

PROJECT

ENVIRONMENTAL PROTECTION AND SUSTAINABLE MANAGEMENT OF THE GUARANI AQUIFER

Argentina - Brazil - Paraguay - Uruguay

GEF – BIRF – OEA

BID REFERENCE TERMS FOR TECHNICAL SUPPORT TO THE PILOT-PROJECT AT RIBEIRÃO PRETO (SÃO PAULO, BRASIL)*

11 October 2003

COD: 1/5041.1

*

Heraldo Campos
Consultant Geologist
PhD – University of São Paulo
Post-Doc in Hydrogeology – Polytechnic University of Cataluña

(048) 99895066
heraldocampos@yahoo.com

CONTENTS

EXECUTIVE DOCUMENT I

1. INTRODUCTION
2. PILOT-PROJECT RIBEIRÃO PRETO: STUDY AREA
3. GENERAL TIMETABLE FOR THE ACTIVITIES
4. FINANCIAL PROFILE
5. BID REFERENCE TERMS

EXECUTIVE DOCUMENT II

1. GUARANI AQUÍFER LOCAL MANAGEMENT PLAN
2. POTENTIALLY PARTICIPATING ORGANISATIONS

1. INTRODUCTION

The purpose of the present bid reference terms is to describe the results obtained by this consultancy service ^[1] over the period between 01 September and 01 October 2003, in response to the demands related to the “Project Environmental Protection and Sustainable Development of the Guarani Aquifer System”, being developed by Argentina, Brazil, Paraguay, and Uruguay, with funds provided by GEF – World Bank, and coordinated by the General Secretary of OAS (GS/OAS).

The consultancy service is encompassed with the Component 5: “Development of Groundwater Management and Mitigation Measures”, to be designed for critical areas of recharge and discharge which bear close relation with Component 2 “Development and Implementation of a Guarani Aquifer System Management Framework (SAG)”. Within Component 5, this reference term prompts the actions of the Subcomponent 5A, designed to develop transboundary projects in which mechanisms for management and protection of groundwater will be assessed with reference to part of the Aquifer situated at the municipality of Ribeirão Preto, Brazil.

The consultant has based his activities on the previous stage of work that was made digitally available at the project’s web page (<http://www.sg-guarani.org>), and summarized and adapted excerpts of the following documentation: a) Preparation of the Project Environmental and Sustainable Development of the Guarani Aquifer System, Activity 9; b) Preliminary Bid Reference Terms for the Development of a Pilot Program at the region of Ribeirão Preto, conducted by Engineer Alberto Calcagno in March 2001 (Objectives of the Pilot Program); c) Preparation of the Seminar of the Pilot Area of Ribeirão Preto (description of activities of PPRP, based on the same document by Alberto Calcagno, modified on 24.7.2003 by UEPP/SP); and d) literature review.

Thus, the text breaks down into the following structure: Executive Document I (introduction, study area of the Pilot Project of Ribeirão Preto, general timetable of activities, financial profile and bid reference terms), Executive Document II (Guarani Aquifer local management plan and potentially participating organizations), and annexes - only portuguese version (consultancy information, illustrations of the study area, facsimile of bid reference term of DAAE (1986), São Paulo State legislation on groundwater, records of the potentially participating organizations and memorial of projects characterization.

2. THE AREA OF THE RIBEIRÃO PRETO PILOT-PROJECT.

The region of Ribeirão Preto (Figure 1) is situated at the northeast part of the state of São Paulo, Brazil. Its choice as pilot area was mainly based on professional judgment and previous knowledge of the area provided by the organizations involved in the State Unit for Project Preparation in the State of São Paulo (UEPP/SP). The region of Ribeirão Preto has been subject to a meaningful process of urban expansion together with agricultural and industrial activity which entails intensive groundwater exploitation from Guarani Aquifer. The significant number of wells has been causing problems of interference and risk of groundwater contamination due to the raise of point and non-point pollution sources installed over such a high vulnerability aquifer.

