular, the fact that two of the TDCs (NILU – atmospheric TDC, and ICES – marine TDC) no longer have any allocated funding to allow their future operations was noted. Without additional funding, these centres will no longer be able to function as AMAP TDCs, and unable to support the acidification and petroleum hydrocarbons assessments, to which they are expected to deliver data (NILU the acidification assessment, and ICES the petroleum hydrocarbons assessment in particular). The radioactivity TDC (at NRPA) is funded to the end of 2004 by Norway. Funding has been secured by the group at UAF who are responsible for operating the AMAP freshwater/terrestrial TDC to allow them to continue their (voluntary) support of routine AMAP data handling activities for the next 3 years, however no funding is allocated within AMAP budgets should special requests be made on the TDC.

Norway emphasized the importance of continuing the operation of the AMAP TDCs as a key component of the core AMAP activities that facilitate the preparation of the AMAP assessments. They called for all countries to look for funds to allow these centres to continue operating as AMAP TDCs, and suggested that a common fund might be established to fund such ‘core activities’.

Sources

Lars-Otto Reiersen informed the meeting participants that little information from countries had been received with respect to reporting on sources and emissions/discharges of contaminants. He reminded the countries that, rather than the emissions/discharge data themselves, they had agreed to provide information on where (i.e. to which organizations and how often, etc.) such information are reported. A similar request was presented under agenda item 9.1, 15th AMAP WG, and a special reporting format was developed and circulated.

The Secretariat was asked to make contact with UN-ECE to call for a close cooperation with the assessment of acidification

The question about South East Asia was also raised. This is a major source area for several atmospheric contaminants. An initiative was taken some years ago to establish a centre in Korea. The Secretariat will try to be updated on the situation.

Regarding oil, there are no topic centres with a good overview of sources.

WWF informed the group that they would start a desk work to identify military sources of contaminants affecting the Arctic. They would very much like to cooperate with AMAP, and a letter will be sent later requesting such cooperation.

The Secretariat informed that the EUs 6th Frame work programme could be an important financial source for projects in the Arctic and adjacent areas, that may contribute to the work implemented by AMAP. An important deadline for applications will be in October when projects related to global change and climate change will be called for. During the winter/spring the Secretariat has been in Brussels two time and made presentations at meetings arranged by the missions to EU of Canada and Norway, in an attempt to influence on priority setting.

10. Development of a coordinated common monitoring programme with CAFF

Introducing this agenda item, the Chair referred to document WG 17/10/1 and noted that this matter had been discussed at CAFF board meeting in March but more detailed information about the outcome of that discussion were not available before the AMAP WG meeting. It was noted that the actual text in the SAO report is slightly different under the respective sections for AMAP and CAFF! – *to request AMAP and CAFF to prepare a coordinated common monitoring program and present it for endorsement by the SAOs by the end of 2003. - to encourage CAFF in cooperation with AMAP, to enhance monitoring of biodiversity at the circumpolar and regional levels to detect the impacts of global changes and to allow Arctic communities to respond and adapt.*

Samantha Smith (WWF) noted that the current CAFF biodiversity monitoring programme is essentially based on existing networks, such as the migratory bird or international polar bear networks/programs. In this connection, CAFF is a recipient of information but does not 'drive' these programmes. As such, CAFF currently has a 'network' rather than a 'monitoring programme'.

Cindy de Wit (Sweden) pointed out that, although contaminants monitoring and biodiversity monitoring are distinct, there are a number of potential interactions where information from biologists engaged in biodiversity monitoring is useful if not essential for interpreting contaminant data (observations about changes in behavior or reproductive success, etc. that might be linked to effects of contaminants, migration patterns, feeding habits, etc.). In addition, the AMAP programme includes a number of biological effects methods (e.g. EROD, bioassays, etc.) that fall into the area between contaminants and biological monitoring.

Reference was made to a research programme that is currently being conducted to study migratory birds on their journey from South Africa to the Arctic, based on observations conducted at national parks, etc., along the way. Such a programme might provide opportunities for sampling for contaminants monitoring work to gain insight into the extent to which birds accumulate contaminants at different points along their migration.

In a question to all delegation, Helgi Jensson asked whether, at the national level, there was any cooperation or coordination of AMAP and CAFF activities. In response, most countries indicated that there was no formal cooperation/coordination. Several countries (USA, Norway, Iceland, Sweden) noted that although there was no formal coordination, there was some 'awareness of respective activities' and informal coordination based on the fact that the same institutes were engaged in both AMAP and CAFF work (e.g. during field campaigns these institutes would collect samples/ information for both the AMAP and CAFF programmes). In other countries (Russia, Denmark) it was noted that the lack of coordination

is related to the fact that AMAP and CAFF activities are handled by different Ministries and/or national agencies/institutes. Only Finland reported that their national AMAP and CAFF activities are coordinated to some extent including some degree of practical linkage.

Helgi Jensson noted that these responses demonstrated some of the difficulties in making progress in the active development of a coordinated 'common monitoring programme'. The possible need for a workshop was raised, to assist the Secretariats and WGs in developing a coordinated outline; however it was noted that AMAP and CAFF WGs had already held two joint meetings and a workshop on this issue, and that further workshop(s) were unlikely to make much progress. Part of the problem is associated with the fact that the two groups have two different cultures, AMAP with its monitoring programme, CAFF with its network approach, and it will take time to merge these.

It was therefore suggested that those countries with national experience in coordinating AMAP and CAFF monitoring activities (Iceland, Finland, and Norway) might assist the Secretariat in preparing a first Outline including some proposals on this matter.

Once a draft paper outlining a coordinated programme had been prepared, it might then be appropriate to call a workshop, including experts from all participating countries and organizations, to further develop this outline into a plan that could be put to the AMAP and CAFF WGs. Iceland, Finland and Norway agreed to take this suggestion home and discuss it with relevant individuals in their national institutes. The AMAP Chair agreed to discuss this proposal with the CAFF Chair during the ACIA meeting in Copenhagen (26 May).

Helgi Jensson noted that, if this suggestion were followed, it would probably not be possible to deliver a proposal for a 'common AMAP/CAFF monitoring programme' to the SAOs by the end of 2003; however, it would be possible to report to SAOs that this activity was underway, and also to take this into account in the development of the future AMAP Strategic Plan.

11. International cooperation

AMAP has established a close cooperation with several international organizations to improve the efficiency of the work and to avoid duplication of work. In the AMAP report to the Ministerial meeting in October 2002 there is an overview of the ongoing activities. Since then main work together with some of these organizations has been the following:

The World Water Forum: see text under agenda item 3.

NEFCO: Initiation of the update of the 1985 NEFCO/AMAP, see text under agenda item 3.

UNEP: AMAP Secretariat has been involved in preparation of the Global Regional Based report on POPs, see agenda item ... In addition the AMAP Secretariat and several AMAP experts have taken an active part in the development of a global monitoring system for POPs as follow up of the Stockholm convention.

The UNEP Millennium assessment: AMAP Secretariat has been requested by the author of the Millennium report if we could contribute to this assessment. The WG supported the involvement of the Secretariat in preparing such a contribution.

12. Cooperation with other AC Working Groups

CAFF: The main cooperation with CAFF is the ACIA and the development of a coordinated common monitoring programme; see the agenda items 5 and 10. For the 2006 oil assessment AMAP see another area for close cooperation.

EPPR: A letter has been received from EPPR (17/12/1) calling for a cooperation on preparation of an interactive map identifying resources at risk from oil spills in the Arctic. The AMAP WG is positive to join such a work, but expressed some concerns about the cost implications and the long term update of such an interactive map. EPPR has also discussed the possibility to expand such a map into other topics and threats, e.g. from radioactivity. The AMAP WG stated that such a map already exist, produced and updated by the AMAP TDC on radioactivity. Other maps on biological resources may also exist (CAFF, WWF?), so all options for linking such maps should be looked into before a decision is made.

