



**PROJECT EXECUTIVE SUMMARY
GEF COUNCIL INTERSESSIONAL WORK PROGRAM SUBMISSION**

AGENCY'S PROJECT ID: GE-P075728
COUNTRY: People's Republic of China
PROJECT TITLE: Guangdong - Pearl River Delta Urban Environment
GEF IMPLEMENTING AGENCY: World Bank
EXECUTING AGENCY(IES): Guangdong Provincial Government and Provincial Municipalities
DURATION: 5 years
GEF FOCAL AREA: International Waters
GEF OPERATIONAL PROGRAM: OP 10 – Contaminant-based Program
GEF STRATEGIC PRIORITY: IW 1 – Catalyzing Financial Resources for Implementation of Agreed Actions and IW 3 – Undertake Innovative Demonstrations for Reducing Contaminants and Addressing Water Scarcity
ESTIMATED STARTING DATE: 04/1/04
IA FEE: \$1,510,000

FINANCING PLAN (US\$)	
GEF PROJECT/COMPONENT	
Project	10,000,000
PDF A	
PDF B	
PDF C	
<i>Sub-Total GEF</i>	10,000,000
<i>Co-FINANCING</i>	
IBRD	165,000,000
Guangdong Province	262,350,000
<i>Sub-Total Co-financing:</i>	427,350,000
<i>Total Project Financing:</i>	437,350,000
FINANCING FOR ASSOCIATED ACTIVITIES IF ANY:	
	n/a
LEVERAGED RESOURCES IF ANY: TBD	

*Details provided under the Financial Modality and Cost Effectiveness section

CONTRIBUTION TO KEY INDICATORS OF THE BUSINESS PLAN: Re. IW Strategic Priority #1, the project will contribute to the GEF target of doubling the number of trans-boundary water bodies in which it catalyzes financial resources for the implementation of stress reduction measures. Re. IW priority #3, the project will be one of the 3-4 pilot demonstrations of innovative mechanisms to involve the private sector and test public-private partnerships in the water sub-sector.

RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT(S):

Mr. Wang Bing, Director Division IV, Ministry of Finance, GEF Focal Point for China Date: January 15, 2004

Approved on behalf of the *World Bank*. This proposal has been prepared in accordance with GEF policies and procedures and meets the standards of the GEF Project Review Criteria for work program inclusion

Steve Gorman,
 GEF Executive Coordinator, The World Bank
 Date: January 30, 2004

Project Contact Person: Robin Broadfield, EAP
 GEF Regional Coordinator
 Tel: 202 473 4355
 E-mail Rbroadfield@worldbank.org

PROJECT SUMMARY

Rationale

This project will significantly reduce land-based pollution of the Pearl River Delta and the South China Sea, which is severe, worsening, and threatening the livelihoods and health of the millions of people who depend on the resources of these two water bodies.

The South China Sea is one of the world's key large marine ecosystems (LMEs) that the GEF has agreed, with the assistance of its Implementing and Executing Agencies, to help the littoral states manage sustainably to achieve global environment benefits. Two GEF-supported strategic action planning and demonstration projects are guiding this effort - the GEF/UNDP/IMO "Partnerships in Environmental Management for the Seas of East Asia" (PEMSEA) and the GEF/UNEP "Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand" Project. Under PEMSEA, the littoral states have identified land-based pollution as one of the key threats to the Seas of East Asia and the Pearl River Delta as one of its land-based pollution "hot-spots". And the GEF/UNEP South China Sea and Gulf of Thailand Project's Working Group on Land-Based Pollution has rated the Pearl River its highest priority for land-based pollution reduction efforts.

This project is thus fully consistent with and will make a major contribution to achieving the strategic priorities of both the PEMSEA-catalyzed "Program of Action to Implement the Sustainable Development Strategy for the Seas of East Asia" and the "Strategic Action Program for the South China Sea and Gulf of Thailand" that is emerging from the complementary GEF/UNEP South China Sea/Gulf of Thailand Project.

Objectives

The project's development objective is to promote sustainable economic and social development of the Pearl River Delta (PRD) area by improving the environmental quality of the PRD and the urban environment of the cities and towns that surround it. The project's global environment objective is to help reduce land-based pollution of the South China Sea and thereby improve the livelihoods and health of the millions of people who depend on its natural resources.

GEF support will contribute to the achievement of these objectives by facilitating the treatment at least an additional 250 million m³ of waste-water in the PRD, relative to the business-as-usual scenario. This outcome will be achieved through a combination of three GEF co-financed initiatives: (a) catalyzing at least one case of municipal collaboration to jointly construct and operate a larger-scale, more efficient and more sustainable waste-water treatment facility that will serve at least two PRD towns; (b) promoting new and additional private or public/private investments in waste management facilities; and (c) stimulating local, national and regional replication of the lessons learned from promoting these two ways to accelerate more sustainable waste-water treatment and waste management investments and operational arrangements.

Outputs

The activities and outputs that will achieve the above objectives and produce the project's local sustainable development and global environment benefits are fully described in the GEF Project Brief and summarized in Annex B, the Project Logical Framework, at the end of this note. The specific project outputs, listed by component, will be:

- (i) Wastewater treatment facilities in Guangzhou City expanded and sustainable
 - Wastewater company in Guangzhou City established, wastewater treatment facilities expanded and operated in a sustainable manner.
- (ii) Joint waste management infrastructure established in other PRD towns
 - At least two jointly-funded and managed wastewater treatment plants and one or more joint water supply systems and/or landfills constructed and operated sustainably by consortia of two or more PRD towns.
- (iii) Hazardous waste management in Guangzhou metropolitan area introduced
 - A company to manage special waste treatment established in Guangzhou City, and operated in a sustainable manner. The plant would operate as a regional facility, accepting wastes from nearby towns.
- (iv) Water quality monitoring/information system and data sharing extended
 - The Guangdong Provincial Environmental Protection Bureau has a comprehensive database of water quality in PRD rivers and capability to effectively enforce pollution control requirements. It shares water quality information with neighboring jurisdictions and the UNEP/GEF South China Sea/Gulf of Thailand Project.
- (v) Environment institutions strengthened and private involvement expanded
 - Provincial and local governments complete capacity building and strategic studies, implement appropriate policy reforms, and test/demonstrate options and incentives to accelerate public/private partnerships in environmental infrastructure management.

Activities

GEF co-financing is requested for three innovative, incremental project activities which will contribute to the achievement of outputs (ii), (iv) and (v) respectively. These are: (a) promoting inter-municipal collaboration in waste management facilities investment and operation to accelerate investment, reduce costs, improve operational efficiency and promote sustainability [output (ii)]; (b) enhancements to water quality monitoring, the initiation of regional water quality data sharing and the promotion of regional cooperation in pollution reduction activities [output (iv)]; and (c) pilot testing of innovative financing mechanisms to promote public/private partnerships in waste management investments and operations [output (v)]. The full range of project activities is as follows:

Component 1 - Guangzhou Wastewater Management (US\$334.0 million, no GEF co-financing) will finance construction of the following facilities: (a) the first stage of a new water treatment plant at Dashadi with capacity of 200,000m³/d (future second stage of 300,000m³/d capacity), (b) the Liede III water treatment plant, comprising expansion of the existing plant by 200,000m³/d, to bring installed capacity up to 640,000m³/d, (c) construction of about 5,000 km of trunk sewers to convey wastewater to the Dashadi and Liede III plants from their drainage catchments and four other drainage catchments (i.e., Xilang, Lijiao, Datansha and Liede II).

