United Nations Development Programme
Sustainable human development

United Nations Development Programme/SEED
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Fax Cover Sheet

DATE: 2 December 1997

TO: Mr Newton Cordery PHONE: (202) 473-6028
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FROM: Philip Reynolds PHONE: (212) 906-5866
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RE:

FILE: GLO 97/643 Mercury

CC Andy Hudson

Number of pages including cover sheet: 3

Attached are some useful comments from UNIDO on UNEP's comments. Please feel free to share them with your colleagues

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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
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PLEASE DELIVER IMMEDIATELY TO ADDRESSEE

To:
Mr. Philip Reynolds
UNDP
GEF Unit
Senior Programme Adviser
New York
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Drafted by/Contact person: B.Rossi-y-Costa	Authorized by: A. de Groot
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Our reference	Your reference
Date: 2 December 1997	Account to be charged
Transmission No	This page no. 1 of 2

URGENT

Subject: **UNEP comments on the mercury project**

Dear Mr. Reynolds,

Pursuant to your request, please find below UNIDO's comments regarding the above mentioned project. We are sending the same comments to Mr. Hudson.

1. **Mercury is a global contaminant and has been recognized as such by the GEF itself**

We do not understand UNEP's comments as mercury is a global problem as defined by the GEF itself and in particular in Operational Programme no.10 "Contaminant-Based". The GEF clearly states in the mentioned programme, under the section titled "Global Contaminants" (p.4 of OP no.10):

> "**Some toxic pollutants** that are persistent in nature **can be considered as "global contaminants"** because they are transported long distances in ocean currents or through deposition from the atmosphere. They can accumulate in living organisms and can pose human or ecosystem health risks. [...] Substances such as mercury, dioxin, PCBs, persistent organic pollutants and some pesticides that can disrupt human endocrine systems or pose human health threats **are candidates for global action**.[...] **GEF may support activities** that help characterize the nature, extent and significance of these contaminants and support. "
>
> "In the contaminant based OP, GEF includes projects that help demonstrate ways of overcoming barriers to the adoption of best practices that limit contamination in the international waters environment".

UNIDO has based its proposal on the mentioned OP. Artisanal gold mining is present in at least 40 countries of all regions of the world, are present along transboundary rivers such as the Amazone river, Zambezi river, Madre de Dios river, or lakes such as Lake Victoria and mercury used is transported. Therefore, the contamination and subsequent pollution is indeed transboundary and global.

2. Specific areas where the project will take place: please note that the project was modified and the identification of specific areas is part of Activity 1.1 of the proposal, where the regions tackled (river basins/lakes) will be selected.

3. Evidence is indeed present in the project of measurable environmental damage resulting from mercury levels detected. Please refer to the Background section of the project and the paragraphs referring to damages caused to the environment, to species, to human health to habitat and to the resource (gold).

4. "Pollutant" and "contaminant": We are reviewing the document to ensure that the terms

5. We are deleting the sentence. Regarding the remark on "many [contaminants that] are more widespread and truly global", please refer to point 1 above.

6. Wherever the contamination comes from - inhalation of toxic vapour, bioaccumulation or very specifically from absorption of contaminated fish, such problems, and "even" effects on human health, are addressed by the GEF and qualify for project funding. We fail to understand the difference that UNEP attempts to establish between environmental contamination and pollution and human contamination as if the latter would not qualify for GEF action whereas the former would.

7. As you are aware, we have already attracted "external"funding. We are sure there is considerable potential, which will be enhanced by the GEF co-funding itself.

Looking forward to hearing from you soon, I remain,

Yours sincerely

Adrie de Groot
Chief
Coordination of Funds Mobilization Section
Country Programmes and Funds Mobilization Division

29 October 1997

PART I: PDF BLOCK B BASELINE INFORMATION

Country: Global

Focal Area: International Waters
Contaminant-Based Operational Program (OP #10)

Project Title: Removal of Barriers to the Abatement of Global Mercury Pollution from Artisanal Gold Mining

Funding Requested: USD $350,000

Co-funding: $21,000 United Nations Industrial Development Organizations (UNIDO)

Requesting Agency: UNDP

Block B

Block A awarded: No (Project development to this point supported by UNIDO)

Project Duration: One year

PART II:

1. SUMMARY PROJECT OBJECTIVES AND DESCRIPTION

The objective of the GEF full project will be to demonstrate and enable the development of alternatives to mercury amalgamation as an artisanal gold mining method in developing countries with clean(er), locally produced technology. At the same time, the project will improve the productivity and environmental income of the miners through more efficient recovery and provide advice to governments on the regulation of small-scale mining and the establishment of institutional structures to assist sustainable artisanal gold mining. As the adoption of new technologies might be hindered by various barriers, i.e., legal, informational, institutional, financial, political, cultural etc., the project will also focus on identifying these barriers in each country and propose solutions to overcome them. Additionally, as a large number of women are involved in mining activities, the project will integrate activities specifically targeting women.

Background

Manual mining without mechanical assistance and other rudimentary methods of metal extraction has a history nearly as long as mankind. Despite the continuous development of the formal sector, artisanal gold production has seen a world-wide resurgence over the past 25 years. In sub-Saharan Africa, for instance, it is estimated that well over 40 t of gold are produced from such "mines" annually, worth about $500 million and employing about 1.5 million persons. It is estimated that one fourth of the entire world gold production derives from artisanal and small-scale operations.