The Secretariat will contact EPPR prior to their WG meeting in early June and express our support and concerns. In addition AMAP would like to invite EPPR to a close cooperation with regard to the 2006 oil assessment and on the work with radioactivity sources and risks .

PAME: The Ministers have asked PAME to take the lead role in the developing an Arctic Marine Strategy Plan. Prior to the SAO meeting in April a draft discussion paper was circulated inviting other AC WG to cooperation. After the SAO meeting an updated version should be prepared and circulated. When the AMAP WG took place an updated version of the plan was not available, so it was difficult for the WG to discuss this proposal in depth, but the WG expressed a positive interest in joining this work. The updated paper will be circulated as soon as it occurs .

SDWG: Between AMAP and SDWG there are several “bordering” projects and activities related to the human health situation for Arctic peoples, and this is rather good coordinated through the AMAP human health group. With the initiation of the 2006 oil assessment the AMAP WG see another area where a close cooperation will be necessary.

13. The financial situation

Lars-Otto Reiersen stressed the need for both general funding to support core AMAP activities, and the need to maintain funding to support national activities that contribute to the work of AMAP.

He referred to agenda item 3, where he had already reported that adequate funding had been provided for the production of the six 2002 AMAP assessment reports. He also reported that the finances made available for the 2002 Symposium in Rovaniemi had been sufficient to cover the costs incurred, with good agreement between the provisional symposium budget and the actual costs.

Regarding the ACIA assessment, Lars-Otto Reiersen reported that all costs associated with the preparation of the scientific assessment reports and the policy document are covered by the US as lead country, apart from the costs of printing the reports. He informed that options were currently being investigated, including options to find a publishing house that might be willing to underwrite the printing costs in return for sale and distribution rights. In any event, the costs for printing of the reports are rather low (a few USD per copy) as the main costs associated with layout work and graphical production, etc. are already covered. It was noted that any deal with a publishing house would have to be carefully evaluated in terms of ensuring that copyrights to the ACIA products are retained, and issues associated with free national distribution, reprinting, electronic distribution, etc. are adequately addressed.

Two items were highlighted for which funding is currently lacking. The first is the Secretariat, which has been supported by Norway at essentially the same level of funding (i.e. without increases to account for inflation), since 1991. The continued support from Norway for the Secretariat is greatly appreciated, however, this has led to a situation where ca. 30% of the Secretariat budget is now covered by ad hoc support from some countries (Canada, Finland), and by overhead on project activities coordinated by the Secretariat. These latter sources of funding are uncertain, but are becoming an increasingly important source of Secretariat finances. All countries were therefore kindly requested to look into possibilities to find finances to support the continued operation of the AMAP Secretariat.

The second item noted, was the AMAP TDC operations - with no finances currently available to support continued operation of the TDCs. He provided indicative costs of ca. 10 - 20000 USD/year for operating a TDC, pending on the work load. In particular, the NILU (atmospheric) and ICES (marine) TDCs will no longer continue to support the AMAP assessment work if no new sources of funding are identified, despite the fact that these two centres are expected to deliver data to and support the ongoing assessments of acidification and petroleum hydrocarbons. These two TDCs are also TDCs for HELCOM, OSPARCOM and UN-ECE, so there is already established a good cost/efficient international cooperation that secure a high quality handling of the data at a reasonable cost. All countries were therefore requested to look into possibilities to find finances to support the continued operation of the AMAP TDCs

Norway raised the issue that a trust fund to support ACAP projects was under discussion among the SAOs, and questioned whether this or some separate trust fund should be established to cover core AMAP activities such as operation of TDCs and assessment report production.

14. AMAP Work plan for 2003-2004

The AMAP Chair and Secretariat will prepare a detailed work plan for the coming year, based on the discussions and decisions from the WG meeting, to be included in the WG meeting minutes (Annex 9).

15. The next AMAP WG meeting.

The AMAP Executive Secretary introduced a preliminary plan to hold the next AMAP WG meeting jointly (or back-to-back) with the CAFF meeting, which the CAFF Chair and Secretary had informally mentioned might be held in March 2004. The main item on the agendas for both the AMAP and CAFF WGs at their spring 2004 meetings will be the final approval of the ACIA policy document. The AMAP Secretariat will discuss possibilities for such an arrangement with CAFF.

The delegate from Canada agreed to look into possibilities for hosting the next AMAP WG meeting in Canada in conjunction with the CAFF meeting.

The WG were reminded that there may be a need to hold an AMAP WG meeting later in the early winter of 2003 in order to discuss the Strategic Plan for 2004 and beyond. The AMAP Secretariat will inform the WG as soon as possible should such a meeting be deemed necessary.

The delegate from Russia announced that Russia was looking into the possibilities to host an AMAP WG meeting, either in 2004 or later. This offer was welcomed by the Chair.

16. Any other business.

Jonas Rohde (Sweden) drew the attention of the meeting participants to a new publication, '*A Warmer World – The Greenhouse Effect and Climate Change*', in the 'Monitor' series that is published by the Swedish Environmental Protection Agency. This report summarizes present-day knowledge about the causes and consequences of climate change for society and the environment, with a main focus on Europe.

Canada informed that the UN-ECE LRTAP protocol soon will enter into force, and this protocol request an evaluation of 3-4 substances in each review. So this protocol will most probably ask for an input before the UNEP Stockholm protocol.

17. End of the meeting.

Helgi Jensson thanked all participants for their contributions during the meeting, and the USA for hosting the meeting.

The meeting was closed at 15:00 on 14 May.

Annexes:

Annex 1. List of Participants at the 17th Working Group Meeting of the Arctic Monitoring and Assessment Programme, Boulder, Co., USA, 12-14 May, 2003.

Annex 2. Draft annotated agenda for the 17th AMAP WG meeting.

Annex 3. List of Documents for the 17th AMAP WG meeting.

Annex 4. List of Actions arising from the 17th AMAP WG meeting.

Annex 5. Updated outline and timetable for preparation of the 2006 AMAP assessment of petroleum hydrocarbons, prepared during the meeting in Boulder.

Annex 6. Updated outline and timetable for preparation of the 2006 AMAP assessment of acidification and Arctic haze.

Annex 7. Extract from WG 17/9/5 – Summary conclusions and requests for actions relating to operation of the AMAP Thematic Data Centres (TDCs).

Annex 8. Interdisciplinary Research on Mercury Deposition in the Arctic. Barrow Alaska, March 1 to May 15, 2004.

Annex 9. Draft AMAP Workplan for 2003 and 2004.

Annex 1. List of Participants at the 17th Working Group Meeting of the Arctic Monitoring and Assessment Programme, Boulder, Co., USA, 12-14 May, 2003.

AMAP WG 17/2/2

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Annex 2. Draft annotated agenda for the 17th AMAP WG meeting.

AMAP WG 17/2/1

1. **Opening of the AMAP WG meeting.**
2. **Approval of the Agenda.**
3. **Progress report from the Chair and the Secretariat, including:**
 - follow up since the AC Ministerial meeting in October 2002,
 - report from the SAO meeting in April and follow up,
 - production of the 2002 AMAP Assessment Reports and the financial situation,
 - status of special projects under implementation: PTS, PCB, NEFCO, EEA/UNEP, UNEP-Chemicals RBA, World Water Forum, Kiev report, etc. (see progress report from AMAP Board to the SAO meeting in April)
 - information strategy for AMAP.

The WG is invited to discuss the presented information.