.....
[1] Consultancy Service for the Devising of Bid Reference Terms for Technical Support of the Pilot Project at Ribeirão Preto (São Paulo, Brazil) COD:1/5041.1, August 2003, Bid.

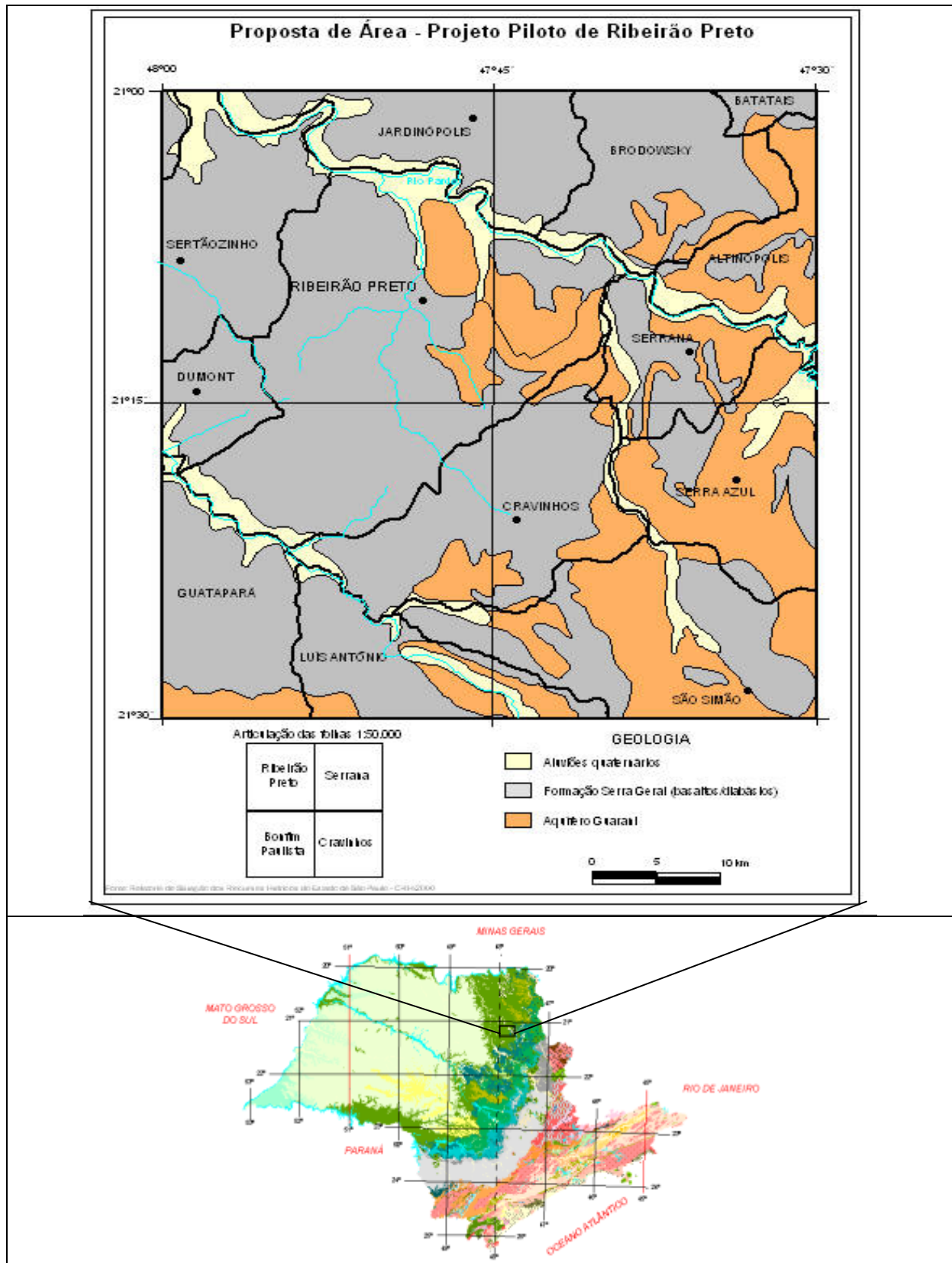


Figure 1 (fac-simile) Location map of the region of Ribeirão Preto proposed as Pilot Project area.