In many developing countries, artisanal gold mining has become a major safety-valve, cushioning the worst effects of structural adjustment, recession and drought by providing people in the rural areas with an alternative or complementary way of securing a livelihood. However, artisanal gold mining has become a source of anxiety and concern to Governments due to the severe impact on the global environment and the danger to human life because of the extensive utilization of mercury to exploit gold resources.

It could be expected that help would be provided by donor agencies to countries facing the disastrous impact of mercury pollution as a result of artisanal gold mining. However, until very recently the economic niche occupied by artisanal miners, usually without legal title and producing goods that could not be legally traded, was not one that aid institutions were comfortable working in.

Overview of Problem/Main Issues: Artisanal mining and its impacts on the environment, habitat, human health, and gold resources

(i) Damage caused to the environment: Mercury (Hg) contamination is considered to be one of the worst hazards among anthropogenic impacts upon the environment. Artisanal gold mining represents one of the principal sources of mercury pollution to the global environment. Sources and impacts of mercury during artisanal gold mining include the following:

Emission of Hg vapor into the atmosphere: In many developing countries of Africa, Latin America and Asia, the toxic metal is widely used for the separation of fine gold particles through amalgamation from river sediments, soils or rock. After the amalgamation, the gold containing Hg alloy is generally burned in retorts, but in many areas this operation is also carried out in open air emitting Hg vapor to the atmosphere.

Loss of Hg into the rivers and soils: During the amalgamation process, a variable amount of Hg is lost to rivers and soils. Using artisanal methods, up to two grams of mercury are lost to the environment when producing one gram of gold. In Brazil, the available evidence shows that nearly 300 tons of Hg are annually lost to the environment. A total of 1,000-2,000 tons of Hg is estimated to have accumulated in the Amazon ecosystem alone. The same problems exist in Africa and Asia; however, reliable data on the extent of Hg pollution are difficult to obtain.

(ii) Damage to species and populations

Apart from poisoning effect of metallic mercury at the working places, the toxic metal used by artisanal mining communities is polluting river ecosystems, where river sediments or primary ore are directly amalgamated. Significant contamination of aquatic environments from mercury has been documented all over the world. Once the metallic mercury is released into the water, it is transformed by bacterial oxidation through the so-called methylation into methylmercury (Me-Hg), a most toxic organic and water soluble compound, which is rapidly taken up by species in the aquatic environment.

Aquatic biota is the main transfer pathway of mercury from a contaminated environment to humans, since this heavy metal typically suffers biomagnification through food chains, presenting its highest concentration in organisms like fish. Contamination of aquatic organisms, in particular of fish, by mercury released into the environment by gold mining activities has been reported in vartious Amazonian rivers and has received more attention from researchers than any

other aspect of mercury contamination in the Amazon. Unfortunately however, most studies were extensive surveys of mercury concentration in fish, not taking into consideration other important organisms in this ecosystem. Highest mercury level were found in carnivorous fish. Mercury content in fish is significantly higher in larger, older individuals, generally following a logarithmic behaviour providing evidence that methylation occurs in river systems contaminated by mercury.

Evidence of mercury contamination are also provided in studies on freshwater snails in rivers flowing through artisanal gold mining areas. Another important component of the Amazon biota included in mercury surveys are aquatic macrophytes. Few data on the mercury content of macrophytes growing in areas affected by gold mining show that these plants can be used as good monitors for mercury contamination in the region.

(iii) ***Damage to human health***: In contrast to other chemicals that cause spectacular accidents when being released, mercury has a long-term, time-delayed impact and is, therefore, regarded as "chemical time-bomb". The environmental concern for the toxic metal is evident given the past occurrences of the "Minamata disease" in Japan and innumerable cases of Hg intoxication in developing countries showing the following five classical symptoms:

1. Visual constriction;
2. Numbness of the extremities;
3. Impairment of hearing;
4. Impairment of speech;
5. Impairment of gait.

Communities whose main diet is composed of fish have shown high levels of mercury in blood. This is especially true for parts of the Amazonian population.

Inhalation of mercury vapour is the most significant contamination way for miners. Once in the lungs, mercury is oxidized forming Hg(II)complexes which are soluble in the body fluids. Metallic mercury is poorly absorbed by the gastrointestinal tract. The ultimate effect of mercury and related compounds is the inhibition of enzyme action. The impairment of the blood-brain barrier, together with the possible inhibition by mercury of certain associated enzymes affects the metabolism of the nervous system.

The kidneys are the affected organs in exposures of moderate duration to considerable levels while the brain is the dominant receptor in long-term exposure at moderate levels. Total mercury elimination can take years. The affected population in Japan with a peak urinary mercury concentration of 600 µg showed neurobehavioral disturbances 20 to 35 years after the mercury exposure. Typical mercury concentrations in urine of artisanal gold miners in Tanzania were above 420 µg/l (Clinical manifestation of mercury poisoning occurs between 100 and 400 µg/l). The symptoms usually associated with undue mercury vapour exposure are erethism (exaggerated emotional response), gingivitis and muscular tremors. The latter is a symptom associated with long-term exposure to high levels of mercury vapour.

The amalgamation process is devastating to human health, not only to miners but also to those indirectly involved, including the unborn, through peripheral contamination and introduction into the food chain. Me-Hg can penetrate the placental barrier transferring mercury to the fetus. It has been observed that when female's intake of the poison is large and she becomes ill, sterility occurs. When the dosage is smaller, pregnancy can take place but the fetus

may abort spontaneously or is stillborn. An even smaller dose permits conception and live birth, but the baby will have severe symptoms of neurological damage. Life-threatening levels of mercury pollution have been identified in most developing countries where artisanal gold production is taking place.