4. **Statements from Observers.**

Any observing country and organizations are invited to present short statements if they so wish.
5. **The ACIA process.**

The Chair will inform the WG about the progress and challenges regarding the preparation and production of:

 - the scientific assessment report,
 - the policy document,
 - practical work related to the production line,
 - dissemination strategy,
 - ACIA symposium 2004,
 - financing of this production.

The WG is invited to discuss the presented information, and to make necessary decisions.

6. **AMAP Strategic Plan for 2004 and onwards.**

Based on the decisions made at the Ministerial meeting in 2002, the existing Strategy Plan will be updated. The WG is invited to discuss the development of the new Strategic Plan.
7. **The 2006 Assessments on Petroleum Hydrocarbons and Acidification & Arctic Haze.**

The countries and observers are invited to bring experts on these to issues so preliminary discussions can be made in parallel to the WG meeting, prior to this issue is brought up in plenary. In plenary we hope to decide on the

strategy for these assessments, and on the plans for an international conference on oil in 2005.

8. Tentative plans for the AMAP WG report to the Ministerial meeting in 2004.

The WG is invited to discuss deliverables from AMAP WG to the AC Ministerial meeting in addition to the ACIA report, e.g. an Interim report that might include updated information on mercury, etc.

Based on the events that took place during the SAO meeting in October, the WG is invited to discuss the procedure for approval of reports: scientific- and WG reports.

9. National Implementation Plans for 2003-2004.

The countries are requested to present their NIPs for monitoring and research programmes for 2003-2004, including:

- long term monitoring of long range transported contaminants, climate and UV,
- coordination of work with UNEP Chemicals regarding a global network of POP monitoring is of special interest,
- biological effects and human health programmes,
- inventory of sources,
- new programmes and projects, including international cooperation.
- activities in the Key Monitoring Areas, etc.
- the mercury workshop proposed by USA,
- update of the AMAP Project Directory and the coordination with ENVINET.
- status for the reporting of data to the AMAP TDCs,

10. Development of a coordinated common monitoring programme with CAFF.

The WG is invited to discuss the strategy and content of this cooperation.

11. International cooperation.

The Secretariat will inform about ongoing activities, e.g. with EU & EEA, ICES, UNEP, OSPAR, WMO, GIWA, World Water Forum, Barents council, NEFCO, ao.

The WG is invited to discuss the cooperation and make priorities for the future.

12. Cooperation with other AC Working Groups.

The Chair will inform about ongoing and planned activities with other WGs. Representatives of our AC WG are invited to present ongoing related activities and plans for joint activities. The WG is invited to discuss the situation and future cooperation.

13. The financial situation.

The Secretariat will inform about the financial situation related to different projects and activities, e.g. core activities. The WG is invited to discuss the

situation and to inform the WG about National activities apart from the NIPs that might be of relevance for the WG activities.

14. AMAP Work plan for 2003-2004.

The Chair and Secretariat will sum up decisions made during the week, to highlight the main work plan for the coming year. The WG is invited to comment and adjust the present plan.

15. The next AMAP WG meeting.

Countries are invited to host the coming WG meetings.

16. Any other business.

The WG is invited to present any information that might be of interest for the WG and its work.

17. End of the meeting.

Annex 3. List of Documents for the 17th AMAP WG meeting.

Document No.	Document Title:
AMAP WG 17/2/1	Draft annotated agenda.
AMAP WG 17/2/2	Updated Draft List of Participants.
AMAP WG 17/2/3	Updated Draft List of Documents.
AMAP WG 17/3/1	AMAP Progress Report to SAO meeting in Reykjavik, April 2003.
AMAP WG 17/3/2	Status of production of assessment reports.
AMAP WG 17/3/3	AMAP website.
AMAP WG 17/3/Info-1	Scientists urge better coordination of environmental monitoring and data sharing. EuroChlo/ECETOC Press release.
AMAP WG 17/3/Info-2	UNEP Regional Based Assessment of PTS (Chapter 3 – environmental levels, toxicological and ecotoxicological patterns).
AMAP WG 17/3/4	Progress Report on the Special Projects and Related Activities.
AMAP WG 17/5/1	Report of ACIA Chair to SAO meeting in Reykjavik, April 2003.
AMAP WG 17/5/2	Arctic Climate Impact Assessment (ACIA) Policy Document. Draft Outline.
AMAP WG 17/5/3	Explanatory Notes from the Scoping Meeting.
AMAP WG 17/5/4	Integrated Time Table for ACIA Events and Deadlines.
AMAP WG 17/6/1	AMAP Strategic Plan: 1998 - 2003 (Available on: www.amap.no/ol-docs/str-plan.pdf).
AMAP WG 17/6/2	Suggestions for Future Activities for the Human Health Assessment Group (HHAG) in AMAP Phase 3.
AMAP WG 17/6/3	Workplan for AMAP (2 pages) in SAO report to Ministers, Inari 2002, and supplementary comments.
AMAP WG 17/6/4	AMAP – Where do we go from here? Discussion paper prepared by the Secretariat.
AMAP WG 17/7/1	AMAP Assessment Phase III. Working Plan for the Assessment on Acidification and Arctic Haze in the Arctic, 2006. Proposal from Finland.
AMAP WG 17/7/1-1	Working Plan for the Assessment on Acidification and Arctic Haze in the Arctic, 2006.
AMAP WG 17/7/1-2	Updated: Working Plan for the Assessment on Acidification and Arctic Haze in the Arctic, 2006.
AMAP WG 17/7/2	AMAP assessment of oil and PAHs in the Arctic. Proposal from Norway/Russia.
AMAP WG 17/7/2-1	Draft Outline – “AMAP Oil Assessment.” Assessment of Petroleum Hydrocarbons and PAHs in the Arctic (Assessment of Oil and Gas Development in the Arctic).
AMAP WG 17/7/3	The National Academies. Cumulative Environmental Effects of Oil and Gas Activities on Alaska’s North Slope.
AMAP WG17/9/1	Draft Letter of Agreement between UNEP-Chemicals and AMAP Secretariat.
AMAP WG17/9/2	Proceedings from UNEP-Chemicals Workshop to Develop a POPs Global Monitoring Programme to Support the Effectiveness Evaluation of the Stockholm Convention (Available on: http://www.chem.unep.ch/gmn/default.htm).

- AMAP WG17/9/3 Records from the AMAP meeting on coordination of monitoring activities in the key monitoring area No 1 (Fenniscandia). Svanhovd, Norway, 17-18 February 2003.
- AMAP WG17/9/3-1 Development and implementation of an environmental monitoring and assessment programme in the joint Finnish, Norwegian and Russian border area.
- AMAP WG 17/9/4 AMAP Project Directory and coordination with ENVINET.
- AMAP WG 17/9/5 Status of TDC operations.
- AMAP WG 17/9/6 Interdisciplinary Research on Mercury Deposition in the Arctic. Proposed for Barrow Alaska, during late January to June 2004.
- AMAP WG 17/9/7 Iceland Implementation Plan/2003.
- AMAP WG 17/9/8 Denmark: Implementation Plan 2003-2004.
- AMAP WG 17/9/9-1 Russian Federal Service for Hydrometeorology and Environmental Monitoring. In the Progress of Implementation of the Russian National AMAP Plan Projects (II Stage) by Roshydromet in 2002.
- AMAP WG 17/9/9-2 AMAP Project Directory Registration Form.
- AMAP WG 17/10/1 Circumpolar Arctic Biodiversity Monitoring Programme – Brief.
- AMAP WG 17/12/1 EPPR Project “Circumpolar Map of Resources at Risk from Oil Spills in the Arctic” – Possible expansion and interest among the other Working Groups to participate?

Annex 4: List of Actions from the WG meeting.