3. GENERAL TIMETABLE OF ACTIVITIES

Worksheet 1 presents a summary of execution and global costs based on Calcagno's proposal and the proposal presented for discussion during the Guarani Aquifer Seminar (UEPP/SP). It also contains a list of implementing organizations, GEF funding, and governmental in kind input.

3.1 In kind input

The governmental in kind input indicated in Worksheet 1 must be formalized through specific instruments under the sponsoring of Guarani Project General Secretary. These in-kind counterparts are considered to be potential and dependent upon relationships to be developed in the course of the Pilot Project.

4. FINANCIAL PROFILE

Worksheet 2 presents the financial profile distributed in a 4-month basis with reference to GEF funds to be made available and governmental in kind input allocated by expenditure categories.

5. BID REFERENCE TERMS

During the activities, it will be important that staff in charge of the execution of tasks (consultants and/or contractors) to hold periodical meetings with the Pilot-Project Steering Group as well as to present progress reports.

Based on the general timetable for the activities, financial profile, documents produced over the period, and on the suggestions provided during the Guarani Aquifer Seminar, the consultant proposes the following bid reference terms for the management of the Guarani Aquifer System at the area of the Pilot-Project.

EARLY STAGE

BID REFERENCE TERM 1

Recompilation of available information and database configuration in GIS environment

October, November, December 2003

Execution: Ribeirão Preto Pilot-Project participating organizations

Potentially participating organizations (in kind): Geological Institute - SMA, CETESB, Forestry Institute - SMA, DAERP, mayoralities situated in the area of the Pilot-Project, DAEE, IPT, and COC College.

Tasks

The tasks will be carried out in strictly coordinated matching with corresponding tasks in the characterization of aquifer and set up of regional information system described in Phase 1 of the precedent "Bavaria Project"^[2], using the information available. Such activity would be developed in an integrated manner with the Ribeirão Preto Pilot-Project.

.....
 [2] Technical co-operation between São Paulo State Secretariat for the Environment and the government of Bavaria State (Germany) for technology transfer, exchange knowledge and building capacity on management and protection of groundwater resources. In: Preparation of the Project Environmental and Sustainable Development of the Guarani Aquifer System, Activity 09, Preliminary Bid Reference Terms for the Development of a Pilot Project at the Region of Ribeirão Preto, by Alberto Calcagno, March 2001 (p. 14).

The engaged organizations are: Geological Institute - SMA, CETESB, Forestry Institute - SMA, DAERP, mayoralities situated in the area of the Pilot-Project, DAEE, IPT, and COC College plus potentially participating organizations.

The preliminary results of the “ System of Information for the Environmental Management of Groundwater Resources in the Outcropping Region of Guarani Aquifer at São Paulo State” are embodied in the synthesis distributed during the Guarani Aquifer Seminar. The project accounts for resources from the implementing organizations themselves (IG, CETESB and Forestry Institute), and additional financial support from PROCOP/CETESB and FAPESP.

The information to be re-compiled comprises all of those considered to be necessary for the purpose of the study. At least, information on climatological, hydrological, geological, hydrogeological, hydrochemical, and hydrodynamic characterizations as well as information on contamination sources, land use, and social-economic, legal and institutional aspects of the study area should be included.

At this very stage, system compatibility permitting, it will be possible to include the registry and licensing database belonging to project GISAT (Geographic Information System about Multiple Groundwater Uses), carried out by DAEE. Furthermore, it will be possible to include data of SIGEST (Integration System Multiple Groundwater Uses). SIGEST represents an institutional technological platform available on the Internet at <http://www.sigest.fcth.br>.

