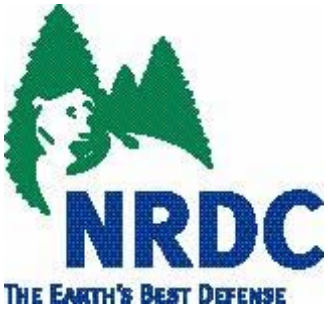

September 5, 2006

TO:
Mr. Luis Oliveros
Regional Coordinator for Environment
Amazon Cooperation Treaty Organization (ACTO)

CC:
Mr. Carlos Aragon
Amazon Cooperation Treaty Organization (ACTO)

Ms Marilia Marrecco Cerqueira
Director, Programme for the Protection & Improvement of Environmental Quality
Ministry of the Environment, Brazil

RE: Comments on the *Regional Action Plan for the Prevention and Control of Mercury Contamination in Amazon Ecosystems*

Dear Mr. Oliveros,

The Natural Resources Defense Council appreciates the opportunity to provide comment on the draft document, *Regional Action Plan for the Prevention and Control of Mercury Contamination in Amazon Ecosystems,* dated January 27, 2006. NRDC is a US-based environmental advocacy organization with more than 1 million members and online activists. NRDC works with other activists around the world to promote positive action on issues affecting the global environment, including climate change, biodiversity and global toxics. In particular, NRDC has been working with other NGOs worldwide, as part of the Zero Mercury Working Group, which includes the Associacao de Combate aos POPs in Brazil, to reduce exposures to mercury globally by advocating a range of measures to reduce mercury supply and demand simultaneously.[1]

[1] The Zero Mercury Working group, www.zeromercury.org, is an international coalition of more than 40 public interest non-governmental organizations from around the world formed in 2006 by the European Environmental Bureau and the Mercury Policy Project/Ban Mercury Working Group. The aim of the group is to reach "'zero' emissions, demand and supply of mercury, from all sources that can be controlled, with the aim of eliminating mercury in the environment at EU level and globally.

We applaud the Amazon Cooperation Treaty Organization (ACTO) for seriously addressing mercury as one of the major toxic threats in the Amazon basin, and encourage the member countries to continue to pursue a vigorous strategy to reduce the impact of this highly toxic metal on populations in the Amazon, and on the world community. The *Regional Action Plan for the Prevention and Control of Mercury Contamination in Amazon Ecosystems*, abbreviated as the Mercury Action Plan (MAP), outlines ACTO's specific proposals to address the challenges surrounding mercury contamination in the Amazon region. As such, the document provides an important roadmap for collaboration among ACTO member countries. The MAP document focuses on a number of specific cooperative activities to improve the environmental, social, and technological management of mercury use in placer gold mining, provides for communications with affected placer mining communities, and encourages knowledge management among government, academia, and other stakeholders.

However, as a general matter, we believe the universe of activities outlined in the plan is extremely resource intensive, particularly the research and data gathering elements. We are concerned that the plan does not reflect the limited financial support realities facing ACTO, and the need to set priorities within the litany of possible meritorious projects. Accordingly, we urge ACTO to give highest priority to those activities that will directly lead to significant mercury use and release reductions, and to highlight within the plan elements of a regional mercury demand and release reduction strategy, which would include the promotion of mercury-free alternatives in placer gold mining, the management of mercury byproduct from industrial gold mining, and the phase-out of mercury in the chlor-alkali sector. We respectfully offer the following recommendations for strengthening the draft Mercury Action Plan (MAP) in these areas.