A great majority of the miners are women and children. Hazards caused by mercury pollution to the health of women are further exacerbated through their reproductive and household responsibilities alongside their mining-related activities.

(iv) ***Damage caused to Habitat***: Artisanal gold mining and extraction are carried out by men and women working interchangeably at all jobs. Depending on the geological situation, gold is extracted from either river sediments or concentrated by processing the ore from small primary deposits. According to Noestaller[1], 225 tons of gold are annually produced by artisanal and small-scale miners world-wide, 65 tons are produced in Africa by these operations. From this quantity, approximately 60% come from hard rock mining operation (primary ore), the rest is extracted from alluvial and eluvial deposits. In both cases, the main tools for concentration are the so-called sluices and pans. Gold panning is the worst form of extraction with devastating consequences to the environment as it involves digging up river beds and utilization of mercury. It is estimated that more than 25 percent of the entire world gold production comes from artisanal exploitation of alluvial and primary deposits.

In many areas of Africa, mercury is also used in small-scale primary gold mining. In Ethiopia, Zimbabwe and surrounding countries of Lake Victoria a mercury catastrophe would appear to be in the making. Villagers are using mercury with disastrous abandon, even burning off mercury residues in pots which women use later for cooking purposes.

In Zimbabwe, for example, between 100,000 and 200,000 people pan for gold illegally in rivers and streams covering about 4,000 kilometers. Also in other gold producing countries of Africa, serious degradation of the river courses and their contamination with mercury has become a common feature due to gold panning. Rivers which used to flow throughout the year no longer flow because the river beds have been destroyed by widening them to such an extent that the embankments have collapsed.

The largest artisanal mining reserve in Latin America is located in the Tapajós river. In 100,000 km^2 there are 460 artisanal mining sites (garimpos). It is estimated that over 500 tonnes of gold were produced in this region since 1980. In 1992, an estimated 230,000 miners were active in the region. Mercury losses in 20 years of artisanal gold mining in Brazil have been reported as between 1,000 and 2,000 tonnes.

(v) ***Loss of gold resources***: Artisanal gold mining is very often the only significant cash generating industry in remote areas of Burundi, Central African Republic, Chad, Ethiopia, Ghana, Guinea, Madagascar, Mozambique, Tanzania, Zimbabwe and other countries. In many areas, artisanal gold mining and extraction methods however are leaving about 75% of the gold unrecovered. Gravels under exploitation are in general so rich in coarse gold - and the artisanal mining methods so inefficient - that the artisans have not found reason to develop fine gold extraction capability. As a result the finer gold fraction (<0.25 mm), which should constitute about 50% of river gold, averages only 3% of artisanal recovery. Miners haphazardly work

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1 Noetstaller R. , Final Report on Expert Group Meeting on UNIDO High-Impact Programme, October 1997

sections of river with highest grade gavels, then abandon these for other areas when repeated mining diminishes recoverable grades below some 0.1 g of gold per worker per day. Average yield appears to be around $2-2.50 per worker per day. This is doubly unfortunate, because: 1) more than 40 t of gold are produced annually from such mines in sub-Saharan Africa, leaving then 160 t unrecovered 2) unless these methods are changed soon, the considerable gold resources exploited on artisanal basis will eventually be mined down to grades that are economically unexploitable by any method.

*(vi) **Barriers to the phasing out of the use of mercury in artisanal gold mining.*** The source of the problem, the gold extraction method using mercury amalgamation, as well as the barriers hindering the phase-out or reduction of mercury emissions are common to many countries in the world, in all regions. Barriers consist *inter alia* of:

- Lack of knowledge at government level that alternatives are available to address the complex problems related to artisanal gold mining;
- Insufficient legal framework for organizing the sub-sector;
- Non-existence of transferable mining titles to the discoverer of a deposit;
- Lack of capital;
- Lack of training at all levels;

Training of artisanal miners in sound technologies is considered a cornerstone among the measures for abating mercury pollution. The transfer of these technologies, and the main activities required are replicable to all the countries concerned. Approaching a number of countries in parallel will reduce costs, by sharing inputs and experience.

Previous Support

Since 1990 continuous efforts have been made by UNIDO to provide assistance to the small-scale mining sector, in particular to the artisanal gold mining sector. The requests for such assistance have been forwarded to UNIDO especially from those governments which had become increasingly aware and concerned about the dangers involved in these activities. Within the last two years, UNIDO provided assistance related to artisanal gold mining and avoidance of mercury pollution to Botswana, Niger, Venezuela, and Vietnam. In addition, the following conferences and studies were organized by UNIDO in relation to mercury use in artisanal gold mining:

*(i) **A UNIDO International Workshop on Ecologically Sustainable Gold Mining and Processing*** was held in Jakarta/Indonesia in November 1995 and attended by 41 participants from 14 countries. Recognizing the necessity for providing advice and technical assistance in order to avoid further mercury pollution, the participants fully endorsed UNIDO's programme and supported the following recommendations:

1. Gold mining on the small and artisanal level should make a valuable contribution to alleviate poverty in developing countries.
2. Since the environmental impacts of this increased activity are considerable, particularly from the widespread use of mercury, a long-term strategy for remediation and for regularization of the sector should be developed.
3. The UN system, particularly UNIDO, must play an important role in assisting developing countries in engineering ecologically sustainable development. In the gold mining sector, UNIDO should increase its assistance to developing countries, including policy advice to government, the promotion of low cost, efficient and safer equipment and techniques and

the encouragement of support by both miners and the public for solutions to the numerous environmental concerns. The participants endorsed the use of bilateral agreements between developing countries for cooperation in these areas.