The information-recompiling task will be completed with adoption of proper configuration and implementation of the management information system in a GIS environment.

BID REFERENCE TERM 2

Implementation of GIS-based system: system integration, adaptation, and data input.

January, February and March 2004

Services to be contracted: individual consultancy

Tasks

An individual consultancy service will be hired after the completion of information recompiling, which will be performed with participation of organizations enrolled in Bid Reference Term 1.

The consultant will be responsible for system integration, adaptation, and data input based on information available at the “System of Information for the Environmental Management of Groundwater Resources in the Outcropping Region of Guarani Aquifer at São Paulo State”.

In order to achieve the goals, the consultant should attend the SISAG event (Montevideo) presenting a briefing by the end of March 2004.

The consultant’s professional background should be: academic expertise with solid professional formation in IT and/or Cartography, preferably with experience in dealing with groundwater management issues.

BID REFERENCE TERM 3

Devising an implementation of an strategic action plan for aquifer management

October, November and December 2003

Implementing Group: Ribeirão Preto Pilot-Project Steering Group

Tasks

The following aspects should be considered for the management of groundwater resources: contamination problems and identified conflicts of use, participation of parties involved, information sharing, and public consultation.

Such strategic action plan should properly define the range of studies to be developed, products to be obtained, and procedures for institutional arrangements in view of the development of the Program, thus contributing for the definition of the project management approach.

The plan should allow centralized co-ordination, decentralized accomplishment, wide, sectorial and local participation. That includes definition of ranges and ways of relating the program with other activities, with other programs and institutions of states and countries participating in the Guarani Project, as well as with complementary projects locally and internationally.

The strategic actions should include: on-going mechanisms of participation and consultation in relation to project development and products, groups of discussion and advising, and best organization arrangements for the planned tasks, and mechanisms for co-ordination and internal follow-up of the project.

With reference to the “State System for Management of Water Resources”, the pilot area of Ribeirão Preto is under the jurisdiction of the “Rio Pardo Watershed Management Committee”. The Work Party 2 - “Operational Arrangements for the Execution and Strategic Actions” - in the panel held at the Guarani Aquifer Seminar in Ribeirão Preto, has recommended the establishment of a Guarani Aquifer Project Steering Group within the structure of the referred Committee.

BID REFERENCE TERM 4

Devising of Bid Reference Terms for components and activities of the Pilot Program

As long as the Ribeirão Preto Pilot Project lasts (2003-2006)

To be implemented by: General Secretary of Guarani Project

Tasks

The bid reference terms for components and activities, in which Ribeirão Preto Pilot Project may eventually be broken down, will be deepened and detailed through consultation and participation mechanisms to be adopted in conjunction with implementing or guest participants. The terms should include definition on the ranges or scope areas, working scale and scale for presentation of partial products, which are specific to each activity or component.

The outcome should be: the definition of a detailed work plan in operational and financial terms; a logical framework to each component/activity of the Ribeirão Preto Pilot Project; and set up of targets to be achieved for assessment and follow-up consideration. In order to assure consistency with the general program, bid reference terms to be formalized with the selected implementing organizations, should clearly set aspects and goals to be achieved in each case.

For further bidding purposes, these bid reference terms were divided into three blocks. At this stage, performance indicators for both consultancy and contractors should be specified.

DEVELOPMENT STAGE

BLOCK 1

BID REFERENCE TERM 5

January, February, and March 2004

Scope: services

Potentially participating organizations (in kind): Geological Institute, CETESB, Forestry Institute, DAERP, DAEE, mayoralties situate din the area of the Pilot Project, EMBRAPA, IPT and Sanitation Reinforcement Services – State Health Authority.

Well log, land and groundwater use inventory

Tasks

To achieve the goals established for the development stage, the task of building up a well log inventory will be performed simultaneously to the task of identifying and registering point and non-point contamination sources.