Regional Plan for Demand Reduction

The MAP proposes a suite of initiatives to improve mercury management and reduce human exposures, especially among small-scale miners. However, the plan fails to address the need to dramatically reduce overall demand for mercury in the region, in the mining industry and in other sectors. Given the current state of worldwide initiatives aimed at curtailing global mercury supply (including, for example, the cessation of virgin mercury mining at the world's largest mercury mine in Almadén, Spain, and an upcoming European ban on the export of mercury), the Amazon region needs to respond with a long-range plan to eliminate its reliance on mercury in its economic activities. The ACTO should develop a regional plan that articulates a specific target or targets for demand reduction, coupled with an ambitious timeframe for achieving the reductions. Clearly articulated demand reduction targets would provide a centerpiece around which the MAP activities can be organized. Once the targets are set, the ACTO members countries can then lay out a clear agenda for:

- developing a system for estimating or tracking the sale, use, import and export of mercury within and among the region's countries;
- creating sector-specific goals for reducing demand; and

- supporting the achievement of these goals by providing technical assistance, legal/regulatory measures and other actions necessary to reduce mercury use and release and, whenever feasible, encourage the conversion of mercury-based technologies to mercury-free technologies, especially among small scale miners.

Some of the activities already proposed in the draft MAP would support a regional demand reduction plan; the remainder of these comments discuss additional measures that would be needed to fully realize the maximum reduction of the use of mercury in the region.

Alternatives to the Use of Mercury in Placer Mining

The MAP states that there is no viable alternative "for extracting gold from alluvium ores other than the mercury amalgam process" (p. 12). However, the published literature describes several other available methods, some of which have been used or tested in Amazon countries already. While appropriate mercury management is a reasonable short-term objective for placer gold mining, the eventual goal of the MAP should be the replacement of mercury with safer, Hg-free methods of gold extraction.

Review articles by Hinton et al. (2003), Veiga et al. (2006), and Vieira (2006) describe several alternative mercury-free processes, including their technological advantages and disadvantages, as well as possible social and environmental concerns associated with these methods. Methods include improved techniques for gravity separation and concentration, such as specially designed sluice boxes, shaking tables and centrifuges. A patented technology, Cleangold, is one specialized type of sluice box that uses magnetic minerals in the ore to capture fine gold. Cleangold has been tested as part of the UNIDO Global Mercury Project and other sponsors and has found good results in a range of settings in Africa, Asia and South America (Venezuela) (see www.artminers.org and www.cleangold.com). Other chemical processes include leaching with hydrochloric acid and chlorine (see Veiga et al. 2006 and Vieira, 2006), as well as leaching with cyanide, in a process similar to the one used by large-scale mining operations. In Kyrgyzstan some placer gold miners use nitric acid for the extraction of gold. In Ghana, Dr. David Norman, a professor of geochemistry at New Mexico Tech University, has introduced a method where gold-containing sands are dried, magnetic grains removed with a magnet, and gold is separated from remaining sand by hand. While the process is more labor intensive than amalgamation, the final product is of higher quality.

While these alternative processes, particularly those involving chemicals, pose their own health and environmental hazards, these hazards can be mitigated through careful control and use of the materials, which will require intensive communication with and training of the miners. Furthermore, the toxic nature of the materials (such as nitric acid) is often transient in nature, unlike mercury, which persists in the environment indefinitely.

Recommendation: We strongly urge ACTO to adopt the promotion of Hg-free, and chemical-free where possible, alternatives as one of the primary goals in the Action Plan. While these technologies may not yet be fully developed nor ready for implementation in

all locations, the adoption of this goal in the long-term would be consistent with the objective of "continuous technological evolution" (p 26) stated in the MAP.

To provide concrete support to achieving the transition to Hg-free methods, the MAP should include activities to address both the technical and social barriers that prevent the widespread adoption of these alternatives. The Hg-free methods will be adopted only if they are relatively cheap, easy to use, and equal or exceed mercury's performance in extracting gold. Therefore, the Social, Environmental and Technological Management program components of the MAP should include a comprehensive review of these technologies, which would consider the costs and relative efficacy of these technologies, assess which are best suited for different types of gold deposits, evaluate potential impacts on the environment, identify the knowledge gaps that still need to be addressed, and identify the barriers to expanding use of the preferred technologies. Also useful would be support of pilot projects that aim to further improve these techniques in a practical setting, by simplifying the methods, reducing their costs and improving occupational safety. It is critical that local NGOs participate in these projects to ensure a smoother adoption of new technologies, and to identify potential cultural and/or religious beliefs that may act as barriers to reducing the use of mercury.