4. Legal and financial constraints limit the evolution of the small-scale gold mining sector into formal operations. Attention needs to be given to both legalizing this sector and to creating alternative financial assistance, including linkages with the formal sector, the use of development bank finance and appropriate taxation regimes.
5. UNIDO and other donor agencies, in cooperation with the governments concerned, should continue and increase their support to developing countries, in particular to the least developed countries, for the development of an orderly and ecologically sustainable small-scale gold mining sector. Such assistance should be directed at and made in conjunction with the needs of the miners working in the field.
6. Women play a major role in artisanal and small-scale gold mining, and special efforts should be made to ensure that they benefit from any assistance given to this sector.
7. Because of the widespread use of child labour in the informal gold mining sector, the relevant governments and agencies should be urged to provide the resources needed to abolish this abuse.

The Workshop gave clear evidence of the high demand for assistance to the informal gold mining sector and supported UNIDO's approach and strategy for the introduction of more efficient gold recovery and cost effective gravity concentration methods that displace mercury amalgamation.

*(ii) **A study conducted by UNIDO on behalf of the Secretariat of the Amazon Cooperation Treaty**,* in 1994, determined that mercury, social questions and ownership are the most serious problems associated with artisanal gold mining of Bolivia, Peru, and Ecuador. Other Amazon countries also suffer from the similar problems.

*(iii) **Study conducted on behalf of SADDC countries** [2] **in 1992*** has identified mercury as one of the pollutants that is not effectively controlled in Africa. Recent missions of UNIDO staff members to African countries have confirmed that amalgamation remains a popular method for recovering gold from alluvial and primary deposits, especially in **Central African Republic, Chad, Ethiopia, Guinea, Mozambique, Tanzania and Zimbabwe**.

The problems in the above-mentioned countries producing gold on artisanal basis include:

- Lack of environmental planning and waste management;
- No fresh water management; as well as a,
- Lack of technical and managerial skills.

In addition, governmental administration and supervision are not working efficiently enough because of major constraints:

- Mining laws do not favour enough development of small-scale operations;
- Many artisanal operations are presently tolerated without registered claims;

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2 Member States: Angola, Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe

- Artisanal operations are insufficiently supervised by government officials because of shortage of personnel, transport facilities and budget for travelling expenses.

Discussions between UNIDO and the Mining Sector Coordinating Unit of SADDC (MSCU) as well as the Ministry of Mines and Energy of Ethiopia (MMEE) held in October 1995 revealed that there is a serious need to check the extent of mercury utilization in the sector. It is assumed that the main problem lies in the emissions occurring when the amalgam is heated to make the mercury evaporate. This observation is in correspondence with the mercury balance established by Farid, L.H.; Machado, J.E.B.; Silva, O.A. at Poconé, Brazil[3]. According to their investigations 70% of the mercury is lost by volatilization during amalgam distillation (when retorts are not used), 20% dragged with the amalgamation tailings and 10 % volatilized in the gold shops when gold is melted.

This practice occurs also throughout Africa, yet simple methods exist to recover and reuse mercury. In conjunction with the adoption of technical alternatives, education and training has to be directed towards introduction of ecologically sustainable technology.

(iv) Expert Group Meeting on Introducing New Technologies for Abatement of Global Mercury Pollution, organized by UNIDO in Vienna 1-3 July 1997:

In the Conclusions of the Expert Group Meeting, representatives of the World Bank, ECA, UNEP, UNIDO, ILO and governmental donor institutions from Austria and USA have stressed the need for inter-organizational cooperation in order to cope with the environmental and health problems caused by mercury.

The fact that social, economic, environmental and technical issues affecting small-scale gold mining are inextricably linked makes it important that these aspects are considered together when assistance projects in small-scale mining are undertaken. Development agencies and other organizations should therefore ensure as much as possible, that their small-scale mining programmes are coordinated and complementary.

Joint activities can lead to a more focused approach to small-scale mining issues - improving the impact of the agencies and increasing the benefits to the countries concerned.

The Expert Group Meeting recommended that organizations:

Coordinate their efforts and programmes in small-scale mining;
Endeavour to create synergies in their activities with a view to establishing formal collaborative relationships in due course;
Establish mechanisms, such as network - informal or formal as appropriate - to exchange information and consult on small-scale mining activities of common interest;
Identify programmes or projects which can be used as a testing ground for collaboration.

Overall, some governments would prefer that the artisanal mining sector disappear. They show little interest in the sector because the majority of artisanal miners do not pay taxes.

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3 Farid, L.H.; Machado, J.E.B.; Silva, O.A., 1991. Emission Control and Mercury Recovery from Garimpo Tailing. In: Poconé: Um Campo de Estudio do Impacto Ambiental do Garimpo, Ed. M.M. Veiga and F.R.C. Fernandez, CETEM/CNPq, Rio de Janairo, Brazil, p.27-44

Furthermore, the miners usually operate far from government control and their activities are typically inefficient, illegal, unsafe, environmentally damaging, and an actual and potential source of conflict with the major mining companies. It would, however, be very unjust to blame only the artisans because of their inadequate technology.

The governments themselves have inadequate resources, lacking capacity and sometimes have no institutional framework to control, guide, and support informal gold mining activities. For these reasons, the governments are unable to collect taxes and have therefore insufficient income to exert control. To get out of this vicious circle, the ongoing UNIDO programme is also aiming at providing policy advice on the regulation of artisanal gold mining. In order to ensure sustainability, UNIDO will establish liaison with the Ministries of Industry or Mining and the local geological survey services of the respective countries; moreover, close cooperation will be sought with associations and organizations representing the interests of female miners and workers and minority communities.