The collected information on water supply and exploration wells should be confirmed by further survey, its consistency double checked, and then updated and complemented. Checks for consistency will include wellhead geographic coordinates and altimetry, static and dynamic water table depth, total flow and specific capacity, current use and existing exploitation tool, daily average production, etc. of the wells in the study area through *in situ* measurements, including gauges, hydrochemical characteristics and groundwater sampling.

In order to record well log information, the contractor should take the IPT well register form (Form 1, enclosed below as Ficha 1- fac-simile) for methodological and systematic guidance. This form has been adapted for the working scale of the Project to include well register items such as identification and precise location on topographic base map, GPS-taken coordinates and altimetry. Contractor survey team must use appropriate equipment and positioning devices.

Inventory of point and non-point contamination sources

The contractor should take the Memoir of Existing and Characterized Enterprises (MCE) from CETESB Register, which is available in this document as annex, as methodological guidance for undertaking the work.


The paper “Groundwater Vulnerability and Contamination Risk Mapping” (IG/CETESB/DAEE, 1997) is recommended as reference for survey and classification of contamination sources. The systematic field work approach to be adopted while recording information on industries is presented in Form 2 (fac-simile from CETESB), available in the this paper.

IPT		CADASTRO DE POÇO			
1 - IDENTIFICAÇÃO E LOCALIZAÇÃO					
FOLHA TOPOGRÁFICA	Nº DO POÇO	REGIÃO ADMINISTRATIVA	ZONA HIDROGRÁFICA	MUNICÍPIO	
DISTRITO		LOCAL			
PROPRIETÁRIO		Nº DO POÇO NO LOCAL	COORDENADA E-O	COORDENADA N-S	COTA (m)
2 - TIPO DE POÇO			3 - ESTADO DO POÇO		
<input type="checkbox"/> EXPLOTAÇÃO DE ÁGUA <input type="checkbox"/> EXPLOTAÇÃO DE PETRÓLEO <input type="checkbox"/> EXPERIMENTAL <input type="checkbox"/> PIEZÔMETRO			<input type="checkbox"/> EQUIPADO <input type="checkbox"/> Ñ EQUIP. UTILIZÁVEL <input type="checkbox"/> Ñ EQUIP. JORRANTE <input type="checkbox"/> EM PERFURAÇÃO <input type="checkbox"/> ABANDONADO POR MOTIVO DE OBS.:		
4 - USO DA ÁGUA					
<input type="checkbox"/> PÚBLICO <input type="checkbox"/> PRIVADO		ABASTECIMENTO <input type="checkbox"/> MÚLTIPLO		<input type="checkbox"/> INDUSTRIAL <input type="checkbox"/> PECUÁRIA <input type="checkbox"/> RECREAÇÃO OBS.: <input type="checkbox"/> DOMÉSTICO <input type="checkbox"/> AGRICULTURA <input type="checkbox"/> ANITÁRIO	
5 - PROJETO					
<input type="checkbox"/> SIM <input type="checkbox"/> NÃO		RESPONSÁVEL	CIA. PERFURADORA	DATA INÍCIO OBRA	DATA TÉRM. OBRA
CUSTO DA OBRA		ENDEREÇO PARA INFORMAÇÕES		OBSERVAÇÕES	
6 - CARACTERÍSTICAS TÉCNICAS DE CONSTRUÇÃO			7 - PERFILAGEM GEOFÍSICA		
PROFUNDIDADE (m)			<input type="checkbox"/> SIM <input type="checkbox"/> NÃO REALIZADA POR		
PERFURAÇÃO			TIPO <input type="checkbox"/> RESISTIVIDADE <input type="checkbox"/> NÊUTRONS <input type="checkbox"/> TÉRMICA		
DE (m)	ATÉ (m)	\varnothing (pol)	SISTEMA	N. Máquina	Sondador
REVESTIMENTO			8 - PERFIL GEOLÓGICO		
TUBO LISO			ORIGEM <input type="checkbox"/> DOCUMENTO <input type="checkbox"/> PROPRIETÁRIO <input type="checkbox"/> GEÓL.CIA.PERF. <input type="checkbox"/> INF. VERBAL <input type="checkbox"/> SONDADOR <input type="checkbox"/> ENTIDADE -		
DESCRİÇÃO			DESCRİÇÃO		
\varnothing (m)	Comp. (m)	Material	Norma	DE (m)	ATÉ (m)
FILTRO			LITOLOGIA		
DE (m)	ATÉ (m)	\varnothing (pol)	Tipo	Material	Marca
PRÉ-FILTRO		TIPO		CONFIABILIDADE	
<input type="checkbox"/> SIM <input type="checkbox"/> NÃO <input type="checkbox"/> Pedregulho <input type="checkbox"/> Sintético -				<input type="checkbox"/> CONFIÁVEL <input type="checkbox"/> POUCO CONFIÁVEL <input type="checkbox"/> NÃO CONFIÁVEL	
ACARAMENTO			9 - DADOS DO AQUIFERO PRINCIPAL		
LAGE DE PROTEÇÃO	TUBO DE BOCA	\varnothing (POL)	PROF. (m)	DENOMINAÇÃO	
<input type="checkbox"/> SIM <input type="checkbox"/> NÃO <input type="checkbox"/> SIM <input type="checkbox"/> NÃO					
CIMENTAÇÃO			TIPO		
<input type="checkbox"/> DE BOCA <input type="checkbox"/> DE FUNDO <input type="checkbox"/> PROT.SANITÁRIA <input type="checkbox"/> ISOL.AQUÍF.			<input type="checkbox"/> LIVRE <input type="checkbox"/> SEMI-LIVRE <input type="checkbox"/> SEMI-CONFINADO <input type="checkbox"/> CONFINADO		
TRECHO CIMENTADO			Form.Geológica:		Espessura Perfurada (m):
DE (m)	ATÉ (m)	ESPESSURA (pol)	Cota do Nível D'água (m):		Espessura Total Prevista (m):
			Cota do Topo do Aquífero (m):		