Component 2 - Hazardous Waste Management (US\$24.7 million, no GEF co-financing) will establish a pre-processing treatment center and a secure landfill to treat hazardous wastes and incinerator ash. The facility will have a final capacity of 850,000 m³, adequate for 25 years operation (Phase 1 of 3 Phases being 150,000 m³). A market survey, regulatory framework and bid document will be prepared to facilitate selection of a private operator for the hazardous waste facility. This is a baseline component with some global benefits.

Component 3 - Inter-Municipal Environmental Infrastructure (US\$45.2 million, of which US\$6.8 million GEF co-financing) will finance the PRD area's first collaborative, inter-municipal environmental investment incentive program, the objective of which is to catalyze at least two jointly-owned and managed municipal wastewater treatment facilities and possibly other jointly-owned environmental infrastructure facilities also. The prospective benefits of such joint investments and operations agreements are economies of scale, higher utilization levels, lower unit processing costs and enhanced financial sustainability. Collectively, these benefits will promote more investment in wastewater treatment and more efficient operation of the new facilities over time.

The incentive program will consist of both financial investment incentives and “inter-municipal collaboration” promotion activities. The financial incentives will comprise: (a) modest GEF-financed “incentive grants” towards each joint facility’s capital cost, for which a total of US\$ 3 million in GEF resources will be allocated; (b) modest (\$3 million in total) GEF grant support for the operation and maintenance of each joint facility that is established, on a declining basis, over an initial operating period; and (c) eligibility for a higher disbursement percentage from the IBRD loan (70% of total plant cost, compared to the Bank standard of 50%). The balance of the GEF co-financing (US\$800,000) will fund a package of inter-municipal collaboration promotion, technical support and “contract facilitation” activities. This package will comprise: (i) exposure to experience with similar initiatives in other countries, (ii) technical assistance for negotiations and contract preparation, and (iii) tailored training programs. To qualify for the GEF-financed elements of the incentive package, the proposed infrastructure facilities would have to be: (a) owned and managed by at least two PRD cities, districts or towns, (b) financially sustainable investments, and (c) pollution reduction oriented (i.e. wastewater treatment plants or wastewater interceptors). IBRD resources alone would be used to support investments that do not have water pollution reduction benefits. The \$6.8 million of GEF resources requested for this component would finance about 15% of its \$45.2 million estimated total cost.

Component 4 - Water Quality Monitoring and Management Information System (US\$11.5 million, of which GEF co-financing US\$2.25 million) would support (a) the construction of 18 new provincial water quality monitoring stations; (b) rehabilitation of three existing monitoring stations; (c) additional equipment for those existing monitoring stations; (d) development of an information system for processing water quality monitoring data; and (e) regional air and water pollution data sharing (including with the GEF/UNEP South China Sea and Gulf of Thailand Project), web-site development, and the promotion of regional collaboration in pollution management through outreach and sub-regional meetings and workshops. These would target the neighboring jurisdictions of Hong Kong and Macau and promote their involvement in the PRD pollution reduction program.

Component 5 - Institutional Strengthening and Training (US\$8.6 million, of which GEF co-financing US\$0.95 million) would support a range of institutional strengthening, training and policy reform activities including (a) financial/institutional support, training & equipment for the Guangzhou Wastewater Treatment Company; (b) financial/institutional support and equipment for institutions involved in the inter-municipal environmental infrastructure program; (c) project management services; (d) metropolitan and regional environment planning; (e) Metropolitan Guanfo Development and Management Strategies; (f) review and updating of the Pearl River Clean-up Program; (g) development of a regulatory and incentive framework for private sector participation (PSP) operations, including preparation of bidding documents for private sector service provision (e.g., management contract for Guangzhou WWTP) and pilot testing of alternative incentives for private investment/operations contracting; (h) policy and regulatory framework reviews for management of livestock waste pollution, to support a related GEF regional industrial livestock waste management project that is under preparation; (i) training for management and operational staff and study tours; and (j) construction supervision and project management services. GEF co-financing would support items (b), (g) and (h).

Key Performance Indicators, and risks

Key performance indicators relating to the project's development and global environment objectives are:

- (a) Additional quantities of domestic wastewater collected and treated.
- (b) Additional volume of industrial wastewater pre-treated before discharge.
- (c) Additional volume of hazardous waste collected and treated.
- (d) Improvement in water quality monitoring data and expanded sharing.
- (e) Increased collaboration between Guangdong and Hong Kong SAR for environmental management of the PRD and the South China Sea region.

The project's major risks are:

- (1) Lax enforcement of pollution control policies and regulations diminish the impact of project investments on river water quality.
- (2) Individual waste management facility designs are over/under dimensioned.
- (3) Provincial and city-level governments will not support proposed least-cost shared infrastructure facilities and management solutions or optimal location of wastewater facilities.
- (4) Provincial and city-level authorities do not

support sector reforms related to creation of autonomous utilities and full cost recovery. (5) Autonomy of wastewater and hazardous waste companies is not realized. (6) Risk of poor operations of the hazardous waste facility. (7) Insufficient interest by provincial and local governments in capacity building and strategic studies and/or to implement reforms, including promotion of private investment and/or operation.

COUNTRY OWNERSHIP

Country eligibility

China is eligible to receive GEF assistance and is an active partner in the GEF-supported East Asian Seas and South China Sea/Gulf of Thailand large marine ecosystem management projects that provide a strategic under-pinning for this project.

Country Driven-ness

The project will support the first phase of a long-term, large-scale program to clean up the PRD that the leaders of Guangdong Province have announced publicly and that the Province's Environmental Protection Program is coordinating. The program initially comprised US\$5 billion of investment in 162 waste-water treatment facilities over the next 8-10 years. However, the Provincial leaders now recognize that this huge scale of investment is neither financially feasible nor strategically sound, because it comprises too many small, sub-scale, individual municipality-owned and operated facilities that are neither the least cost solution nor likely to be operated efficiently or maintained properly. Hence the provincial government has requested the World Bank and the GEF to help them rationalize the program and to pilot initiatives of inter-jurisdictional infrastructure services, which the project will do.

PROGRAM AND POLICY CONFORMITY

Fit with GEF Operational Programs and strategic priorities

The project is consistent with the GEF's Operational Program 8 in that it would accelerate action by China to significantly reduce land-based pollution of the South China Sea, the sustainable management of which the GEF is supporting through the UNEP-implemented project "Reversing Environmental Trends in the South China Sea and Gulf of Thailand". The project site – the Pearl River Delta - has been identified by the GEF/UNDP/IMO "Sustainable Development Strategy for the Seas of East Asia" as the largest single source of land-based pollution of the South China Sea, and hence as one of this large marine ecosystem's most urgent trans-boundary action priorities. Guangdong Province is the single largest source of the PRD's pollution.

The project is also consistent with the GEF's Operational Program 10, in that it will demonstrate innovative options for reducing the contamination of an international water body – the South China Sea. The project's objectives of identifying joint municipal environmental investments and private-public and private-private investments are both

innovative, as also is the proposed use of GEF resources as an incentive for municipalities to undertake joint investments to demonstrate the feasibility and cost-effectiveness of this approach to environmental investment.

The project is consistent with the GEF's Strategic Priorities 1 and 3 for the International Waters Focal Area in 2004-06. With respect to priority 1, it will facilitate China's efforts to mobilize and make more effective use of resources for implementing policy, legal and institutional reforms and stress-reducing investments that were previously agreed with GEF assistance. And, as also called for under this strategic priority, the project is fully mainstreamed into the World Bank's country assistance and lending program, promotes engagement of the private sector, and is consistent with the GEF's principle of incremental cost financing. The pollution-reduction actions that the project will promote will contribute to the GEF's target for 2004-06 of doubling the number of trans-boundary water bodies within which it has catalyzed policy reforms and stress-reduction measures.