Since the issue of damage caused to the environment and human health by mercury pollution due to artisanal gold mining is multifaceted and complex, identification of the barriers for introduction of sustainable technology, education, communication of information and technology transfer are indispensable for improving the situation. For achieving this, UNIDO is well prepared and experienced in putting together inter-disciplinary programmes covering environmental protection, introduction of new technologies and manufacturing, mineral beneficiation as well as integration of women in industry.

In the latter context, UNIDO will make a special effort to ensure that women participate equally in - and benefit equally from - the introduction of new equipment and processing techniques. UNIDO is also counting on women miners to be the most ardent advocates for the alternative technology as they traditionally play a role of "agents of change" in many areas, particularly in the protection of the environment and health.

Full Project Objectives and Activities:

Full Project Objective: The Full Project aims at demonstrating approaches to replacing low recovery, high mercury consuming and discharging gold extraction methods with environmentally safe and high-yield extraction alternatives that sharply reduce or eliminate the use and discharge of mercury, in a suite of developing countries located in Africa, Asia and Latin America which are subject to transboundary mercury contamination problems in shared river basins or enclosed water bodies.

Full Project Strategy/Activities:

On the basis of the results of the diagnostic missions (environmental impact and assessment of the present legal framework governing the sector in each of the major regions - please see PDF Block B proposed outputs and activities), the Full Project will:

1. Introduce high efficiency clean gold recovery and concentration methods. The activities under these outputs will include building capacity for the local manufacture of required equipment, the training of producers and users of the equipment, and comparative demonstration trials to prove the efficiency of the new methods. Additionally, documentary videos and other audiovisual materials on sustainable artisanal gold mining will be prepared and distributed to Government agencies, NGOs and other appropriate organisations.

2. Assist the country authorities in assessing the role of small-scale miners and develop new approaches to allow artisanal mining on a legitimate basis, and to overcome barriers to the introduction of the new and clean technology.

3. Develop a special outreach approach for female artisanal miners in the introduction of new methods of mining and equipment in a way that ensures their integration into the new mining practices. This will be organized taking into consideration any impediments or special constraints women face due to socio-cultural values or time constraints as a result of their multiple roles. For this purpose, cooperation will be sought from the related women's organizations/associations. The project will ensure that women miners are also trained properly to use newly introduced equipment and technology. The general strategy of the project will be to introduce new technology or equipment that can be produced locally by the mining communities themselves, or by modest fabrication facilities. This will have a significant impact on the sustainability of the Full Project.

4. Use video and other audiovisual materials such as posters, brochures and even radio programmes for the dissemination of information about the menace of mercury and environmental concerns as well as the new mining techniques. Preparation of a film for training and distribution about new mining and processing methods, and a stark propaganda piece from archives graphically defining the mercury problem - the Minamata illness, etc. - should quicken the acceptance of these ideas. Each country activity will need to have a video camera and, a television in the equipment list, and utilize a local film-maker. TV and radio are widespread in virtually all the concerned countries.

2. DESCRIPTION OF PROPOSED PDF-B ACTIVITIES BY COMPONENT

The methodology for preparing the Preparatory Assistance project is shown as "road map" in Annex II (UNIDO's Approach in Global Abatement of Mercury Pollution). This methodology leads through yes/no decisions to a programme combining assistance in legal issues, institutional strengthening, and training with measures for the introduction of new technology.

The proposed activities will aim at identifying barriers to the introduction of cleaner technologies in artisanal gold mining. In pursuance of this objective, UNIDO recognizes the fact

that artisanal mining is a natural phase in mineral development; it was the practice before the industrial revolution and preceded large-scale mining in many mature economies.

From the employment point of view, artisanal mining is an important engine for job creation. Women constitute up to 50% of the labour force involved. However, the sector is characterized by rudimentary tools and methods which are used in these informal mining operations involving river bed sediments and/or dirt overburden of adjoining river banks and hill slopes.

For addressing these issues and proposing actions to reduce the environmental impact, UNIDO will undertake the activities described further below, giving special attention to:

Identification of barriers still hindering the phase-out or reduction of mercury utilization in artisanal and small-scale mining;
Environmental, social and gender issues for improving living conditions;
Technical and financial issues for alleviating constraints;
Legal, regulatory and institutional issues for creating enabling conditions,

in two main steps, as follows:

Step 1: Identification of one or more priority 'hot spot' areas (river basin/waterbody) in each of the three major regions and of countries with the most active artisanal gold mining activities impacting these waterbodies.

Step 2: Diagnostic missions to each of the countries identified in Step 1 to identify the barriers for introduction of sustainable gold extraction technology and to analyse the situation in each country with respect to mercury pollution.

Step 3: Preparation of GEF Project Brief and UNDP Project Document

Indicative Activities

Output 1: Report on the extent of mercury use by artisanal mining and the environmental impact of this situation as well as assessment of the present legal framework of the artisanal gold mining sector.

Activity 1.1: Literature and other source review to identify specific river basin and/or enclosed waterbody areas subject to intense mercury contamination pressure from artisanal gold mining (likely candidates could include Lake Victoria, Amazon River, Mekong River, Zambezi River, etc.); identification of candidate countries around each basin/waterbody with most active artisanal mining industries;

Activity 1.2: Meet officials of Government and mining-related institutions including cooperatives and discuss present situation of the environment and health in the informal gold mining areas and assess data of previous studies (if available).