						Obs:			
10 - EXPLOTAÇÃO									
EQUIPAMENTO									
BOMBA				COMPRESSOR					
TIPO <input type="checkbox"/> SUBMERSA <input type="checkbox"/> EIXO PROLONGADO <input type="checkbox"/> OUTRA-				MARCA		PRESSÃO ARRANQUE		PRESSÃO TRABALHO	
MARCA		MODELO		Nº DE ESTÁGIOS		INJETOR DE AR φ (pol):		Prof.(m):	
POTÊNCIA (CV)		φ (POL)		PROF. INSTALAÇÃO (M)		MOTOR <input type="checkbox"/> ELÉTRICO <input type="checkbox"/> DIESEL		MARCA	
OPERÇÃO / EXTRAÇÃO									
h/d		d / mês		mês / ano		m ³ / h	m ³ / dia	m ³ / ano	
11 - MEDIDAS EFETUADAS					14 - QUALIDADE DA ÁGUA				
DURANTE O CADASTRAMENTO						OBSERVADA DURANTE O CADASTRAMENTO			
DATA	NE (m)	Tempo Parada	ND (m)	Tempo Funcion.	Q (m ³ /h)	Tempo Funcion.	RESPONSÁVEL		
							DATA		
							HORA		
							AMOSTRA N ^o		
REFERÊNCIA DAS MEDIDAS DE NÍVEL D'ÁGUA/VAZÃO						PARÂMETRO	VALOR	Nº DO APARELHO	
<input type="checkbox"/> FURO NO TUBO DE BOCA		<input type="checkbox"/> RESERVATÓRIO				TEMP. DO AR (°C)			
<input type="checkbox"/> FURO NA TAMPA		<input type="checkbox"/> BOCA DO POÇO				TEMP. DA ÁGUA (°C)			
<input type="checkbox"/> BOCA SEM TAMPA		<input type="checkbox"/> TUBO-GUIA				PH			
ALT. DO PONTO DE MEDIDA EM REL. À SUP. DO SOLO (m):						CE A 25 °C (µmho/cm)			
ANTERIORES AO CADASTRAMENTO						ODOR	TURBIDEZ	AREIA	
						<input type="checkbox"/> SIM <input type="checkbox"/> NÃO	<input type="checkbox"/> SIM <input type="checkbox"/> NÃO	<input type="checkbox"/> SIM <input type="checkbox"/> NÃO	
DATA	NE (m)	ND (m)	Q (m ³ /h)			ANÁLISES ANTERIORES AO CADASTRAMENTO			
						<input type="checkbox"/> SIM	TIPO	<input type="checkbox"/> FÍSICO-QUÍMICA	
						<input type="checkbox"/> NÃO		LABOR.:	
								DATA:	
12 - ADEQUAÇÃO DO POÇO PARA ESTUDOS						OBS.			
<input type="checkbox"/> REDE PIEZOMÉTRICA						15 - CROQUIS DE LOCALIZAÇÃO			
<input type="checkbox"/> ENSAIO DE BOMBEAMENTO. Nº DE PIEZÔMETROS:									
<input type="checkbox"/> COLETA DE AMOSTRA DE ÁGUA									
<input type="checkbox"/> SEM ADEQUAÇÃO									
OBS.						OBS.:			
13 - EXECUÇÃO DE ENSAIO DE BOMB. E/OU RECUP.						1. - INDICAR NO CROQUI, SE PRESENTE(S) A(S) FONTE(S) POTENCIALMENTE POLUIDORA(S);			
<input type="checkbox"/> SIM <input type="checkbox"/> EXPEDITO						2 - INDICAR DISTÂNCIAS E NORTE GEOGRÁFICO.			
<input type="checkbox"/> NÃO <input type="checkbox"/> LONGA DURAÇÃO (ANEXAR FOLHAS DE DADOS)						16 - PERFIL ESQUEMÁTICO			
ENSAIO EXPEDITO						Prof. (m)	Perfil do Poço	Descrição Litológica	D. Perf.
<input type="checkbox"/> REBAIXAMENTO		PROF. DA BOMBA:				Revest.			
<input type="checkbox"/> RECUPERAÇÃO		Tempo (min)	ND (m)	Q (m ³ /h)	Tempo (min)	ND (m)	Q (m ³ /h)		
RESULTADO DAS INTERPRETAÇÕES						17 - IDENTIFICAÇÃO DO INFORMANTE			
MÉTODO									