With respect to priority 3, GEF assistance is focused on the demonstration, testing and replication of innovative ways to reduce the barriers to policy reform, to more efficient use of public investment resources, to increased private sector involvement and to international collaboration in addressing land-based pollution of a shared water body. And it will test and demonstrate the use of innovative financial instruments for achieving these objectives. It will thus constitute one of the 3-4 pilot demonstrations of such instruments that the GEF has committed to support in 2004-06.

Sustainability (including financial sustainability)

The project is designed to be sustainable in three key respects: (a) financially; (b) institutionally; and (c) with respect to its development and global environment objectives. Tariff reforms will enhance the financial viability of municipal environmental service providers and of the new facilities that the project will finance. Institutionally, the creation of a financially autonomous wastewater company and continued technical assistance for the participating institutions will strengthen utility management and water quality monitoring capacity. The complementary hazardous waste facility is not expected to be financially viable from the beginning without support from Guangzhou Municipality, because a culture has to first be developed for hazardous waste producers to bring their wastes to the facility. Therefore charges would be kept low initially, and will be increased in time when the practice is well established. Finally, the project addresses an issue of high priority to both the local and the national governments: vital self-interest in achieving environmental conditions necessary for sustained economic growth, which would be a strong motivation to continue implementing the long-term PRD water resource management strategy.

Replicability

The project has major local, national, regional and perhaps even global replication potential. Locally, the fact that it is the first phase of a long-term environmental program means that there is already a firm plan and a commitment to replicate its successes and lessons in the PRD through the participating provincial and municipal institutions, for

which financial resources are already allocated. Nationally, there is enormous scope in China's many other large metropolitan areas for replicating its policy and institutional reforms, its pioneering concept of joint municipal wastewater and solid waste treatment facilities, and its initiative to expand the role of private-public and private-private partnerships in waste management investment and service provision. National replication will be facilitated by the Chinese Government and by the World Bank's East Asia Infrastructure Operations Unit. The latter will also apply the lessons learned to its regional portfolio of environmental management projects and disseminate them globally through the World Bank's Infrastructure Operations Network.

The World Bank is fully committed to helping design and deliver a comprehensive and long term assistance strategy for environmental management of the Pearl River Delta and this is the first project in an expected series of investments in water quality improvement. Future assistance would be both broadened to neighboring regions and deepened to provide follow on investments, such as tertiary waste water treatment and industrial waste water minimization. The GEF funds will thus assist in the development of a long term, aggressive water quality improvement program which could be a model for other countries that share the South China Sea. In order to help ensure the likelihood of this replicability, project preparation is being coordinated with both the UNDP/GEF/IMO PEMSEA and the UNEP/GEF South China Seas regional programs.

The project will also serve as an example of the type of large-scale, public/private funded environmental investment, policy and institutional reform program that the GEF plans to catalyze elsewhere in East Asia, both through the above-referenced projects and through a proposed World Bank/GEF Strategic Partnership for a Pollution Reduction Investment Fund to Address Land-Based Pollution of the Large Marine Ecosystems of East Asia. With respect to this potential partnership, the project will test if some of the GEF resources provided could catalyze new private sector wastewater investments on a reimbursable basis ("revolving funds") and demonstrate how these private sector investments could be integrated into expanding municipal environmental infrastructure.

The project's replicability potential is already evident as other Chinese regions e.g. Tai Basin, are coming forward with municipal cooperative proposals, based on this aspect of the project's strategy. The GEF funds will provide a catalytic and illustrative role for this and other sub-regions and the replication strategy includes regional and international workshops to discuss both its plans and progress. The Bank will also play an active role by raising project experience with senior government officials. This would include publication of project experience in readily available "public information documents".

Stakeholder Involvement

Institutions. The Guangdong Provincial Government, through its Project Management Office (GDPMO) will be responsible for project coordination. Each participating city will set-up its own Project Management Unit (PMO) to oversee preparation and implementation of its component and consultation with local stakeholders. Guangzhou has already done this. Individual components would be implemented by the respective sector agencies. In Guangzhou City, the wastewater treatment component will be

implemented by the Guangzhou Sewage Treatment Company; the solid waste management component will be prepared and implemented by the Guangzhou Solid Waste Management and Treatment Center; and the Guangdong Provincial Environmental Protection Bureau will be responsible for implementation of the water quality monitoring component.

Individuals/communities. The project is being designed and prepared and will be implemented in a highly participatory manner. The GDPMO Office has held numerous consultative meetings and formal workshops with representatives of the provincial and municipal governments to apprise them of the environmental and development issues the project will address, and to formulate the strategic framework for addressing them. GDPMO consultants are visiting all the local governments to assess their environmental investment plans and priorities and their interest in the project.

The GDPMO, together with faculty and students at Zhongshan University, carried out social surveys of the potential beneficiaries and users of project services. These surveys will guide the project design by, *inter alia*, analyzing beneficiary demand for improved wastewater and solid waste services and the willingness and ability to pay for them. Special attention will be given to ensuring that poorer households can afford services provided under the project.

The Guangzhou wastewater component will involve some resettlement of residents where the new interceptors and sewage network pipes are to be installed. While many of the residents will receive better accommodations and services, the relocation could impact the social structure of these areas and possibly the economic situation of the affected persons. Following a survey of all affected persons, a Resettlement Action Plan (RAP) has been prepared in consultation with, and full participation of stakeholders, in accordance with the Bank's social safeguards policies and practices. The RAP design will demonstrate that any negative impacts have been mitigated.

Extensive public consultation on the wastewater treatment and hazardous waste component was held during project preparation (see detailed environmental assessments). This spirit and practice of extensive public discussion and information will be maintained throughout the project. For example the website providing water quality data is especially designed to be user-friendly. Newsletters and school progress are also proposed for people without internet access. Public participation is also an important component for encouragement of shared municipal infrastructure. Informing the public on potential cost savings of potential investments should have a powerful positive impact and facilitate their acceptance by the affected communities.

Monitoring and Evaluation

The GDPMO and Guangdong Provincial Environmental Protection Bureau (GPEPB) will have overall responsibility for project and water quality monitoring and evaluation, which will be consistent with the Monitoring and Evaluation Indicators for GEF International Waters Projects. The GPEPB has both established baseline waste management processing and water quality data and developed a detailed project monitoring and

evaluation plan. The project will facilitate the implementation of this plan by funding laboratory and field equipment (including automatic water quality recorders) and development of a MIS to measure water quality in all the PRD rivers, and to enhance the capacity of the Provincial Environmental Protection Bureau to improve its efficiency and effectiveness for pollution monitoring and control.

Water quality data to be collected weekly and reported quarterly will include standard parameters such as, BOD, turbidity, phosphorous, COD, temperature and DO. These parameters will be available on the website and will be presented as trend as well. Monitoring will be provided vis-à-vis the existing agreed to baseline water quality data. The PMO will share these data with the GEF/UNEP South China Sea/Gulf of Thailand Project and with other international pollution monitoring efforts.

FINANCIAL MODALITY AND COST EFFECTIVENESS

The project's total cost is US\$437.35 million, which includes US\$11.70 million interest during construction and US\$1.65 million front-end fees. Total project component cost is US\$424 million, of this, US\$249 million will be financed by the Guangdong Provincial Government and the major cities and towns in the PRD; US\$165 million will be funded by an IBRD loan; and US\$10 million will be funded by a GEF grant. A portion of the GEF grant will fund private investment incentives to pilot test several alternative incentives and contract arrangements for mobilizing increased private sector investments. For example the development and use of revolving funds, guarantees, and regional incentives would be explored.