Solutions are also needed to overcome the regulatory, legal, economic and social barriers to the adoption of new methods. The Social Management program component of the MAP should conduct an evaluation of the technological and economic drivers that would govern the choice of different methods of gold extraction (costs and access to materials, e.g.) including the barriers identified in the technical review, the ease with which alternative methods could be overseen and controlled, the financial support needed and types of financial instruments that could be used for adoption of alternatives (such as revolving funds or micro-credit), and the best means to deliver necessary technical education to the miners on the safe operation of alternative methods. Because many placer miners operate outside of the formal legal and regulatory system, it may be necessary to create new legal structures to develop and formalize the sector (for example, licensing), in order to have official mechanisms to deliver technical training, provide financial assistance, and promote alternatives.

The Social Communication and Knowledge Management program components could be critically important to the promotion of alternatives. However, the projects currently envisioned under these program components do not explicitly include efforts to disseminate information about these alternative processes to placer mining communities. The proposed projects under the Social Communication and Knowledge Management components should be augmented to include such projects. For example, the Social Communication component already includes a proposed project for citizen environmental education, with emphasis on placer mining populations, which will focus risks of mercury use and ways to mitigate these risks (p 33). This program should be complemented by technical training for placer miners on the use of alternative Hg-free processes.

Similarly, the Knowledge Management program component describes projects aimed at developing and sharing critical information on mercury in the Amazon environment, its effects on health, and its use in gold commerce (p 34). While maintaining and sharing such knowledge is undoubtedly an important goal, more urgent is the need for developing, maintaining and disseminating knowledge on Hg-free alternatives, as a means to "foster the adoption of new technologies to reduce mercury emissions in the basin." (p. 41). We encourage ACTO member countries to propose specific projects to promote community education and knowledge management for Hg-free alternatives under both the Social Communication and Knowledge Management program components.

However, while it is critical to help further develop and promote mercury-free alternatives, until these alternatives are widely available, the community and placer miner education programs should aggressively promote measures to reduce mercury exposures, including use of retorts during the mercury burn-off stage. Retorts are relatively inexpensive, are simple to operate, allow for reuse of captured mercury and help to reduce exposure. Retorts can be used by individual miners, but can also be used in central processing stations to make the capture of mercury more economically viable and to further limit exposures to miners and their families.

The use of retorts and other exposure minimization efforts should be viewed as interim measures while alternatives are pursued. Even with the use of retorts, some mercury will still be released, and retorts do not address contamination to soil and water that occurs during the initial amalgamation process. Ultimately, only movement to mercury-free technologies will mitigate the threat of mercury contamination from placer mining.

Finally, the Social Communication program component should also include training of medical personnel on the health risks of mercury and, importantly, on the diagnosis of mercury poisoning. The MAP points out that there is currently a lack of ability to diagnose mercury poisoning, and that the symptoms are sometimes confused with other diseases such as malaria (p 16). Medical training of those serving in areas with large placer mining communities would not only improve diagnosis and treatment of those affected, it would also provide a more comprehensive data set upon which to base epidemiological studies of placer mining communities, which are proposed as part of the Social Management program component (p 31).