Activity 1.3: Assess the extent of environmental degradation and water pollution caused by the informal gold mining operations in the relevant areas of the countries concerned.

Activity 1.4: Analysis of presently used technologies and potentials for cleaner technologies

Activity 1.5: Verify the compliance of technology applied with existing regulation and analyse effectiveness of mentioned regulations.

Output 2: Report summarizing barriers to the introduction of cleaner artisanal gold mining technologies

Activity 2.1 Identification of the stakeholders of the artisanal gold mining industry in the countries identified in Activity 1.1, especially the role of "pit owners", intermediaries, private sector, mercury suppliers, women workers, traders, environmental agencies, banks, finance authorities, ministries, legislators.

Activity 2.2 Identification of potential barriers in each country/region such as policy and legal framework, trade and financial regulations, information flows, training, social and cultural aspects, etc.

Activity 2.3 Explore summary of proposed approaches to barrier removal in different social, political and economic settings.

Output 3: Project Brief to GEF Council for series of country-based demonstration projects testing barrier removal strategies identified in PDF-B.

Activity 3.1: Identification of national baselines and incremental costs.

Activity 3.2: Identify and secure co-financing for full GEF project, especially non-GEF eligible components (e.g., health and income, etc.)

Activity 3.3: Draft and review of GEF Project Brief and UNDP Project Document by countries, UNIDO and UNDP.

Activity 3.4: Submission of Brief and project reports to GEF Council.

3. ELIGIBILITY

Project Eligibility Criteria

The use of mercury in artisanal gold mining is a poorly addressed issue and is one of the toxic substances which the Operational Programme Number 10 "Contaminant-Based" aims at addressing.

Mercury as such is a contaminant not really addressed on a global scale. As mentioned in the background section the use of mercury for artisanal gold mining is very widespread and not

limited to one country or region of the world. It represents an imminent and severe threat as it is highly damaging (i) to the environment, not only because the use of mercury damages rivers, soils, and ecosystems, but also because of the method of extraction itself, (ii) to human health (emissions of Hg vapor) and (iii) to the resource itself. The result is irreversible damages to soils, waters, river banks and beds, and human beings.

The project is country driven as it responds to a large number of requests for assistance from Governments received by UNIDO (see Annex 1, Government requests).

Artisanal gold mining can be a typical economic activity for small private companies or miners' cooperatives. However, in most countries the legal environment and the lack of regulation are the main barriers to the sustainable development of the legitimate small-scale mining.

4. NATIONAL LEVEL SUPPORT

UNIDO has prepared and developed similar projects for the Philippines, Chad and Cameroon. As an example, in the Philippines, support and assistance for activities similar to those planned in the present PDF project, were provided by the following institutions:

- *Government level*: Department of Environment and Natural Resources, Mines and Geoscience Bureau, Manila;

- *Provincial level* in the selected mining districts: the Department of Health, Davao City; the Department of Science and Technology, Provincial Environment and Natural Resources Office; Provincial Mining Regulatory Board; Mines and Geo-Science Bureau; Local Ore Processor Association; Department of Trade and Industry; Federation of Small Scale Miners; National Economic and Development Authority Department of Education, Culture and Sport University of Apokon; Several Provincial Environment and Natural Resources Offices Environmental Management and Protection Areas Services Provincial Governor's Office.

* *Private Companies*, such as Benguet Corporation and Granscor.

* *NGOs*: Mindanao Federation of Small Scale Miners and Davao Federation of Small Scale Mining Association.

As was achieved for the project mentioned as an example in the Philippines, for the institutional arrangements, counterparts will be established in ministries of mines or industry, mining related institutions, and existing NGO's representing the miners and/or women among the miners. Together with these counterparts, the detailed preparation of the country level activities for introducing new mining equipment and methods and clean technology will be undertaken, as well as education about mercury hazard to local miners and farmers organized.

For the full project itself, the Ministry of Mines of the participating country will appoint a National Project Director and a Secretary to the project in order to supervise the activities and monitor introduction of the new equipment and the progress of training. It will have a lead role in all technology- and environment-related issues. The Ministry will also appoint a local consultant in Environment Development and Appropriate Technology. Furthermore, it will make available

all expertise gained, its archives and personnel for research and will assist through its liaison to the women's associations.

The relevant women's association/organizations will advise in all women-related issues and monitor the integration of women in all activities of the project. It will encourage women's participation in the offered training programme.

The Geological Survey Service of the participating country will support on a technical level, i.e. will make available to the project all necessary geological, engineering support for mapping, exploring and testing of alluvial gold mining sites.

UNIDO will be responsible for the overall control and management of the project and delivery of required external inputs.

Government requests have been received from a number of countries with active artisanal mining industries; several of these represent potential candidate sites for the proposed program. They are attached as Annex 1.

5. JUSTIFICATION FOR PDF GRANT

The proposed Full Project intends to address all the issues relating to reducing global mercury pollution resulting from artisanal gold mining and the adoption of cleaner technologies and practices in a systematic and integrated way with the involvement of all stakeholders in the countries selected.

The preparation of project activities for each of the countries that the full project will cover requires diagnostic missions in the countries to assess the legal framework in place, the extent of mercury use, the existing barriers to the adoption of cleaner technologies, etc. Such preparatory missions are also necessary to contact the national and local institutions and organizations. Mercury, as a serious contaminant to soil, air and most particularly to waters - with transboundary effects to species, habitat, ecosystems and human health - has not been addressed systematically and in an integrated manner to date although it has been in use in artisanal mining for some time. Most national efforts in the abatement of mercury pollution have been hindered or have not been successful so far either due to lack of legal/policy framework, or of failure to introduce appropriate technologies, or of inability to address related social aspects.