T (m ² /d)	K (m/d)	S	NOME	DATA
Q/S (m ³ /h/m)	OBS.		PROFISSÃO	VISTO

Quadro 9 - Formulário levantamento industrial - I - 33-10.418/9 (CETESB, modificado).

	COMPANHIA DE TECNOLOGIA DE SANEAMENTO AMBIENTAL LEVANTAMENTO INDUSTRIAL I		UNIDADE REGIONAL:	
			REGIÃO ADMINISTRATIVA:	
			BACIA:	
			DATA: _____/_____/_____	
1. IDENTIFICAÇÃO DA INDÚSTRIA				
RAZÃO SOCIAL:		C.G.C./M.F.:		
NOME DE FANTASIA:		TELEFONE:		
ENDEREÇO COMPLETO:				
ATIVIDADE PRINCIPAL:		CÓDIGO DA ATIVIDADE / M.F.:		
MUNICÍPIO:		CAIXA POSTAL:	CEP:	
2. CARACTERÍSTICAS DA INDÚSTRIA				
INÍCIO DE ATIVIDADE: _____/_____/_____	Nº de empregados (administração):	Nº de empregados (produção):	Nº de empregados (total):	
Consumo mensal de energia elétrica (kw):	Demanda de energia elétrica (kw):	Área do terreno:	Área ocupada (m ²):	
TIPO DE PRODUÇÃO:				
<input type="checkbox"/> CONTÍNUA		<input type="checkbox"/> INTERMITENTE		- horas por dia: _____
<input type="checkbox"/> SAZONAL - meses de maior atividade: _____				- dias por semana: _____
JORNADA DE TRABALHO:			OBSERVAÇÕES:	
TORNOS	HORÁRIO:	Nº de empregados/turno		
1	DAS _____ ÀS _____			
2	DAS _____ ÀS _____			
3	DAS _____ ÀS _____			
4	DAS _____ ÀS _____			
NORMAL	DAS _____ ÀS _____			
3. MATÉRIAS PRIMAS E PRODUTOS FINAIS				
MATÉRIAS PRIMAS:		QUANTIDADES MÉDIAS MENSAIS:	UNIDADE:	
PRODUTOS FINAIS:		QUANTIDADES MÉDIAS MENSAIS:	UNIDADE:	