Agenda item 3:

The AMAP Secretariat shall contact the editor to make the necessary arrangements for editing of the report on heavy metal.

As soon as the new website development has been completed, the WG should be notified by the Secretariat and invited to provide comments and suggestions for further improvement before the new development is made public.

Agenda item 5:

The Secretariat will provide the HoDs with names of all external reviewers for the ACIA scientific report.

Observing countries and organizations were asked to present their comments to ACIA policy paper to the AMAP Chair that will take them further to the Policy Drafting Team (PDT).

Agenda item 6:

The deadline for input to the Strategic Plan would be August 2003. Canada and Denmark volunteered to assist the Secretariat in the work to compile these inputs and to prepare a paper to be circulated to the HoDs in September 2003 for comments by October 2003.

HoDs were requested to nominate experts to participate in this preliminary work, and to confirm with their lead country experts that they would be involved in providing input to this process.

Agenda item 7:

The AMAP Chair will prepare a letter to the Chairs of the other Arctic Council groups, outlining the discussions within AMAP and emphasizing that the outline prepared by the AMAP sub-group is a draft only. This letter would include the 'outline' for content of the Assessment of petroleum hydrocarbons.

As an immediate requirement, countries were requested to nominate their experts to take part in the assessment acidification to the lead country (Finland) and the Secretariat by the end of June.

Agenda item 8:

The possibility of including a mercury assessment in the deliverables for 2006 will be taken up during the development of the AMAP Strategic Plan for 2004+.

Agenda item 9:

The national NIP document is being updated and will be provided to the Secretariat within the next month or so.

Norway will circulate three new reports by the National Research Council, including a report detailing terrestrial and marine climate time series.

Countries were requested to investigate possibilities for finding funding to continue the POPs monitoring at Amderma.

The Netherlands would prepare an updated list of Arctic projects in the autumn and provide this to AMAP, with updated registrations appearing also in the AMAP PD.

All countries were requested to:

- ensure that the PD includes descriptions of projects and programmes relevant to AMAP work
- ensure that projects and programmes that constitute their AMAP NIPs are fully and correctly represented, including projects covering contaminants, human health, UV and climate, and
- ensure that descriptions relevant to the ongoing assessments of acidification and petroleum hydrocarbons are included.

The member countries are kindly asked to look for funding to secure operation of the TDCs, especially the atmospheric and marine centres.

The Secretariat was asked to make contact with UN-ECE to call for a close cooperation with the assessment of acidification.

South East Asia is a major source area for several atmospheric contaminants. An initiative was taken some years ago to establish a centre in Korea. The Secretariat will try to be updated on the situation.

Agenda item 10:

In the work to prepare a coordinated common monitoring program between AMAP and CAFF, Iceland, Finland and Norway agreed to assist, but first these countries would take this suggestion home and discuss it with relevant individuals in their national institutes. The AMAP Chair agreed to discuss this proposal with the CAFF Chair during the ACIA meeting in Copenhagen (26 May).

Agenda item 12:

The Secretariat will contact EPPR prior to their WG meeting in early June and express our support and concerns. In addition AMAP would like to invite EPPR to a close cooperation with regard to the 2006 oil assessment and on the work with radioactivity sources and risks.

As soon as the Secretariat receives an updated paper on the Arctic Marine Strategy Plan from PAME, the updated paper will be circulated to the WG members.

Agenda item 13:

All countries were kindly requested to look into possibilities to find finances to support the continued operation of the AMAP Secretariat.

Agenda item 15:

The secretariat will discuss possibilities for a joint arrangement with CAFF in March 2004 for final approval of the ACIA policy document.

The delegate from Canada agreed to look into possibilities for hosting the next AMAP WG meeting in Canada in conjunction with the CAFF meeting.

The secretariat will inform the WG as soon as possible if an extra WG meeting will be needed in early winter of 2003.

Annex 5. Updated outline and timetable for preparation of the 2006 AMAP assessment of petroleum hydrocarbons, prepared during the meeting in Boulder.

Assessment of petroleum hydrocarbons and PAHs in the Arctic

(Assessment of oil and gas developments in the Arctic)

SCOPE:

Assessment of the environmental impacts of oil and gas developments in the Arctic and of pollution of petroleum hydrocarbons and PAHs from other sources. The assessment will also include possible effects on human health and social and economic consequences.

DRAFT OUTLINE OF ASSESSMENT REPORT:

0 Executive summary

1 Introduction

Background and introduction to the assessment, emphasizing recent and future developments and the need to assess environmental, social, and economic consequences.

2 Oil and gas developments in the Arctic

This chapter should give an updated overview of the oil and gas resources perspective in the Arctic as well as a description of recent developments in the oil and gas industry. This would include transportation of oil and gas and infrastructure such as roads, harbors, etc. The chapter should also give an outlook with development scenarios based on future plans and prospects.

3 Sources and inputs of petroleum hydrocarbons and PAHs in the Arctic

The chapter will give an overview of sources of inputs of petroleum hydrocarbons and PAHs to the Arctic environment. This will include discharges, emissions and spills from petroleum exploration, production, and transportation, as well as other sources from human activities and long-range transport. The substances would include all relevant contaminants from oil and gas development and use, i.e. petroleum hydrocarbons, petroleum related PAHs, oil related substances in produced water (e.g. phenols), and production chemicals. Information should be given on source characteristics and approaches to identify and distinguish different sources.

The chapter should also give an overview of the amounts of inputs of petroleum hydrocarbons, PAHs, and other relevant substances to the different regions of the Arctic.

4 Concentrations and fate of petroleum hydrocarbons and PAHs in the Arctic environment

This chapter will give an updated description of concentrations of petroleum hydrocarbons, PAHs, and other relevant substances in different compartments (sediments, soils, water, and

biota) of the Arctic terrestrial, freshwater and marine environments. This will be based on existing information from national monitoring, and research activities. The chapter will also describe transport pathways and fates of hydrocarbons, PAHs, etc. in the Arctic environment, including oil-ice interactions and physical-chemical weathering processes. Information on temporal trends will be included based upon results from long term monitoring and sediment cores where such information exists. The spatial and temporal patterns in concentration of the contaminants will be examined in relation to sources and inputs.

5 Biological effects

This chapter will consist of three main parts. The first will describe biological uptake and metabolism of petroleum hydrocarbons, PAHs, and other relevant substances in various organisms in the Arctic. The second part will give an overview of the various types of biological effects from oil, PAHs, other substances, and petroleum developments in the Arctic. The emphasis will be to summarize new information. The third part will summarize information on the sensitivity and vulnerability of different groups of organisms (birds, mammals, vegetation, plankton, and benthos) to oil and petroleum activities. The chapter will include results and experiences from accidental oil spills as well as laboratory and field studies.

6 Environmental status and impacts on habitats and ecosystems in the Arctic

Building on the information on biological effects in the previous chapter, this chapter will address the environmental quality status and impacts or threats by pollution or petroleum activities on habitats and ecosystems in the Arctic. The chapter will provide a brief overview of ecosystems and habitats based on major river systems and drainage basins, and large marine ecosystems. This will include information on species, populations and habitats that are vulnerable and/or of special conservation concern in relation to pollution and petroleum activities. Information on the environmental quality status of habitats and ecosystems will be summarized from case studies. Information will also be summarized from environmental impact analyses and risk assessments that have been carried out in relation to petroleum development activities. The information will be used to make an assessment of the environmental impacts and threats from pollution by petroleum hydrocarbons, PAHs, etc., and from other factors related to petroleum development.