This proposal conforms with the GEF Operational Strategy for International Waters and GEF Operational Programme No.10 "Contaminants-based", in particular the Global Contaminant component, 10.14.

Mercury pollution in national and international waters has reached serious dimensions. It is caused either indirectly through mercury dust or vapour contained in the atmosphere which later mixes with water; or mercury is deposited in water directly through gold panning or washing operations of the miners in river beds or lakes. For instance, artisanal mining in Tanzania causes serious damage to the waters of Lake Victoria which affects all the other countries which have shores to the lake or have rivers fed by the lake waters. When the rivers reach sea waters, the contamination then continues there and mercury is deposited in the sea.

6. ITEMS TO BE FINANCED

6.1 GEF Inputs

The below proposed budget is assuming that 11 to 12 countries will be part of the project.

Budg. Line	Item	M/M	USD
11-50	**International experts**	10	164,000
	- 1 Regional Consultant on legal and policy aspects	3	
	- 1 Intern. Consult. on environmental impacts of mining	6	
	- 1 Inter. Consult. on GEF baseline and incremental costs	1	
15-00	**Project travel**		27,000
16-00	**Travel (staff) to the countries**		60,000
17-00	**National consultants in artisanal mining**	24	72,000
35-00	**Meetings with stakeholders in the field**		12,000
51-00	Sundries (Preparation of prodocs)		15,000
	TOTAL	**34**	**350,000**

6.2 UNIDO inputs

Preparatory activities including the formulation of the project document	2	21,000

UNIDO has created an interdivisional and multidisciplinary team to deal with the technology, women and financial issues, of 4 staff, all involved in the preparation of the project document and which will participate in the development and submission of the full project proposal.

7. OUTPUTS

Output 1: Identification of candidate participant countries for the full project based on one or more priority mercury 'hot spot' areas (river basin/waterbody) in each of the three major regions.

Output 2: Reports on the extent of mercury use by artisanal mining, the environmental impact of this situation and the present legal framework of the artisanal gold mining sector in each of the proposed regions/waterbodies.

Output 3: Report on the barriers identified to the introduction of cleaner technologies.

Output 4: GEF Project Brief and UNDP Project Document prepared.

8. EXPECTED DATE OF PREPARATION COMPLETION

The assessment of the institutional structure of all countries covered and the definitions of the requirements for external assistance can be accomplished in about one year, depending on the mining season and the existing activities.

9. SPECIAL FEATURES

The present initiative will combine project identification, elaboration and local consultations to promote the methodology of an integrated high impact programme. The follow-up project will address the following issues:

(i) Assessment of environmental and human health degradation caused by mercury
(ii) Analysis of barriers to the abatement of mercury pollution
(iii) Introduction of new technologies to prevent pollution and to improve productivity/recovery
(iv) Involvement of all stakeholders in the implementation of the activities
(v) Addressing gender issues and the integration of women in development
(vi) Development of small-scale entrepreneurial activities and improvement of income generation

10. IMPLEMENTING AGENCY COORDINATION

The country level coordination will be established with UNDP offices and other agents including the World Bank and UNEP, if these have, or intend to undertake, activities relevant to the Full Project.

For the purpose of **project management**, two types of Steering Committees will be established, i.e., an overall Project Steering Committee and Regional Steering Committees:

The Project Steering Committee: will include UNIDO, UNDP and an Environmental or other ministry representative from each participating country; other GEF Implementing Agencies (UNEP and World Bank) could also be invited to participate in the Committee. The Project Steering Committee will meet once per year.

National Steering Committees, established in each country, will comprise the Ministry of Mines, Ministry of the Environment, the finance authorities, the private sector, the Geological Survey Service, the Women's Association, and UNIDO. The steering committee will meet every two months to review progress.

Recommended to be deferred for inclusion in the April/May work program, subject to the following revisions:

in the Project Brief:

a) The proposal be prepared in the agreed standard format and shortened to the agreed length.

b) The project be presented in the context of OP # 9, integrated land and water, as its relationship with OP #2, coastal, marine, freshwater ecosystems, is secondary.

c) The incremental cost matrix be included.

d) Ineligible expenditure items (e.g., office maintenance and sundries) be deleted.

in the Final Project Document:

Criteria for selection of small grants recipients and provisions for their disclosure to the public in appropriate venues and formats be included. Provisions for public involvement and social studies in affected coastal communities be made, including corresponding budgetary allocations.

9. PDF-B -- Global: International Waters Distance Learning and Training Project ($0.35 m)

Recommended for CEO approval, subject to the following:

a) References to the projected costs of the resulting project phases be deleted as there is no pre-commitment to these amounts prior to project preparation.

b) The intention of achieving co-funding of at least 50% be stated explicitly.

c) An incremental cost matrix would be prepared during project preparation.

In making this recommendation, the Secretariat took note of UNDP's assurance that UNEP would be consulted and involved in a meaningful way in the preparation of the project and would be afforded an opportunity to participate in the Steering Committee.

10. PDF-B -- Global: Removal of Barriers to the Abatement of Global Mercury Pollution From Artisanal Gold Mining ($0.35 m)

Recommended for CEO approval, subject to the following:

Due to the complex nature of contamination processes, and the multi-level impacts at the policy, industry, and coastal village levels, the proportion of the budget allotted for public involvement be increased to enable appropriate stakeholder identification.