Co-financing Sources				
Name of Co-financier (source)	Classification	Type	Amount (US\$m)	Status
Guangdong Provincial Government and PRD municipal governments	Provincial/Local Government	Cash and in-kind inputs	262.35	Agreed in principle, to be confirmed at negotiations
IBRD	Implementing Agency	Loan	165.0	Agreed in principle, to be confirmed at negotiations
Sub-Total Co-financing			427.35	

INSTITUTIONAL COORDINATION AND SUPPORT

Core Commitments and Linkages

The project is co-financed by the IBRD and is an integral part of the World Bank's Country Assistance Program to China. The World Bank has committed in principle to support later phases of the long-term PRD environmental management program, of which this project constitutes the first phase, and will actively apply the lessons learned from the

project to its extensive program of environmental management support to China, to other countries in the East Asia and Pacific Region and World-wide. Related industrial livestock waste management initiatives that are being developed through a parallel World Bank/GEF-co-financed regional livestock waste management project will be fully integrated into and supported by this project.

The project will serve as a demonstration of the type of large-scale pollution reduction program that the GEF plans to catalyze in the East Asia region, possibly through a large-scale, land-based pollution reduction partnership with the World Bank. And it will test two specific innovations that the GEF wishes to promote, namely (a) inter-municipal collaboration in waste management investment and operation, and (b) incentive mechanisms (particularly of a “revolving” type) to promote greater private sector involvement in waste management investment and facilities management. Early experience with these two project initiatives will be reported back to the GEF to help scope out the next phase of GEF pollution reduction assistance to the East Asia region.

Consultation, Coordination and Collaboration between IAs and ExAs

The project will be the first major GEF-supported step to address China’s strategic action priorities, as identified by the participants in the UNEP/GEF project “Reversing Environmental Degradation Trends in the South China Sea and the Gulf of Thailand”. In reflection of this, the UNEP/GEF project’s Pollution Working Group has been briefed on and expressed its full support for the proposed project design and the request for GEF co-financing. The Working Group will be updated on the final project design and its implementation progress, and its monitoring evaluation outputs will feed into the UNEP/GEF Project’s monitoring and evaluation system and help mobilize support for it.

The project also supports the objectives of the UNDP/IMO/GEF Regional Programme on Partnerships in Environmental Management of the Seas of East Asia (PEMSEA). The Pearl River Delta is identified as one of the East Asian Seas land-based pollution “hot-spots” in the “Sustainable Development Strategy for the Seas of East Asia” that PEMSEA has recently catalyzed and is therefore an agreed priority for regional action.

Project Implementation Arrangements

The GDPMO will be responsible for overall project coordination. The Guangdong Provincial Government Office for World Bank Projects (GDPMO), which is located within the Provincial Finance Bureau, will be responsible for detailed management. It has already successfully implemented several World Bank-financed projects. Guangzhou city has set-up a Project Management Office (GZPMO) to oversee preparation and implementation of its constituent activities. Other PRD cities that participate in the project will establish their own project management offices, in accordance with national practice. Individual investments will be implemented by the responsible sector agencies within these local government bodies. In Guangzhou city, the wastewater treatment component will be implemented by the Guangzhou Tunnel Development Company (GTDC) as the agent of the Guangzhou Sewage Treatment Company, and the hazardous waste management component will be implemented by the Guangzhou Hazardous Waste

Management Center (GHWMC). The Guangdong Provincial Environmental Protection Bureau (GDEPB) will be responsible for implementation of the water quality monitoring component, through its Guangdong Environmental Monitoring Center (GEMC). GDPMO will implement the institutional strengthening and training component.

ANNEX A: INCREMENTAL COST ANALYSIS

The Program and Project Area

China's Pearl River Delta (PRD) is one of the largest and most complex urban systems in Asia. It is home to over 40 million people who live in 25 administratively-defined cities in Guangdong Province and in two Special Administrative Regions (Hong Kong and Macau). The PRD has ranked at or near the top nationwide in economic growth over the past decade (averaging 14.7% per annum during 1990-2000), mostly due to large inflows of direct foreign investment, initially in low value-added manufacturing and more recently in higher value-added manufacturing and services. The program encompasses all of this area and is mainly overseen by Guangdong Province with cooperative agreements between other jurisdictions such as Hong Kong and Macau.

The Delta is also complex geographically. Three major branches of the Pearl River (Zhu Jiang) join at the city of Guangzhou, the river's political, economic and cultural hub. The Pearl is China's third longest river, and second only to the Yangtze in annual average flow. It discharges into the South China Sea through eight principal tributaries across flat terrain, which is criss-crossed by numerous canals and streams.

The project area for the Guangdong Pearl River Delta Urban Environment Project which is the first phase of a larger scale and longer term program, is mainly within Guangzhou and consists of civil works (wastewater treatment and hazardous waste) for the city and capacity building and institutional strengthening activities for the program area such as environmental data collection (provincial scale), industrial pollution abatement programs (provincial and city level). The program area is all of the Pearl River Delta, including the city of Guangzhou.

The GEF Guangdong Pearl River Delta Urban Environment Project would support activities in the entire program area with a key focus of reducing, as fast as possible, total pollution loading to the South China Sea. Efforts would focus mostly within Guangdong province but they would be structured in a manner to encourage replicability in the rest of China and similar activities in other countries discharging wastes into the South China Sea.

The Pearl River Delta's Environmental Condition and Causes

Environmental protection policies and investments have not kept pace with economic growth, and the PRD's rapid economic growth has come at a heavy environmental cost. Many of the lower reaches of the Pearl River, especially around Guangzhou, the water quality standards are Class V or worse, and therefore unfit for drinking water source and unsuitable for irrigation, aquaculture or recreational use.

Domestic and industrial wastewater discharges, urban storm-water runoff and agricultural and livestock farm run-off are the main pollution sources. Most municipal wastewater is collected, but discharged into the river systems without treatment. Environmentally safe sludge disposal is just beginning, with the first plant under construction in Guangzhou.

Growing volumes of hazardous wastes also present considerable risks to health, surface and ground water sources. Regional treatment facilities are needed, plus complementary activities such as waste minimization and safe transportation of dangerous goods.

Charges for water supply and wastewater are a fraction of the true cost of providing these services, which is draining municipal resources and reducing operational performance. Charges for hazardous waste disposal are low or non-existent in Guangzhou. Only a small fraction of the waste is properly disposed.

At present, every town builds and manages its own urban utility system and potential economies of scale and operation are not realized. The recently announced Provincial waste water management program of constructing more than 162 wastewater treatment plants to clean up the PRD river system perpetuates this fragmented approach to planning, investment and operation. While the Guangdong Provincial Government (GPG) and municipalities recognize that regional planning approaches present opportunities for inter-municipal cooperation, jointly managed facilities, reduced costs, and economies of scale for provision of environmental infrastructure, they have not addressed the institutional challenges inherent in this approach. The problem is compounded by the lack of a strategic framework at the provincial, metropolitan and city levels for planning and implementing least-cost priority investments and policy/institutional reforms.

Little private sector participation in environmental investments and service provision has been mobilized. In all of Guangdong Province there is just one private water supply concession (in Tazhou), one private wastewater treatment plant (in Guangzhou), one privately-operated municipal solid waste landfill (for Guangzhou), and a proposed Build-Operate-Transfer sludge treatment plant, also for Guangzhou. No initiatives have been taken to facilitate entry of private service providers for the distribution of drinking and wastewater collection, where the greatest gains in efficiency and service levels are possible.

Guangdong Provincial Government Strategy.

Guangdong Province (GP), through its provincial Environmental Protection Bureau (GDEPB), has recently announced a plan to clean-up the PRD, the main feature of which is a proposed eight-year, US\$5 billion program of investment in wastewater treatment facilities. However the program perpetuates the fragmented approach to infrastructure planning, contains too many treatment plants, is too ambitious and costly, and fails to realize potential economies of scale. Preliminary reviews of the plan suggest that better rationalization of treatment plants could yield a 35% decrease in overall costs.