7 Social and economic consequences of petroleum development in the Arctic

This chapter should assess the impacts and benefits of petroleum developments in the Arctic from human, social, and economic perspectives. Economic aspects could include infrastructure developments (roads, housing, public services, etc.) related to the petroleum development and the economic consequences for local communities in the Arctic and for the wider economy. Also the sustainability aspect and the interaction with other economic sectors should be addressed, as well as costs of cleanup and remedial actions. The social issues would include human health aspects related to pollution and changes in life styles.

8 Conclusions and recommendations

AMAP (/AC WGs) assessment of petroleum hydrocarbons and PAHs in the Arctic (assessment of oil and gas developments in the Arctic)

DRAFT Revised Work Plan – 13 May 2003

List of actions/products

1. Update through national nominations the core group of national key experts and the supporting group of designated experts.
 - by October 2003
2. Complete assessment outline and work plan in collaboration with other AC Working Groups
 - by October 2003
3. Compile national information on recent petroleum industry developments and future plans.
 - initial reporting by December 2003
 - supplementary reporting by mid 2005
4. Compile national information on sources and amounts of inputs of petroleum hydrocarbons, PAHs, substances in produced water and production chemicals.
 - initial reporting by December 2003
 - supplementary reporting by January 2005
5. Compile information on monitoring and analytical methodologies, guidelines and QA procedures to facilitate assessment of data quality and improve the comparability of data from ongoing and new monitoring activities.
 - by March 2004
6. Compile data on concentration levels of petroleum hydrocarbons, PAHs, and other relevant substances in the Arctic environment.
 - initial compilation by March 2004
 - supplementary data compilation by January 2005
7. Conduct supplementary monitoring of petroleum hydrocarbons, PAHs, and other relevant substances in water and sediments to fill gaps, contribute to intercomparisons, and improve the baseline.
 - monitoring in 2003-2004
 - final data availability by mid 2005
8. Provide the means for international cooperation to obtain Russian data in a form suitable for assessment (older monitoring data, newer petroleum industry data, and scientific research data).
9. Summarize and review recent studies on environmental behavior and fate of oil, gas, petroleum hydrocarbons, PAHs, substances in produced water and production chemicals

under Arctic environmental conditions. This includes the possible application of models along with QA-data, to describe and analyze transport pathways and fate.

- initial draft by December 2004
 - final draft by October 2005
10. Summarize and review recent studies on biological effects of oil, petroleum hydrocarbons, PAHs, substances in produced water, and production chemicals.
 - initial draft by December 2004
 - final draft by October 2005
 11. Summarize and review environmental impact assessments and risk analyses performed in relation to the petroleum industry development and major oil spill events.
 - initial draft by December 2004
 - final draft by October 2005
 12. Summarize information on species and habitats of special conservation concern and/or high sensitivity and vulnerability in relation to oil and gas developments.
 - by June 2004
 13. Summarize and review information on biodiversity impacts of physical impacts and disturbances from oil and gas developments
 - initial draft by December 2004
 - final draft by October 2005
 14. Cooperate with the human health group to provide a summary of possible effects on human health by oil and PAHs.
 15. Summarize and review information on social and economic aspects in relation to oil and gas developments in the Arctic.
 - initial draft by December 2004
 - final draft by October 2005
 16. Organize a conference on oil and gas developments in the Arctic to review new results on industry developments, plans and future scenarios, including technological aspects, regulations, emergency contingency planning, environmental impacts and risks, and social and economic consequences.
 - Summer 2005
 17. Prepare the draft assessment report on oil and gas developments in the Arctic.
 - Initial draft by March 2005
 - Draft for peer review by November 2005
 18. Carry out peer review of the draft assessment report
 - November 2005-January 2006
 19. Complete and print the assessment report
 - final draft by March 2006
 - technical editing April-May 2006
 - printing June 2006

Sub-group Meeting Notes (May 12, 2003) on expanded scope of the AMAP assessment of oil and gas development in the Arctic

1. The basis of discussion was the AMAP document (WG17/7/2) and its two annexes. In addition to evaluating the environmental assessment aspects, the expanded scope of assessment is to include socio-economic, cultural (traditional, historical, and subsistence) and human aspects as well as evaluation of oil and gas development scenarios and technologies, including oil spill response capabilities. Further, the assessment is to include oil and gas transfer, transportation and shipping aspects as well. The assessment will consider both acute and chronic aspects of pollution. There was some discussion on including specific areas as pollution sources where petroleum contamination from historic industry or military operations is substantial and persistent, such as the Franz Josef archipelago, St. Lawrence Island, etc.
2. On matters related to impacts on fisheries (and the impact of fishing activities on oil and gas development), the group would seek clarification about the extent to which these issues ought to be considered. Fisheries are meant to include managed exploitation of the living marine resources. It is understood that effects of hydrocarbons on fish and shellfish species and impacts of oil and gas development on habitats and ecosystem would be included any way.
3. Given the expanded scope of effort, it was reiterated or reaffirmed to establish with other working groups of the Arctic Council (i.e., SDWG, PAME, EPPR, and CAFF) that can provide relevant information for the oil and gas assessment. This should be done as early as feasible. John Calder will get in touch with PAME Chairman within the next several days. During the next meeting of the chairs of the working groups (Fall 2003), the oil and gas assessment and acidification-Arctic haze assessment plans could be included as an agenda item. The "oil and gas assessment group" should prepare a document for presentation at the forthcoming meeting of EPPR (in June) and also find out the details of the sensitivity mapping of the Arctic region (e.g., whether it identifies cultural resources, subsistence hunting areas, etc. in addition to geomorphology and critical biological habitats). CAFF information on species, habitats and biodiversity, including migratory pathways of key species (and perhaps marine protected areas) is considered essential for the oil and gas assessment.
4. It was generally agreed that both the positive and negative impacts be included in the assessment. There was some discussion on whether SDWG should take responsibility for the socio-economic aspects of assessment.
5. For presentation to AC WGs, the oil and gas assessment group should prepare an outline that includes (1) proposed list of contents of the assessment chapter, (2) some sort of a time-table, and (3) general assignments.
6. It would be important to include representation of the petroleum industry in the process. This may not be an easy task; therefore contacts should be initiated soon. In the case of Russia, contacts with companies (e.g., GASPROM, UKOS) or ministries (e.g., Ministry of Natural Resources, and Ministry of Economic Development and Trade) should be uninitiated and perhaps some contacts should be made during forthcoming conferences between the petroleum industry and indigenous people's

organizations in Russia (e.g., RAIPON). The group identified industry organizations in USA (AOGA), Canada (Canadian Association of Petroleum Producers), Faeroe's (FOIB), Norway (National Oil Industry Association), Greenland (a Canadian company doing business there). Other groups, perhaps some NGOs are also possible as sources of relevant information. Such groups may include the Society of Petroleum Engineers, International Association of Pipeline Operators, AMOP, among others. No activities or plans for oil and gas development are currently underway in Iceland, Sweden and Finland.

7. It was also recognized to get in touch with organizations representing the indigenous people in regard to the planned oil and gas assessment. Permanent participants of the Arctic Council will be involved in the process. Effort should be made to get excerpts or proceedings of meetings that have recently taken place between petroleum industry and indigenous people in Russia. It was noted that in USA it may not be feasible (or appropriate) to seek a single representative for the Native people. It is understood that representation of Alaska Natives in the North Slope Borough, Bristol Bay, Chukchi Sea, and the Gwitchin community ought to be included. This matter should be evaluated further.
8. There was no discussion on whether the concept of Large Marine Ecosystems would be the way to present information on the physical environment and biological resources of the sub-regions of the Arctic. This aspects needs to be further explored.

Conference.