Mercury from Other Mining Activities

Although the MAP states that the strategy is focused on "mining and placer mining" (p. 5), most of the subsequent discussion appears to focus only on the use of mercury to amalgamate gold in placer mining operations. While this is certainly a critical and highly damaging use of mercury, the MAP should not neglect to consider the impact of mercury emitted from large scale gold mining operations, and should include proposed activities to reduce the emissions of mercury from these sources. Peru is among the top five gold-producing countries in the world, and Brazil and Colombia are also significant gold producers, and certainly much of this production is from industrial mines. As stated in

the MAP (pg 13), gold mines are a major source of Hg air emissions. In gold mining operations, mercury may be emitted to air during a number of points in the process, including ore roasting, processing of the gold-cyanide material to *dore*, and stripping of carbon adsorption units. Rather than emitting mercury to air, the mines could capture the mercury and then sell the material as a profitable commodity, or otherwise manage it in an environmentally responsible manner. Some mining operations in Amazon countries are apparently already engaged in these practices. For example, according to the COMTRADE data, in 2004, Peru exported 67 tons of mercury to Spain and the US, presumably largely captured as byproduct from gold mines, since there are no virgin mercury mines in Peru. These export data show that mercury byproduct recovery is a viable practice in the Amazon region.

Recommendation: The MAP offers an opportunity to encourage the adoption of best technology and mercury management practices at gold mining operations on a coordinated, regional scale. Under the Social Management program component, the MAP should include a review of current requirements for air/water pollution control at gold mines within member countries, make recommendations for strengthening these requirements, and share information on relevant technologies. Available mercury control processes include mercury scrubbers and selenium adsorption. Another available process is the Boliden-Norzink process, where mercurous chloride is added to scrubbers to react with elemental mercury to form mercuric chloride. A discussion of these processes can be found at http://www.chem.unep.ch/Mercury/Sector-Specific-Information/Docs/Mercury_mass_balance&emissions.pdf.

Notably, the International Finance Corporation (IFC) has recently issued broad guidance on environmental and social standards for all IFC-financed activities, and is currently developing specific technical guidance for the mining sector (see http://www.ifc.org/EHSGuidelinesUpdate). Furthermore, the State of Nevada in the United States, a major gold mining state, has recently published permitting rules which will establish maximum available control technology standards (MACT) for industrial gold mines. Nevada intends to set up a MACT clearinghouse on mercury control technologies accessible on the Internet, once the MACT controls are identified. These two international examples of pollution control standards can provide useful models for ACTO member countries to develop their own consistent, meaningful standards to control mercury emissions from gold mining operations, where such standards are not already in place.

At a minimum, as part of the proposed emissions inventory to be conducted under the Environmental Management program component (p 31), we urge the ACTO member countries to estimate current mercury emissions from industrial gold mining operations that lack mercury recovery practices (using for example, a crude mass balance calculation to obtain reasonable estimates), to quantify the volumes of mercury recovered at mines which currently practice byproduct recovery, and to follow the fate of the recovered mercury as it is bought, sold and traded, within ACTO countries and internationally. This information will help the design and/or improvement of mercury emissions management at industrial gold mines in the region, supporting the MAP goal of "fostering qualified management practices in the production chain, by means of obtaining

and applying recognized environmental management systems" under the Technological Management program component (p 32).

Sources of Mercury other than Gold Mining

The MAP plan recognizes that there are several important uses of mercury in the Amazon Basin, but has chosen to focus on placer mining as the most critical source of human health and environmental risks. However, the use of mercury in placer mining should not be considered in isolation from use in other applications, because the demand for mercury in these other uses will affect the overall trade of mercury within the Amazon region, and thus influence the local availability and costs of mercury to placer miners. In fact, the MAP states that one of its objectives is to "analyze the possibility of creating barriers against importing mercury, to strengthen recycling" (p 26); any such action would clearly have to be considered in the context of all affected uses of mercury in ACTO member countries.