Guangdong Province is also preparing master plans for municipal and industrial solid waste management. These plans are also likely to suggest a fragmented and non least-cost approach. Nevertheless, the GPG is committed to achieving increased sustainable development of the PRD and expanding provision of urban environmental services, including the use of innovative forms of private involvement. It realizes that

environmental infrastructure investment should be guided by a regional development strategy that better reflects the goals of sound environmental management and fiscal sustainability across PRD as a whole. However this is difficult and capacity-building assistance and incentives are needed to help achieve those outcomes.

The Project's Global Environment Objective

The South China Sea, into which the Pearl River flows, is one of World's Large Marine Ecosystems (LMEs). The GEF, especially concerned with such a critical international water body is helping the littoral states to better manage this shared resource. Analyses of the major threats to the Sea, facilitated by the GEF/UNDP/IMO Partnerships in Environmental Management for the Seas of East Asia and the GEF/UNEP Project on Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand, have identified land-based pollution as one of the most serious threats and the Pearl River Delta as a critical land-based pollution "hot-spot". This project's global environment objective is to improve the environmental condition of the South China Sea LME by helping Guangdong province reduce land-based pollution of the Sea from the Pearl River Delta area.

Baseline Scenario

This scenario comprises of previously agreed plans and initiatives of the Chinese Government to address water related problems at national and local levels. It reflects the likely situation concerning the Pearl River Delta and its key cities in the absence of GEF support.

Under the baseline scenario, the GPG and its many cities and towns will make substantial investments in wastewater treatment and in improving solid and hazardous waste management in the next fifteen years that will reduce the volume of pollution entering the South China Sea. Some of these facilities will however be delayed by jurisdictional squabbles; neighboring municipalities will each build their own, inadequately sized facilities that will waste investment resources, raise operating costs and threaten their sustainability. Also, little effort will be made to involve the private sector in service provision, even though this is often the least-cost and most efficient option. The project in the absence of the GEF project would co-finance Phase one of the Program and would consist of the following components:

- The Dashadi and Liede III wastewater treatment and network expansion
- The regional hazardous waste facility
- An industrial pollution control program
- Related capacity building activities

The longer term program described in the baseline would suffer from the following strategic shortcomings:

- minimal action to accelerate private sector involvement
- absence of collaborative sharing of environmental data with other municipalities and other countries

- an ad-hoc system of water-quality monitoring
- inefficiencies resulting from municipalities desire to build their own facilities
- insufficient management and technical operator capacity

GEF Alternative

The proposed GEF Program for the Guangdong/Pearl River Delta Urban Environment Project will encourage a more comprehensive integrated approach than outlined under the baseline scenario by addressing its strategic shortcomings. This will help give direction and ensure that various plans of the agencies involved in the Pearl River Delta are coordinated and properly integrated.

Under the GEF Alternative Scenario, the proposed project would constitute the first-phase of a cost-effective, long-term and very large-scale environmental management program that will address the key weaknesses of the Baseline Scenario and thereby achieve significantly larger and more cost-effective environmental improvements in the PRD and in the South China Sea, into which it flows. The GEF Alternative project would support a larger volume of collaborative, least-cost municipal waste management investments; be funded from a wider variety of sources, including the private sector; and would promote greater financial sustainability of these investments than the Baseline Scenario. To achieve these outcomes, the project would support the implementation of physical investments, policy and institutional reforms, and financial management improvements. Its over-arching goal would be to achieve the maximum sustainable environment benefits for the PRD area and the South China Sea by identifying and funding the most environmentally efficient, least-cost investment program that can be afforded and sustained with sound financial management. The project and program will commence with the highest priority investments in the city of Guangzhou, which is the largest contributor to pollution in the PRD, with smaller cities also implementing jointly-managed environmental infrastructure investments on a pilot basis. It would also demonstrate innovative service delivery and financing approaches, including private sector provision of environmental infrastructure and services. The Guangdong component of the parallel World Bank/GEF Livestock Waste Management Project would address this specific issue as an integral part of the provincial environmental management program.

GEF support would catalyze three key, innovative aspects of the GEF Alternative strategy. First the GEF would promote the planning and construction of shared municipal wastewater treatment and waste management facilities. This collaborative approach to wastewater and waste management would achieve significant capital and operational cost savings, which in turn would accelerate investment in wastewater treatment and landfill development, and expand the volume of investment and enhance its financial sustainability. These actions would achieve faster and larger reductions in pollution loads. Second, the GEF would stimulate greater private sector involvement in waste management and wastewater treatment investment and operation by (i) encouraging the municipalities to actively seek private sector partners, and (ii) assisting potential private sector investor/operators to prepare facility management investment and operational

service proposals for consideration by the municipalities and ensuring that such proposals are evaluated solely on their technical and financial merits and implemented when they are both least-cost and financially sustainable options. Third, the GEF would provide additional funding for water quality testing that would improve the collection and dissemination of water quality data that would enable a collaborative sharing of data with other municipalities and other countries.

The GEF's support for Phase One of the PRD Environment Program through this project would also promote greater inter-municipal cooperation and private sector involvement in the subsequent phases of the Program by piloting and demonstrating innovative ways to achieve these two objectives and by promoting their replication in subsequent phases of the Program.

The global environment objective of the GEF Alternative would be faster improvement of water quality in the Pearl River Delta and reduced pollution of the South China Sea. This objective will be achieved by (a) allocating public pollution reduction investment resources more efficiently and by operating public waste management facilities more efficiently and sustainably; and (b) accelerating private sector investment in waste management and participation in waste management operations. In combination, these advances will allow Guangzhou City to treat an additional 250 million m³ of waste water over the next 15 years than under the Baseline Scenario. This outcome will be monitored through a comprehensive and replicable water quality testing regime. Key outputs of the GEF assisted project components would be the number of facilitated agreements to share waste treatment facilities among the municipalities and the expanded service levels achieved through private sector involvement.

Incremental Costs

In order to achieve these additional global environment benefits, GEF support is requested for the following project components: 1) encouragement of inter-municipal environmental infrastructure (urban wastewater and waste management) in Guangdong; 2) Water Quality Monitoring and Information Systems, and; 3) facilitation of private sector involvement in environmental infrastructure and operations (see Table 2 below).

In the case of component (1) GEF resources totalling \$6.8 million are requested to finance the incremental costs of promoting innovative, collaborative, more cost-effective and more sustainable joint municipal environmental infrastructure investments by helping to identify the first of these options and by providing modest incentives to the concerned municipalities to collaborate on jointly designing, constructing and operating several joint facilities. This GEF component will have measurable efficiency outcomes by increasing the total amount of wastewater treated over fifteen years from 1 Billion m³ to 1.15 Billion m³, i.e. supporting an incremental global benefit of 150 million m³ extra of waste water treated. This represents about a 15% decrease in the total amount of waste entering the South China Sea from the Program area by 2019. This GEF component will also support increases in daily MSW disposal capacity by a similar 10% improvement. The GEF investment incentive funds would only be committed if and when viable joint

municipal projects were identified by the GEF-supported identification efforts. This GEF support would catalyze both a greater volume of environmental investment and a greater number of financially sustainable investments than the municipalities would make or could sustain under the Baseline (business-as-usual) Scenario.

GEF co-financing for component (2) of \$2.25 million would enhance water quality monitoring facilities and staff capacity and strengthen both the project's impact assessment and the PRD's contribution to the UNEP/GEF South China Sea Project's M & E program. This would result in greater international environment quality data and allow for better targeted pollution reduction interventions. Regional and international pollution reduction conferences would be organized to bring together the parties impacting the South China Sea. These workshops would provide a forum to discuss pollution reduction plans and report on achievements, and help to speed-up the reduction of pollution loading to the South China Sea. The first of these ongoing meetings is proposed to be in Guangzhou in early 2005.