9. The matter of an AMAP oil and gas symposium has been discussed on a few previous meetings, and a preliminary outline is available. However, this outline must be expanded to reflect the larger scope of the assessment chapter. Similarly, the list of “sponsors” to be expanded. It was decided to not simply dwell on the “impacts aspects” of oil and gas development but also on economic benefits to local communities and the Arctic region in general that would likely be derived from petroleum development and transportation. It was generally agreed that the conference title be a simple one but also quite inclusive: “Oil and Gas Development in the Arctic – Current and Future Challenges” was considered appropriate.
10. Again, in view of the expanded scope of the meeting and the follow-up assessment report, a steering group or a planning group for the conference should have broad constituency. Such a group should be ready and functional by October 2003.
11. It was agreed that the assessment chapter, as well as discussions at the conference, also focus on cumulative impacts. A recent report by the National Research Council (USA) was cited as an example of such as assessment.
12. It was generally agreed that the “effects” part of the assessment report be organized according to biological groups (such as phytoplankton, birds, etc.) rather than the nature of effects (such as direct chemical toxicity, genotoxicity, synergistic effects, etc.).
13. Revised Outline of Chapter (Hein Rune)

Annex 6: Updated outline and timetable for preparation of the 2006 AMAP Assessment of acidification and Arctic haze.

14.5.2003, Boulder

Updated working plan for the Assessment on Acidification and Arctic Haze in the Arctic, 2006

General aspects

New general information + a more detailed review of the regions identified as hot spots in the earlier assessment: e.g. the Kola Peninsula (KMA-1), Norilsk and the Taimyr Peninsula (KMA-3), and the Chukotka region (KMA-5).

Maximum utilization of ongoing assessment projects that are generating information relevant to AMAP's acidification assessment. Suggestions already received:

Canada is currently working on the 2004 Canadian Acid Rain Science Assessment (sources in N. Alberta probably the most important from AMAP's point of view)

RAIPON/AMAP/GEF Project (Persistent Toxic Substances, PTS). May supply some relevant information.

EMEP is preparing their own acidification assessment, due out 20??

In addition, full use should be made of the information available from international data centres. Suggested sites:

EMEP Co-ordinating Centre (NILU, Norway)

ICP Waters (NIVA, Norway)

ICP Integrated Monitoring (Finnish Environment Institute)

ICP Forests (up until 2002, FIMCI, the Netherlands; from 2003 onwards, the responsibility of the EU Joint Research Centre, Ispra, Italy)

An attempt should be made to distinguish between natural (e.g. volcanic eruptions) and anthropogenic emissions.

Contents

1. Introduction – background

2. Sources

3. Transport, deposition and air quality – atmospheric processes (in close co-operation with EMEP)

4. Arctic haze (e.g. NOAA, Russ Schnell)

4.1. Trends

5. Effects of acidifying pollutants

5.1. The Kola Peninsula

- Emissions
- Air quality, deposition
- Effects of SO₂ on e.g. vegetation
- Effects of acidifying deposition on terrestrial and freshwater ecosystems
- Trends

5.2 The Norilsk region

- as in 5.1.

5.3 The Chukotka region

- as in 5.1.
- relevant monitoring organizations in Pacific countries should be contacted (SIMON)
- NO_x is probably also a contributing factor in this area

5.4 Other affected areas (e.g. in North America, Arctic islands)

5.5 Areas showing signs of recovery

5.6 Gaps in knowledge

6. Conclusions and recommendations

Timetable for the assessment reports

Scientific report	Condensed report	Deadline
Draft version of the overall structure and contents		May 2003
Nomination of experts		June 2003
Expert working group starts work		October 2003
Collation of relevant material completed		September 2004
First draft of the SCR completed		December 2004
Last entries of data		March 2005
Completion of second draft, sent for external review	Start on report, based on second draft	May 2005
Final draft ready for final checking		January 2006
	Completion of report, WG approval	February 2006
Report printed	Report printed	August 2006

The HODs of the individual countries will be responsible for forwarding (to Finland) a list of national experts willing to participate in compiling and writing the different sections of the assessment report. However, this does not mean that each country has to have an expert in each section.

The expert group will also include leading scientists in the field(s) from other countries. We hope that the first meeting of the group can be held in ?early autumn?

Additional information about ongoing (or completed) projects on acidification-related topics in Arctic areas, as well as about other sources of appropriate data, would be appreciated.

Contact person in Finland (until notified otherwise): John.Derome@metla.fi

Annex 7. Extract from WG 17/9/5 – Summary conclusions and requests for actions relating to operation of the AMAP Thematic Data Centres (TDCs).

Atmospheric TDC (NILU):

1. All countries are encouraged to continue their generally good level of data reporting to the AMAP atmospheric TDC.

The main outstanding data known to exist and of interest to AMAP but not yet reported to NILU include the following:

- Additional data on POPs from Dunai Island (Canada/Russia)
 - Data on POPs and Hg from Amderma (Canada/Russia)
 - Data on POPs from Pewek and Hg from Lavrentiya (USA/Russia)
 - Data on Hg (and other metals) from Alert for the period after 1995 (Canada)
2. All countries/institutes should put effort into using the available software to report data in the agreed format, to reduce the effort (and resources) used within NILU to handle AMAP datasets.
 3. NILU data holdings include components that are relevant to the acidification and petroleum hydrocarbon assessments. Coordinators of the acidification and petroleum hydrocarbon assessments should consult the available data report.
 4. At present the AMAP Secretariat has no funding allocated or contract with NILU to continue to operate the AMAP atmospheric TDC.

Marine TDC (ICES):

1. All countries are encouraged to continue data reporting to the AMAP marine TDC.

The main outstanding data known to exist and of interest to AMAP but not yet reported to ICES include the following:

- Additional Norwegian marine contaminants monitoring data (e.g. from IMR-Bergen and Norwegian Polar Institute/Veterinary Institute) (Norway)
 - Canadian marine monitoring data (Canada)
2. AMAP should discuss with ICES possible solutions to the problems associated with reporting data to ICES using the existing data exchange formats.
 3. At present the AMAP Secretariat has no funding allocated or contract with ICES to continue to operate the AMAP marine TDC.

Terrestrial/Freshwater TDC (UAF):

1. All countries are encouraged to continue data reporting to the AMAP freshwater/terrestrial TDC.
2. AMAP should discuss with UAF possibilities for transferring AMAP marine datasets to the ICES TDC.

3. At present the AMAP Secretariat has no funding allocated to support continued operations the AMAP freshwater/terrestrial TDC.

Radioactivity TDC (NRPA):

1. All countries are encouraged to continue data reporting to the AMAP radioactivity TDC, on a regular basis.
2. Possibilities for allocation of funding to support continued operations the AMAP radioactivity TDC after 2004 should be investigated.

General Issues:

1. The role of the TDCs in facilitating the acidification and petroleum hydrocarbons assessments needs to be considered, and agreements (including allocation of funding, etc.) established with the TDCs as necessary to conduct this work.
2. The full registration of AMAP data restriction agreements needs to be completed as a priority matter with all owners of data currently held at AMAP TDCs. The wider issues relating to sharing of AMAP data need to be addressed – several such requests are currently under consideration, both from scientists but also from organizations (e.g. UNEP-Chemical, UNEP GEMS) and an appropriate policy for responding to such requests needs to be developed, especially for delivery to organizations who may want to use AMAP data for their own assessment work but who would then have no direct ‘agreements’ with data owners if the data are made available by AMAP.

Annex 8: Interdisciplinary Research on Mercury Deposition in the Arctic. Barrow Alaska, March 1 to May 15, 2004.

Purpose: To bring together an international group of researchers for an intensive Springtime '04 study to determine the controls and fate of springtime atmospheric mercury deposition at Barrow.