For example, the MAP cites a 1997 report which estimated that 10 percent of air emissions of mercury in Brazil were emitted from chlor-alkali plants (p 13). While this is not an insubstantial contribution for a single industry, it should be noted that emissions from this sector can be dramatically underestimated. A recent study of the U.S. chlor-alkali sector found that the industry could not account for 130 tons of mercury lost from its plants, in addition to the 29 tons of reported mercury air emissions, suggesting that Hg losses to the environmental are greater than officially reported.[2] According to the Chlorine Institute (2004), as of 2004, there were seven operating chlor-alkali units using mercury-based technology in Brazil, while Peru had eight operating units. The continued use of mercury for the chlor-alkali sector maintains a legal avenue by which mercury imports can be justified. Hinton (2005) notes that the legal import of mercury for uses such as dental use and chlor-alkali plants means that mercury remains easily and inexpensively accessible for the miners. Eliminating the use of mercury in the chlor-alkali sector would create one less legal source of mercury entering Amazon nations. Furthermore, the mercury-cell based process is very outdated and energy-inefficient; as a result, it is being phased out elsewhere in the world, particularly in Europe, both to reduce mercury pollution and to increase industrial energy efficiency. Thus, the conversion of chlor-alkali plants to non-mercury processes is justified on broad environmental grounds.

Recommendation: The MAP should adopt a goal to encourage chlor-alkali plants to convert to mercury-free technologies, consistent with the MAP's overall goal of promoting clean technology and fostering improved environmental management. In countries with chlor-alkali plants, conversion to cleaner technology, namely membrane technology, could be required by regulatory directives, consistent with initiatives elsewhere in the world; for example, the Indian chlor-alkali industry has made an agreement with the Indian government to phase out mercury chlor-alkali plants by 2012, and many EU countries are requiring closures or conversions by 2010 or earlier. Because

[2] Natural Resources Defense Council, 2006, *Lost and Found: Missing Mercury from Chemical Plants Pollutes Air and Water*. NRDC Issue Paper, April 2006.

conversion also reduces the amount of electricity required by the chlor-alkali plants, such conversions may produce carbon credits that can be traded under international carbon funds. If so, these conversions may qualify for various carbon financing programs aimed at generating greenhouse gas reductions in developing and transition countries (see, for example, http://carbonfinance.org/). Should such conversions take place, it will be important to develop regulatory mechanisms to carefully manage the waste mercury resulting from the closure of mercury cells, so that the material is not "dumped" on the local market, which would depress the local price of mercury, making it more attractive to placer miners.

Other Comments

Understanding Mercury Flows

An important factual basis for the development of a comprehensive mercury demand reduction strategy is to understand how mercury is produced, sold and traded within Amazon countries and internationally. Reported mercury imports to countries in the Amazon basin in the 2002-2004 period totaled 770,194 kg, while reported exports from these countries amounted to 266,722 kg (see Table 1). Peru, Brazil and Colombia account for most of the imports, while Peru accounted for 95.5 percent of these exports, which were destined to Spain and the United States.[3] However, the overall reliability of these numbers is questionable, since the imported quantities of mercury reported by Amazon countries do not often match the corresponding reports of exports from other countries. For example, from 2002 to 2004 Brazil reported importing 252,320 kg of mercury, while all other countries of the world reported exporting only 122,584 kg to Brazil. Similarly, Guyana reported importing 55,371 kg, while other countries reported exporting only 6,702 kg to Guyana that year. These discrepancies amount to 195,055 kg for the 2002-2004 period and expose the limitations of import/export data, indicating that underreporting of mercury trade may be a common problem. This is particularly critical gap to understanding the potential extent of mercury use in artisanal gold mining, which often must be inferred from trade statistics.

We urge ACTO member countries to create a better mercury tracking system within their countries, and to more accurately track imports from and exports to the world market, also in line with the 23 UNEP Governing Council decision.

[3] However, Colombia and Germany reported importing from Peru 1,750 kg and 16,875 kg of mercury, respectively, although Peru did not report any mercury exports to these countries from 2002 to 2004.