In the case of component (3), GEF resources are requested to finance the incremental costs of identifying and preparing viable proposals for private sector involvement to finance and operate additional environmental infrastructure facilities, which total \$0.95 million. Without GEF support for this component (business as usual), the PRD's constituent municipalities will be reluctant to explore and develop such innovative options and will not fully tap the potential for joint municipal and/or private sector environmental investment and service provision. GEF support would thus supplement scarce public sector environmental investment resources with private sector investments and thereby accelerate pollution reduction in the PRD and from the PRD area into the South China Sea. This component is estimated to result in an extra 60 million m³ of waste-water treated over the next 15 years, a 5% decrease in total pollution loading to the South China Sea by 2019.

Through this combination of incremental activities, GEF support would catalyze an innovative regional (PRD-wide) and more comprehensive approach to water quality improvement. No single municipal investment program is capable of providing all of the treatment facilities and behavioral modifications needed to have a marked improvement to the South China Sea water quality. For example, complementary action on industrial livestock waste and other directed interventions to increase water treatment capabilities and reduce industrial waste discharges is also needed. The GEF Alternative will thus be the first of what is planned to be a series of such integrated yet independently delivered water quality improvement interventions.

The following incremental cost matrix summarizes the positive impacts that GEF support have on the pace and scale of pollution abatement programs within the Pearl River Delta. The Baseline Scenario is based on the Guangdong PRD Environmental Strategy Plan. This plan outlines an investment program of about 162 wastewater treatment plants estimated to cost about \$5 billion. For wastewater and landfill development, total expenditures under the GEF scenario are estimated to be the same as the baseline scenario. However, through more efficient use of capital and faster development, the

GEF Alternative Scenario results in a 20% decrease in the total pollution loading from the region to the South China Sea by the 2019. This is a staggering amount of avoided pollution. These improvements are brought about through component 1, inter-municipal cooperation, and component 3, increased private sector involvement.

The second component, water quality monitoring, has a baseline scenario cost of \$9.25 million and a \$11.5 million cost for the GEF Alternative Scenario, of which \$2.25 million would be co-financed by the GEF. Provincial and municipal governments have committed to this increased investment level and to support the international aspects of data collection and dissemination if the GEF support is forthcoming.

Table 2 presents both 'program' (i.e. some 162 wastewater treatment plants over 15 years within the PRD) and 'project' (Phase 1 of the program - this specific investment activity involving at least one wastewater treatment plant). The GEF assistance is not expected to change the overall costs of the program, but rather enhance the efficiency and treat an additional 250,000,000 m³ of wastewater.

Table 2: Incremental Cost Matrix

	Cost Category	US\$ Million	Domestic Environment Benefit	Global Environment Benefit
1. Urban Wastewater and Solid Waste Management in Guangzhou City and Inter-Municipal Environment Infrastructure	Baseline	WWT 5,000 (program cost) MSW 300 (program cost)	1.25 Billion m3 of wastewater treated 100 million tonnes of MSW disposed	1.25 billion m3 of WW treated and resulting pollution reduced Reduced water pollution from waste properly managed
	With GEF Alternative - a 15% increase in WW treated and a 10% increase in solid waste treated	WWT 5,000 (Program cost) MSW 300 (program cost)	1.44 Billion m3 of wastewater treated 110 million tonnes of MSW disposed; reduced pollution	1.44 Billion m3 of Waste Water treated Reduced water pollution from waste properly managed
	Increment	6.8 (project cost)	190,000,000 m3 extra WW treated	Reduced water contamination from an extra 190,000,000 m3 WW treated and 10,000,000 tonnes of waste landfilled
2. Water Quality Monitoring and Information Systems	Baseline	9.25 (project cost)	Modest expansion of existing data collection system	Greater international environment quality data Better targeted interventions

	With GEF Alternative	11.50 (project cost)		
	Increment	2.25		
3. Private Sector Involvement in Environment and Infrastructure	Baseline	WWT 5,000 (program cost) MSW 300 (program cost)	1.25 Billion m3 of wastewater treated 100 million tonnes of MSW disposed	1.25 Billion m3 of WW Treated and resulting pollution Reduced water pollution from waste properly managed
	With GEF Alternative - a 5% increase in WW treated and a 5% increase in solid waste treated	WWT 5,000 (program cost) MSW 300 (program cost)	1.31 Billion m3 wastewater treated 105 million tonnes of MSW disposed; reduced pollution	1.31 Billion m3 of WW Treated Reduced water pollution from waste properly managed
	Increment	0.95 (project cost)	60,000,000 m3 extra WW treated	Reduced water contamination from an extra 60,000,000 m3 WW treated and 5,000,000 tonnes of waste landfilled
Total	Baseline	5,305,000,000		
	With GEF Alternative	5,315,000,000		
	Increment	10,000,000		

ANNEX B: PROJECT LOGICAL FRAMEWORK

Hierarchy of Objectives	Key Performance Indicators	Data Collection Strategy	Critical Assumptions
Sector-related CAS Goal:	Sector Indicators:	Sector/ country reports:	(from Goal to Bank Mission)
Facilitate rural-urban transition underway in China by helping to <i>enhance the productivity of cities, where the overwhelming majority of jobs will be created, and the quality of urban environment and living conditions.</i>	Growth in employment and incomes in urban areas. Quality and service coverage levels of environmental infrastructure in urban areas.	Occasional Bank urban and environmental reports. Bank urban sector supervision missions.	Future urban development, service delivery and environmental conditions encourage investment and job creation in Chinese cities. Expanded investments in environmental infrastructure and ongoing policy and institutional reforms will lead to sustainable improvements in environmental quality.
GEF Operational Program:	Outcome / Impact Indicators:		
Reduce pollution loading to the Pearl River Delta and South China Sea through increased inter and intra-municipal environmental services delivery.	Increased volume of wastewater treated (190,000,000 m ³) and solid waste disposed (10,000,000 tonnes).	Operational reports	Local governments have political will to share common facilities.
Improve water quality data for PRD and South China Sea.	Regional agencies collecting and sharing relevant water quality data.	EPB management reports, international conference.	Commitment and sufficient financial allocations by Guangdong EPB and neighboring jurisdictions.
Reduce pollution loading to the Pearl River Delta and South China Sea through increased private sector participation in environmental services delivery.	Increased volume of wastewater treated (60,000,000 m ³) and solid waste disposed (5,000,000 tonnes).	Operational reports	Local governments have political will to involve the private sector in environmental infrastructure.
Output from each Global Component:	Output Indicators:		
Larger volume of least cost municipal wastewater and waste management investments constructed and operated through increased inter and intra-municipal cooperation.	Two or more contiguous municipalities/cities using shared facilities.	Operating and financial reports	Municipal cooperation in constructing and providing environmental service delivery of reduced capital and operating cost.
Strengthening South China Sea regional water quality data monitoring system. Catalyzing regional, e.g. Hong Kong and Macau SAR, pollution reduction measures.	Reliable and relevant water quality data readily available and shared. Rate and scale of pollution reduction progress in neighboring jurisdictions.	EPB management reports, website operations, public documentation. Through regional conferences and international water quality reporting.	Relevant data will be generated on a timely basis and readily shared with the public and other interested jurisdictions and agencies. Political will to reduce pollution will be maintained and expanded across neighboring jurisdictions.
Larger volume of least cost municipal wastewater and waste management investments constructed and operated through increased private sector involvement.	At least one additional facility funded or operated in part with private sector partners	Operating and financial reports.	Inter-municipal cooperation in constructing and providing environmental service delivery of reduced capital and operating cost.