Background: A meeting on Atmospheric Mercury in the Arctic was held in Toronto last August. Attendees concluded with a compilation of high priority research questions related to this polar phenomena. Chief among these were:

- * What chemical species comprise reactive gaseous mercury?
- * What are the sea ice processes leading to the release of photolyzable bromine?
- * To what extent is the snowpack a sink for reactive gaseous mercury and a source of elemental mercury?
- * What is the biotic fate of the deposited mercury?
- * What are the climatic variables that control mercury deposition rates?

For the past three years, the NOAA Arctic Research Office has funded the Barrow Arctic Mercury Study (BAMS). The team of scientists involved in BAMS has offered to take the lead in the organization and logistics of a coordinated research effort centered at Barrow. As its contribution to the overall study, the BAMS team will conduct a set of core measurements throughout the study consisting of:

- * Continuous monitoring of gaseous elemental mercury, reactive gaseous mercury and fine particulate mercury
- * Continuous monitoring of elemental gaseous mercury surface flux
- * Continuous monitoring of reactive gaseous mercury surface flux
- * Continuous monitoring of interstitial Hg in the snowpack
- * Total mercury and bioavailable mercury levels in the snowpack (daily)
- * Total mercury and bioavailable mercury levels in blowing snow (weekly)

The BAMS team welcomes the involvement of other scientists who can enhance or extend the research to address the priority questions identified at the Toronto meeting.

The following seven leaders/teams are currently scheduled for study:

Steve Brooks/NOAA - Core measurements, vertical Hg profiling, bulk Hg input to ocean water, frost flower sampling

Steve Lindberg/Oak Ridge National Lab – Hg emissions at snow melt, biological fate

Sandy Steffen/MSU Canada – Instrument intercomparisons, atmospheric dynamics

Henrik Skov/NERI Denmark – Atmospheric chemistry

Alfonso Saiz-Lopez, John Plane/University of East Anglia – vertical profiles of Halogens (tentative)

Torunn Berg/NILU Norway – Instrument Intercomparisons, Hg dynamics

Mike Goodsite/U. of Southern Denmark – Deposition of oxidized Hg

The BAMS team and the Barrow Arctic Science Consortium are assisting guest researchers in the following ways:

- Coordinate shipping, transportation, and lodging
- Supply Ultra-High Purity (UHP) argon gas cylinders
- Supply lab space/electrical power
- Supply vehicles (crew cab pick-ups) and snowmobiles
- Coordinate access to the NOAA clean air sector and the Barrow Environmental Observatory
- Supply walk-in freezer space
- Supply computer, office and e-mail/internet needs
- Supply and coordinate access and guides to the sea-ice and lead-water
- Supply dry-ice for shipping samples
- Supply and coordinate the distribution of baseline datasets for solar and meteorological data

Description of Barrow: The Barrow area presents an unparalleled opportunity for arctic terrestrial, freshwater, marine, coastal, and atmospheric research. Geographically, the two distinct water masses of the Chukchi and Beaufort seas converge at Point Barrow. There are estuarine, shelf, deep-water, and diverse sea ice environments. The Barrow Environmental Observatory (BEO; 7,466 acres) allows for study of a wide range of facets of the arctic environment including; tundra, snowpack, permafrost, streams, lakes, and wildlife (ranging from microbes and invertebrates to fish, waterfowl, lemmings, caribou, etc.). Barrow provides the necessary base for all-season arctic research.

Barrow is an ideal location for atmospheric research. In addition to the on-going Barrow Arctic Mercury Study (BAMS), the National Oceanic and Atmospheric Administration (NOAA) Climate Monitoring and Diagnostics Laboratory (CMDL) Barrow Station is one of four manned global atmospheric monitoring facilities. NOAA/CMDL measurements include the longest continuous records of atmospheric trace gas concentration, aerosols, surface and total column ozone, and solar radiation anywhere in the Arctic. The facility hosts numerous international cooperative projects.

Immediately adjacent to the NOAA/CMDL Barrow Station, the U.S. Department of Energy (DOE) has established its North Slope of Alaska and Adjacent Arctic Ocean (NSA/AAO) Cloud and Radiation Testbed (CART) Barrow facility, which is part of the Atmospheric Radiation Measurement (ARM) program. The National Weather Service collects meteorological data at its station in Barrow. Through these facilities, the atmosphere above Barrow is characterized more fully than at any other site in the Arctic. These datasets will be available to all participating researchers.

Researchers working in Barrow, while being in the Arctic, will enjoy good access to logistical support such as jet airline service, reliable electrical supply, Fed-Ex and UPS shipping, housing and dining facilities, laboratory space, access to e-mail/internet, local availability of aircraft and boats, and electronic access to regional Geographic Information

System-linked mapping and overlay data.

Study Gap:

Our main gap is the determination of “Reactive Gaseous Mercury” composition in the near surface air. It is anticipated that a group with expertise in “soft ionization mass spectrometry” is needed to fill this gap.

For further technical information, please contact:

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Annex 9. Draft AMAP Workplan for 2003 and 2004

The publication of the outstanding **2002 AMAP assessment reports** will continue according to the plan.

The publication of the **Danish and Greenlandic language versions** of the Arctic pollution 2002 report are currently undergoing translation and will be presented autumn 2003..

The **Russian versions** is planned to be printed and launched in early September 2003.

The production of the **ACIA reports** will be further elaborated for final decision later in 2003.

The Secretariat, in cooperation with key individuals, will continue to develop the proposal for the **AMAP Strategic Plan 2004+**, taking into account the issues noted in document WG 17/6/4. To facilitate this work, the Lead countries for the 1998-2002 assessments were requested to provide input to this process from their lead authors/experts, based on both past experiences and looking forward to future goals, and priorities, etc. The permanent participants would also be requested to contribute to this work. The deadline for this input on the Strategic Plan would be August 2003. Canada and Denmark volunteered to assist the Secretariat in the work to compile these inputs and to prepare a paper to be circulated to the HoDs in September 2003 for comments by October 2003. On the basis of this consultation, the WG/Board would decide what to communicate to SAOs at their autumn meeting regarding progress in, and plans for development of the AMAP Strategic Plan 2004+, and if necessary request relevant decisions from the SAOs, etc.

For AMAP and CAFF to prepare a coordinated **common monitoring program** and present it for endorsement by the SAOs by the end of 2003. It was suggested that those countries with national experience in coordinating AMAP and CAFF monitoring activities (Iceland, Finland, and Norway) might assist the Secretariats in first preparing an Outline including some proposals on this matter. This will be done during summer and early autumn of 2003.

The schedule for WG review of the updated **AMAP website**, and its subsequent release.

Development of **New Fact Sheets** based on the new AMAP report will be done during 2003.

The petroleum hydrocarbons and acidification **work of the petroleum hydrocarbons and acidification** will be started, including invitation of other partners. This will be done during the summer of 2003 .