Table 1. Elemental mercury imports and exports, 2002-04								
Target country	**World: Reported exports to target country**		**Target country: Reported imports from rest of the world**		**Target country: Reported exports to rest of the world**		**World: Reported imports from target country**	
	Kg mercury	Value ($US)	Kg mercury	Value ($US)	Kg mercury	Value ($US)	Kg mercury	Value ($US)
Bolivia	60	704	5,975	25,928	NR	NR	NR	NR
Brazil	122,584	1,384,655	252,320	1,690,903	1	163	140	18,100
Colombia	192,149	1,184,534	187,069	983,264	51	1,355	6	612
Ecuador	11,569	112,119	27,656	195,020	33	1,107	NR	NR
Guyana	6,702	35,042	55,371	175,903	1,828	17,542	NR	NR
Peru	227,003	995,345	241,132	1,135,979	247,790	440,803	297,483	703,316
Suriname	14,327	132,474	NR	NR	NR	NR	339	2,488
Venezuela	745	10,111	671	8,788	17,019	649	NR	NR
Total	**575,139**	**3,854,984**	**770,194**	**4,215,785**	**266,722**	**461,619**	**297,968**	**724,516**

NR = No amount reported

Discussion of Sources and Risks of Mercury

The MAP report contains an extensive review of the sources of mercury (natural and anthropogenic) in the environment, information on emissions and levels of contamination in various media, and a review of the toxic effects of mercury. Having such a review in the report is useful for understanding the scope of the problem and the urgency of action. However, we note that there are more recent overview reports that may provide a more current picture of mercury sources, emissions and concentrations, than the references cited in the MAP. Importantly, the description of gold mining and its contribution to mercury pollution is outdated, with most references cited from to the mid-to-late 1990s. These data do not reflect the likely dramatic changes in this sector due to the recent sharp rise in the price of gold, which has undoubtedly created increased incentives for exploration, industrial and artisanal mining. Furthermore, more recent reviews of the toxicity of mercury emphasize the devastating effects of mercury on children in earliest stages of development. (see for example National Research Council, 2000). The recognition of the disproportionate impact of mercury on child-bearing women and children engaging in placer mining, as well as for those in the general population exposed through water and air pollution from mining activities, makes a compelling case for immediate and decisive collaborative action to mitigate these risks.

The MAP also calls for additional, new research to understand the health effects and environmental fate of mercury in the Amazon basin (pg 34). However, there is already ample information in the existing literature about the behavior of mercury in the environment, and about the severe health implications of exposure to mercury. Given the limited resources available to ACTO countries for actions on mercury, it is not necessary to perform additional, costly research to establish the need for action. Rather, the emphasis of the action plan should be specific institutional, regulatory and social actions to reduce the exposure to this toxic metal.

Country Survey of Practices

Annex 3 of the MAP describes a survey conducted among ACTO member countries, which requested detailed information about mercury sources, uses, and management in each country. The responses to this survey constitute a very rich set of information and provide insight into each country's objective data and subjective views on the mercury situation in its territory. If possible, ACTO should make the results of this survey public, so that all stakeholders in the process can benefit from the information contained in the survey results. Furthermore, ACTO should also submit the results of the survey to UNEP. UNEP is charged with developing a report "summarizing supply, trade and demand information for mercury, including in artisanal and small-scale gold mining" (see: http://www.chem.unep.ch/mercury/Trade-information.htm). The report will serve as a basis for formulating new actions at the 2007 UNEP Governing Council meeting. As part of the preparation of this report, in March 2006, UNEP invited governments and others to provide relevant information. ACTO should submit the survey information in response to this request, because these data will be very informative to the overall international deliberations on mercury policy.

NGO Involvement in the Strategy Development and Implementation

We are grateful that the ACTO member states made the results of its deliberations and the MAP document available on the World Wide Web, so that it is accessible to interested members of the public. The development and implementation of the MAP will be further greatly enhanced by the active engagement and participation of Amazon basin nongovernmental organizations (NGOs), environmental health organizations, and other stakeholders. A first step toward engaging such organizations would be to disseminate the draft MAP to these organizations, and solicit their input. Further strategy development and implementation should be done in regular consultation with these groups. Consultation will provide an opportunity to hear valuable stakeholder perspectives; stakeholders can also provide cost-effective assistance in dissemination of information on mercury to the public.

Thank you in advance for considering our comments

Sincerely,

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