Project Development Objective:	Outcome / Impact Indicators:	Project reports:	(from Objective to Goal)
<p>Improve the quality of the environment in key cities in the PRD, by following an integrated regional planning approach, in order to facilitate continued economic and social development.</p>	<p>Percentage of samples from key PRD rivers meeting Chinese surface water quality standard (of Class III) increased gradually.</p> <p>Enforcement of environmentally safe manifesting, transporting and treatment of hazardous waste.</p> <p>Increased volume of hazardous waste handled and disposed of in an environmentally safe manner.</p> <p>Strengthened management capacity of provincial and municipal agencies responsible for water pollution control and hazardous waste management.</p>	<p>Annual project reports with performance indicators.</p> <p>Annual Review.</p> <p>Annual Review.</p> <p>Mid-term Review.</p> <p>Implementation Completion Report.</p> <p>OED Sector Assessment Reports</p>	<p>Provincial and local authorities have political will and regulatory tools to ensure that all major sources of pollution are effectively controlled, and that lax enforcement does not diminish impact of proposed investments on river water quality.</p> <p>Effective management and financing continue beyond project implementation into operational phase.</p>
Output from each Component:	Output Indicators:	Project reports:	(from Outputs to Objective)
<p>Improved and expanded wastewater treatment infrastructure in Guangzhou City.</p>	<p>Increased percentage of municipal and industrial wastewater intercepted and treated to relevant Chinese treated effluent discharge standard.</p> <p>A 90% increase in treatment of collected wastewater.</p> <p>Collection sewer networks expanded to collect most of the wastewater generated.</p> <p>Increased percentage of total generated wastewater load is captured by the sewer system.</p> <p>Increased percentage of load captured receives appropriate treatment.</p> <p>Increased effectiveness of treatment system in removing pollutants.</p>	<p>PMOs to monitor project progress and submit periodic reports.</p> <p>Bank to conduct regular supervision missions.</p> <p>Joint review of project progress to take place annually and at the project mid-term.</p>	<p>Executing agency will have financial and technical capacity to successfully implement project investments.</p> <p>City authorities will support least-cost technical solution or location of treatment plants and discharge infrastructure.</p> <p>Individual project designs are appropriate and not over designed.</p>

Piloting of improved and expanded environmental infrastructure facilities constructed and operated on a shared basis by more than one municipality in PRD region.	Establishment of shared infrastructure facilities that are planned, constructed, and operated in an integrated and cost effective manner. Increased percentage of environmental infrastructure services provided in a cost effective and sustainable fashion.		Provincial and city-level governments will support proposed shared infrastructure management, least cost technical solutions or location of treatment plants and discharge infrastructure.
Improved and expanded hazardous waste treatment facility for Guangzhou metropolitan area.	Increased proportion of hazardous waste generated in the PRD collected, treated and safely disposed. A minimum 50% increases in hazardous waste safely collected and treated in the Guangzhou Region.		Local government support sustained for proposed technical solution or location of hazardous waste treatment facility, and for shared use of facilities. Local authorities are able to create sufficient incentives, and enforce regulations to ensure that special waste is safely transported to proposed project facilities for disposal.
Enhanced water quality monitoring systems and capabilities in PRD.	Timely availability of reliable water quality information for decision-making purposes on investment priorities and regulatory actions.		Provincial authorities (EPB) will have adequate resources for staffing and operating the enhanced water quality monitoring system. Water quality information and new systems used by decision-makers
Strengthened institutional arrangements for planning, financing and managing of wastewater treatment in PRD region.	Guangzhou wastewater utility corporatized, number of regional/inter-municipal wastewater companies formed and financial situation of municipal wastewater utilities participating in project improved.		Provincial and city-level authorities continue to support sector reforms related to creation of autonomous utilities, full cost recovery for services, and piloting of new initiatives for inter-municipal cooperation in provision of municipal services. Staff knowledge gained is incorporated into professional practice at Provincial and municipal levels.
Project Components / Sub-components:	Inputs: (budget for each component)	Project reports:	(from Components to Outputs)
Wastewater management in Guangzhou City	Construction of 1 wastewater treatment plant and extension of an existing one in Guangzhou City to increase the total capacity by 400,000 m ³ /day --- \$334.0 million.	Provincial and Guangzhou PMOs to prepare regular progress reports. PMO provides Bank with periodic progress reports which compare planned and actual progress for each project component in terms of cost and physical works.	Wastewater company in Guangzhou City established, and facilities operated in a sustainable manner.

		Monthly (or quarterly) disbursement reports which compare planned with actual disbursements for each component.	
Hazardous Waste Management in Guangzhou metropolitan area.	Construction of landfill for treatment of about 10,000 tons/year of hazardous waste in Guangzhou City and environs --- \$24.6 million.		A company to manage special waste treatment established in Guangzhou City, and operated in a sustainable manner. Possibility for the plant to accept such wastes from nearby towns.
Environmental infrastructure in other PRD towns. MOUs have been signed for three subprojects between: Panyu District Gardens Bureau and Guangzhou Gardens Bureau; Longgang District Government and Shenzhen Great Industrial Zone Administration Commission; and Foshan Chanchen District Government and Nanhai District Government.	Incentive-based lending for groups of contiguous towns willing to construct shared infrastructure (e.g., water supply, wastewater collection and treatment, solid waste landfills, etc.) -- - \$113.2 million.		Jointly managed water supply, or wastewater treatment plants, or landfills or incinerators constructed, and operated in a sustainable manner, under joint management by two or more towns.
Water Quality Monitoring and Information System.	Installation of water quality monitoring equipment, data collection and decision support systems for the Guangdong Province --- \$11.5 million.		Provincial Environmental Protection Bureau has comprehensive database of water quality in PRD rivers, and capability to effectively enforce pollution control.
Institution Strengthening and Training.	Consultant services for project implementation support, institutional strengthening, strategic studies and training --- \$8.6 million.		Sufficient interest by Provincial and local governments to carry out capacity building and strategic studies, and to implement appropriate reforms.

Project Performance Monitoring Indicators

The baseline and targets would be reviewed and updated during the Project Launch Workshop.

Indicators (Physical)	2004 Base	2007	2009
1. Wastewater Volume Treated (%)			
2. Compliance with discharge standard (%)			
3. Compliance with water quality objectives (%) in Guangzhou PRD Area (%)			
4. Quantity of hazardous waste treated and disposed of (tons/year)	0		

Indicators (Financial)	2004 Base	2007	2009
Wastewater tariffs implemented to meet financial projections (Yuan per m ³)	0.70	2.0	2.4
Hazardous waste fees and charges implemented to cover costs of collection and disposal			

ANNEX C: RESPONSE TO PROJECT REVIEWS

- a) **Convention Secretariat:** Not Applicable
- b) **Review by expert from STAP Roster:**

Review Comments on the brief of the GEF project:
"Guangdong Pearl River Delta Urban Environment Project"
by

SU Jilan
Second Institute of Oceanography
State Oceanic Administration
36 Bao-Chu-Bei-Lu
Hangzhou, Zhejiang, 310012
China
(Tel: 86-571-8884 0332 Email: sujil@zgb.com.cn)

The Pearl River Delta (PRD) is one of the most populated and industrialized areas in China. The water quality in many parts of the PRD has rated Class V or worse, particularly near large cities like Guangzhou, although in the upper reaches of the Pearl River in the main branches the water quality is generally good.

In recent years there has been a major emphasis on building wastewater treatment plants in the PRD. However, there is still a long way to go before water pollution in the PRD will be abated. One important reason for this slow progress is because of China's general lack of experience to address environmental problems with modern management skills and to involve private sectors in public works. In this sense, the integrated regional planning approach as evidenced by Project Components 2-4 is most noteworthy. The willingness of the Guangzhou municipality to support/participate in this undertaking is also most encouraging. Thus, I fully recommend approval of this proposed GEF project.