Next WG meeting is tentatively scheduled for March 2004 – jointly with CAFF

AMAP List of Publications:

	Minutes of the First Meeting of the Arctic Monitoring and Assessment Task Force (AMATF), Tromsø, 2-6 December 1991
	Minutes of the Second Meeting of the Arctic Monitoring Assessment Task Force (AMATF), Toronto, 30 November - 4 December 1992
AMAP Report 93:2	Minutes from the Third Meeting of the Arctic Monitoring and Assessment Task Force (AMATF), Stockholm - Helsinki, 12 - 14 May 1993
AMAP Report 93:3	The Monitoring Programme for the AMAP
AMAP Report 93:4	Report to Ministers. Update on Issues of Concern to the Arctic Environment, including Recommendations for Actions
AMAP Report 93:5	Audit Report: Arctic Monitoring and Assessment Programme
AMAP Report 93:6	Minutes from the Fourth Meeting of the Arctic Monitoring and Assessment Programme Working Group (AMAPWG), Reykjavik, 11 - 13 October 1993
AMAP Report 94:1	Minutes from the Fifth Meeting of the Arctic Monitoring and Assessment Programme Working Group (AMAPWG), Tromsø, 3 - 4 March 1994
AMAP Report 94:2	Minutes from the Sixth Meeting of the Arctic Monitoring and Assessment Programme Working Group (AMAPWG), Washington 26 - 28 October 1994
AMAP Report 95:1	Guidelines for the AMAP Assessment
AMAP Report 95:2	Minutes from the Seventh Meeting of Arctic Monitoring and Assessment Programme Working Group (AMAPWG), Moscow, September 13-15 1995
NEFCO/AMAP Report 1995	Barents Region Environmental Programme: Proposals for environmentally sound Investment Projects in the Russian Part of the Barents Region: Volume one: Non-radioactive Contamination Volume two: Radioactive Contamination
AMAP Report 97:1	Minutes from the Eighth Meeting of Arctic Monitoring and Assessment Programme Working Group (AMAPWG), Groningen, January 27 - 31 1997
AMAP Report 97:2	Minutes from the Ninth Meeting of Arctic Monitoring and Assessment Programme Working Group (AMAPWG), Stockholm, 21 - 23 April, 1997
AMAP Report 1997	Arctic Pollution Issues: A State of the Arctic Environment Report
AMAP Report 98:1	Minutes from the Tenth Meeting of Arctic Monitoring and Assessment Programme Working Group (AMAPWG), Aarhus, 17 - 20 November, 1997

AMAP Report 98:2	Minutes from the Eleventh Meeting of Arctic Monitoring and Assessment Programme Working Group (AMAPWG), Girdwood, Alaska, USA April 23-24, 1998
AMAP Report 98:3	AMAP/CAFF Workshop on Climate Change, Rovaniemi, 24 – 25 March, 1998. Summary Report
AMAP Report 98:4	Brief Synopsis of the State of the Arctic Marine Environment in the Context of the Development of a Regional Plan of Action to Protect the Marine Environment from Land-Based Activities (RPA). June, 1998.
AMAP Report 1998	AMAP Assessment Report: Arctic Pollution Issues
AMAP Report 99:1	Report of the Workshop on Combined Effects in the Marine Environment, Copenhagen, 16 – 17 November, 1998
AMAP Report 99:2	Minutes from the Twelfth Meeting of Arctic Monitoring and Assessment Programme Working Group (AMAPWG), Helsinki, Finland December 7 – 9, 1998
AMAP Report 99:3	Synopsis of the State of the Arctic Environment in the Context of the Development of an Arctic Council Action Plan for the Elimination of Pollution in the Arctic (ACAP). Prepared by AMAP.
AMAP Report 99:4	Modelling and Sources: A Workshop on Techniques and Associated Uncertainties in Quantifying the Origin and Long-Range Transport of Contaminants to the Arctic, Bergen, Norway
AMAP Report 99:5	Minutes from the Thirteenth Meeting of Arctic Monitoring and Assessment Programme Working Group (AMAPWG), Toronto, Canada, November 10 – 12, 1999
AMAP Report 99:6	The AMAP Strategic Plan: 1998 – 2003
AMAP Report 99:7	The AMAP Trends and Effects Programme
AMAP Report 99:8	"Heavy Metals in the Arctic." Anchorage, Alaska, September 7 – 10, 1999. Proceedings.
AMAP Report 2000:1	International Workshop on Persistent Organic Pollutants (POPs) in the Arctic: Human Health and Environmental Concerns, Rovaniemi, Finland, 18 – 20 January, 2000. Proceedings.
AMAP Report 2000:2	CAFF/AMAP Workshop on a Circumpolar Biodiversity Monitoring Program, Reykjavik, 7 – 9 February 2000. Summary Report
AMAP Report 2000:3	PCB in the Russian Federation: Inventory and proposals for priority remedial actions (Executive Summary).
AMAP Report 2000:4	AMAP Report on Issues of Concern: Updated Information on Human Health, Persistent Organic Pollutants, Radioactivity, and Mercury in the Arctic.
AMAP Report 2000:5	AMAP Report to the Second Ministerial Meeting of the Arctic Council, Barrow, Alaska, U.S.A., October 12 – 13, 2000.
AMAP Report 2000:6	Report of the Expert Meeting on Sampling and Analysis of Persistent Toxic Substances (PTS), St. Petersburg, Russia, 28 May - 1 June, 2000.

AMAP Report 2000:7	Minutes from the 14th AMAP Working Group Meeting, Trondheim, Norway, 5 – 6 September, 2000.
AMAP Report 2001:1	Guidelines for the AMAP Phase 2 Assessments.
AMAP Report 2001:2	Minutes of the 15 th AMAP WG Meeting, Stockholm, Sweden, 30 August 2001.
AMAP Report 2001:3	Proceedings: Trends and Effects of Heavy Metals in the Arctic. International Workshop, McLean, Virginia, USA 18 – 22 June, 2001
AMAP Report 2002	Arctic Pollution 2002
AMAP Report 2002:1	Minutes of the 16 th AMAP WG Meeting, Thorshavn, Faroe Islands, 30 April – 3 May, 2002
AMAP Report 2002:2	The Second AMAP International Symposium on Environmental Pollution of the Arctic, Rovaniemi, Finland. October 1-4, 2002. Extended Abstracts
AMAP Report 2002:3 to 13	PCB Reports. Activity 1 – 11
AMAP Report 2002:14	AMAP Progress Report to the Arctic Council Ministerial Meeting. Inari, Finland, October 9-10, 2002.
AMAP Report 2003:1	Minutes from the 17 th Meeting of the AMAPWG Meeting, Boulder, USA, 12 – 14 May, 2003
AMAP Report 2003:2	Nordic Environment Finance Corporation (NEFCO). Updating of Environmental “Hot Spots” List in the Russian Part of the Barents Region: Proposal for Environmentally Sound Investment Projects. AMAP Secretariat, Oslo, August, 2003.

The Arctic Monitoring and Assessment Programme (AMAP) was established in June 1991 by Ministers of the eight Arctic countries (Canada, Denmark, Finland, Iceland, Norway, Federation of Russia, Sweden and U.S.A.) as a part of the Arctic Environmental Protection Strategy (AEPS). In order to implement AMAP, the eight Arctic countries established the AMAP Working Group (WG). Representatives of the 6 Arctic indigenous peoples organizations are permanent participants to the WG. 5 non-Arctic countries and 27 international organizations involved in significant research and monitoring relevant to the Arctic are observers to AMAP. In 1997, AMAP, together with other programme groups established under the AEPS, became part of the Arctic Council (AC) responsibility.

The primary objectives of AMAP are the measurement of the levels of anthropogenic pollutants and assessment of their effects in all relevant compartments of the Arctic environment. AMAP monitoring activities cover the atmospheric, terrestrial, freshwater and marine environments, and human health. AMAP assessments are presented in status reports to Ministers and form a basis for necessary steps to be taken to protect the Arctic and its inhabitants from pollution.

During the period 1991 - 1997 the priority focus was on persistent organic pollutants, selected heavy metals, radionuclides and acidification. Oil, UV and Climate Change issues were also covered, but with a lower priority. The first circumpolar assessments were published in 1997 and 1998. For the period 1998 - 2003 the priority is to document biological effects on the Arctic environment and its inhabitants due to pollutants and changes in climate and UV. Assessment of geographical and temporal trends is a continuing priority, as is human health related work.

AMAP has a permanent Secretariat located in Oslo, Norway. For further information regarding AMAP or ordering of reports, please contact the AMAP Secretariat or visit the AMAP website at <http://www.amap.no>.