Global Environment Facility
1818 H Street, N.W., Washington, D.C. 20433 USA
Tel: (202) 473-0508 - Fax: (202) 522-3240 / (202) 522-3245

GEF

MEMORANDUM

DATE: December 19, 1997

TO: Kenneth King, Principal Environmental Specialist

FROM: Mohamed T. El-Ashry, CEO and Chairman MTE

PHONE: 33202

SUBJECT: Outcome of December 2, 1997 Bilateral Review Meeting with UNDP

Thank you for your memo dated December 19, 1997 on the outcome of the December 2, 1997 bilateral review meeting with UNDP. I agree with your conclusions and recommendations.

Global Environment Facility
1818 H Street, N.W., Washington, D.C. 20433 USA
Tel: (202) 473-0508 - Fax: (202) 522-3240 / (202) 522-3245

GEF

MEMORANDUM

DATE: December 19, 1997

TO: Mohamed T. El-Ashry, CEO and Chairman

FROM: Kenneth King, Principal Environmental Specialist

PHONE: 31075

SUBJECT: Outcome of the December 2, 1997, Bilateral Meeting With UNDP

1. A bilateral review meeting was held with UNDP on December 2, 1997 to consider four projects, five PDF-B, and one enabling activity proposals. These proposals were circulated two days prior to the meting for comments to Implementing Agencies, Convention Secretariats, and STAP. Comments were received from the World Bank and UNEP.

2. As a result of the review and meeting, the recommendation is to include two biodiversity and one international waters projects, and one biodiversity enabling activity project (India) which is above the cost norm. Two PDF-B proposals in biodiversity, one in climate change, and two in international waters are recommended for CEO approval.

3. No policy issues were raised in the discussions of the project and PDF-B proposals. The only eligibility issue was related to one country in the Tumen River international waters project so that this project will be deferred and will be included in the April, 1998 work program.

Attachment

cc: Messrs. R. Asenjo (UNDP), L. Vidaeus (World Bank), A. Djoghlaf (UNEP), P. Vellinga (STAP), T. Hadj-Sadok (FCCC), C. Juma (CBD), Team Leaders, Op Program Team (GEFSEC)

Summary of Recommendations on Project and PDF-B Proposals From the Bilateral Review Meeting with UNDP on December 2, 1997

A. Biodiversity

1. Pakistan: Mountain Areas Conservancy Project ($10.6 m)

Recommended for inclusion in the intersessional work program, subject to the following revisions:

in the Project Brief:

a) Clarificatiion be made of the relationships to, or coordination with: (i) activities already completed in the PRIF phase; (b) World Bank initiatives, especially in the Chitral site; and (iii) the modalities and scope of the proposed World Bank environmental fund.

b) The co-funding arrangements be clarified; specifically, whether the funds are in-kind contributions and how such contributions relate directly to project activities.

c) An assurance be given that there would be no follow-up or extensions requiring additional GEF funding.

2. Regional (Algeria, Morocco, Tunisia): Participatory Management of Plant Genetic Resources in Oases of Magreb ($3.08 m)

Recommended for inclusion in the intersessional work program, subject to the following revisions:

in the Project Brief:

An incremental cost matrix is added, building on the incremental reasoning already included that would attribute incremental costs to widening the varieties of cultivars protected, lengthening the period of protection, and expanding the scope of beneficiaries beyond what would be economic in the national interest alone to the project brief.

3. PDF-B -- Armenia: In-situ Conservation and Sustainable Use of Agrobiodiversity in Armenia ($0.097 m)

Recommended for CEO approval.

In making this recommendation, the Secretariat noted UNDP's assurance that the crop cultivars were of global significance and that the project would not duplicate any elements of the Fertile Crescent project.

4. PDF-B -- Philippines: Samar Island Biodiversity ($0.35 m)

Recommended for CEO approval, subject to the following revisions:

a) It be stated that components that are common to the World Bank/GEF funded biodiversity protection project would be harmonized.

b) Only a stakeholder identification activity be completed in the PDF, but acknowledgment be made that a full-scale stakeholder participation plan would be undertaken in the project itself.

5. Enabling Activity -- India: National Biodiversity Strategy and Action Plan ($0.97 m)

Recommended for inclusion in the intersessional work program as an enabling activity project with proposed funding above the cost norms for expedited processing.

B. Climate Change

6. PDF-B -- Russian Federation: Reduction of Coalbed Methane Emissions in the Kuznetsk Coal Basin ($0.20 m)

Recommended for CEO approval, subject to the following revisions:

a) The PDF identify all the relevant barriers, the means by which they would be removed through demonstration or other measures, the scope for subsequent replication, and the outreach plan of the demonstration.

b) The PDF explore the appropriate financial modalities for investments following the barrier removal project.

C. International Waters

7. Regional (Belarus, Russian Federation, Ukraine): Preparation of a Strategic Action Programme (SAP) for the Dnieper River Basin and Development of SAP Implementation Mechanisms ($6.86 m)

Recommended for inclusion in the intersessional work program, subject to the following revisions:

in the Project Brief:

a) The proposal be prepared in the agreed standard format.

b) An incremental cost matrix be provided.

in the Final Project Document:

Provisions for public involvement and social studies in affected coastal communities will be described, together with a corresponding budgetary item for such activities.

8. Regional (Dem. People's Rep. of Korea, Mongolia, People's Rep. of China, Rep. of Korea, Russian Federation): Preparation of a Strategic Action Programme (SAP) and Transboundary Diagnostic Analysis (TDA) for the Tumen River Area, its Coastal Regions and Related Northeast Asian Environs ($5.21 m)