In the following, I have four technical comments for the authors to consider when finalizing the proposal:

1. As it presently stated the Project development objective is "***to improve the quality of the urban environment in key cities in the Pearl River Delta (PRD)***, by following an integrated regional planning approach, in order to facilitate continued economic and social development". However, it is not clear that the 8 points stated in the next paragraph of the proposal are all direct progress-measures to the objective shown in bold face above. I would suggest rewording the objective to bring up the importance of demonstrating to the public and local officials the effectiveness of the '*integrated regional planning approach*'.
2. If the global objective of the Project is to be related to the South China Sea, the important land-based pollutants are principally POPs and nutrients. However, river-borne dissolved/particulate pollutants have significant impacts on the marine

environment and ecosystems only in shallow coastal water with depths less than, say, 50 m. For the South China Sea Proper, it is the atmosphere-borne pollutants, i.e., in the form of aerosols, which exert influences. Thus, rationales given here, as well as related arguments stated elsewhere in the brief, need to be re-worded to reflect this fact.

3. The brief sounded apologetic, in my view unnecessary, when it stated under Section B.3 that "...the project would be processed even with this one city...". The city referred to here is Guangzhou. As an administrative unit, the word "city" in China encompasses a large region with many district level and small-city level administrations. Although they are all under the jurisdiction of Guangzhou City, implementation of integrated regional planning approach advocated by the proposed GEF Project does not come by any easier. I would suggest the proposal simply sets its minimum goal to implement the approach in Guangzhou City.
4. Lastly, usage of English needs to be checked. For example, it is better to say "low-wage", not "low-cost", migrant workers. The word "distributaries", rather than "tributaries", should be used when referring to river branches through which the Pearl River discharges its water to the sea.

Response to Review comments by SU Jilan, Second Institute of Oceanography, State Oceanic Administration, Hangzhou, Zhejiang, China. STAP Review.

Dr. SU Jilan's support of the project is very welcome. His agreement with the project's integrated approach, and practicalities of starting with Guangzhou are encouraging. Also, the need to focus on modern management skills and involvement of the private sector is supported.

With regards to the four specific technical comments, they will be reflected in the project's final design and documentation.

1. *The project's broad objective "to improve the quality of the urban environment in key cities in the Pearl River Delta" will be broadened to also include "and highlight the need for an integrated approach to environmental management".*
2. *The point that a keen focus is needed on POPs and nutrient loading for attainment of measurable water quality improvement in the South China Sea is very valid. Programs are underway to address these issues through other means, e.g. the regional livestock waste management project being supported by GEF. This project is intended to start with improved wastewater treatment and hazardous waste management as part of an overall comprehensive, multi-level effort. As suggested the rationale will be revised to reflect these facts.*
3. *The suggestion to be more positive on the exemplary role of the city of Guangzhou is appreciated. As related to point two, efforts will be made during project implementation to maximize the municipal governments and public*

4. *As recommended the project team will change “low-cost” to “low-wage” and “tributaries” to “distributaries” where warranted.*

Again, the project team expresses its appreciation of Dr. SU Jilan’s comments and his depth of understanding in the water quality of the South China Sea and its current impacts.

c) Response to comments from Secretariat and other Agencies

(i) At Work Program submission:

The project design should include a replication strategy, stakeholder participation plan, M&E indicators.

The project has a detailed replication strategy. First, the collected and collated water quality data will be made available broadly and consistently. The data will be presented in a user-friendly manner both on a readily accessible web-site and in annual environmental status reports. Data collection and distribution will endeavor to use common, and readily available, equipment and software to help other neighboring jurisdictions and countries set up similar and compatible systems.

The project is starting with the city of Guangzhou. Guangzhou (the capital of Guangdong) is an important city for piloting any activities within the region since results are quickly and easily seen by neighboring cities. Water quality data will be presented by cities which will enable quick comparisons. Guangzhou is also able to discuss regional approaches with Hong Kong SAR.

On specific project aspects such as private sector involvement in facility operations and joint municipal development of environmental infrastructure this project has clear terms of reference for any contract development to be carried out in a manner that includes a common structure which can be easily replicated by other cities. There are also specific funds identified for ongoing training programs where the lessons from Guangzhou’s efforts will be discussed among other neighboring municipalities.

Stakeholder participation programs have been developed in at least four broad areas; siting and operation of wastewater treatment facilities, siting and operation of the hazardous waste facility, design and progress of the industrial pollution control program (IPCP), and collection and dissemination of Pearl River water quality. In the wastewater and hazardous waste facilities stakeholder participation has been built into the ongoing environmental management system EMS. This EMS forms part of the reviewed and legally binding environmental impact assessment. Although the public will be presented with the progress of industrial activities to reduce pollution on the web-site and annual environmental reports, the key stakeholder will be neighboring industries who the project intends to work with to reduce their overall pollution loadings. This will be done through

technical workshops, in-house waste audits, and other technical and policy fora. Public stakeholder participation will occur mainly through existing and strengthened municipal (and higher levels of government) programs. This includes easy access to the web-site (with a question and answer section), schools educational program, annual municipal 'state of the environment' reporting.

The project has a comprehensive monitoring and evaluation program. Specific items to be monitored include; quantity of wastewater treated; efficiency of wastewater treatment, amount and efficiency of hazardous waste treated, number of operating contracts for environmental infrastructure that include private sector involvement, and number of intra and inter-municipally developed environmental infrastructure programs. These items will be monitored through various means such as regular project supervision, monthly/annual reports, real-time water quality data.

The Bank agreed to develop a strategic framework for other GEF supported land-based pollution interventions in the Region and, by the time of CEO endorsement, to report on the advancement of those efforts to define a replication strategy for the measures being piloted in Guangdong Province within the broader context of the South China Sea and other LMEs of East Asia, including through a strategic partnership approach. The Bank also agreed to promote closer links between the project and the proposed East Asia Industrial Livestock Waste Reduction Project.

The Bank has prepared a Project Concept Note for a possible Strategic Partnership on Land-Based Pollution Reduction for the Large Marine Ecosystems of East Asia. By CEO endorsement, this concept will have been reviewed by senior Bank management and the results of the review and the Bank's proposal for developing the Partnership will have been reported to the GEF.

During project preparation discussions were held with Ministry of Agriculture representatives to design a complimentary agricultural waste program (livestock and run-off). A plan is now in place to monitor agricultural waste reduction programs (integrating them with the water quality objectives outlined in this project) and report the results to the general public and the agricultural community. The regional livestock waste management project's activities in Guangdong province will be fully integrated with this project.

The Province of Guangdong (EPB) agreed to prepare a livestock management action plan. This plan, where appropriate, would be integrated into activities supported by this project. Capacity building activities for relevant agencies would be supported by this project where staff capacities overlap in EPB – this would help maximize any synergies between the two GEF supported activities. The Guangdong EPB also agreed to carryout pilot activities in the livestock waste area, e.g. emissions trading.

The Bank would investigate institutional coordination and support.

The Bank has an extensive investment program in the Pearl River Delta area. Already a second PRD is under preparation and discussion has started on a third. The lessons learned from the GEF supported activities are already being incorporated in follow-on project designs. There is keen interest within the PRD and within all urban areas of China, especially those along the eastern sea-board, to see how inter-municipal cooperation can be made to work and how best to involve the private sector in the development and operation of environmental infrastructure.

The Bank will actively participate in the international conferences being proposed by Guangdong Province. The Bank has also facilitated discussions with Hong Kong SAR, PEMSEA and UNDP. Information on the program (the overall objective of improving the water quality in the PRD in general – and specifically the mechanics and objectives of this project) is being widely distributed.