33 - 10 - 4189

Quadro 9 - Formulário levantamento industrial - I - 33-10.418/9 (CETESB, modificado) (continuação).

4. PREVISÕES DE AUMENTO DE PRODUÇÃO E DIVERSIFICAÇÃO							
- EXISTEM PLANOS PARA AUMENTO DE PRODUÇÃO? <input type="checkbox"/> NÃO <input type="checkbox"/> SIM - PREVISTO PARA O ANO: _____							
- EM QUE PORCENTAGEM SE DARÁ ESTE AUMENTO? (EM RELAÇÃO A PRODUÇÃO ATUAL): _____							
- ESTA EXPANSÃO PREVÊ UM AUMENTO DO CONSUMO DE ÁGUA PARA: _____ m ³ /DIA							
- EXISTEM PLANOS PARA DIVERSIFICAÇÃO INDUSTRIAL?							
<input type="checkbox"/> NÃO <input type="checkbox"/> SIM - TIPO: _____ EM QUE ANO?: _____							

5. ABASTECIMENTO ATUAL DE ÁGUA							
REDE PÚBLICA (NOME DA ENTIDADE FORNECEDORA)				VAZÃO CAPTADA		UNIDADE	
MANANCIAIS (RIOS, RIBEIRÕES, CÓRREGOS E NASCENTES)				VAZÃO CAPTADA	UNIDADE	horas/dia	dias/mês
- HÁ TRATAMENTO PRÉVIO DA ÁGUA A SER UTILIZADA? <input type="checkbox"/> NÃO <input type="checkbox"/> SIM							
- QUAL O TIPO DE TRATAMENTO? _____							
- VAZÃO TOTAL TRATADA _____ m ³ /h _____ h/dia							
POÇOS	LOCAL INSTALADO	VAZÃO DA BOMBA	UNIDADE	POTÊNCIA	UNIDADE	PERÍODO	UNIDADE

6. UTILIZAÇÃO DA ÁGUA							
FINALIDADE	VAZÃO MÉDIA	UNIDADE	HÁ RECIRCULAÇÃO?	VAZÃO RECIRCULADA	UNIDADE	REPOSIÇÃO DE PERDAS	UNIDADE
SANITÁRIA			<input type="checkbox"/> SIM <input type="checkbox"/> NÃO				
LAVAGEM			<input type="checkbox"/> SIM <input type="checkbox"/> NÃO				
REFRIGERAÇÃO			<input type="checkbox"/> SIM <input type="checkbox"/> NÃO				
CALDEIRAS			<input type="checkbox"/> SIM <input type="checkbox"/> NÃO				
PROCESSAMENTO			<input type="checkbox"/> SIM <input type="checkbox"/> NÃO				
QUANTAS VEZES POR ANO É TROCADA A ÁGUA DOS SISTEMAS DE RECIRCULAÇÃO? _____							
QUANDO DA REPOSIÇÃO TOTAL DA ÁGUA DOS SISTEMAS DE RECIRCULAÇÃO, QUAL VOLUME NECESSÁRIO? _____ m ³							

7. CONSUMO RELATIVO DE ÁGUA DOS PRINCIPAIS PRODUTOS						
PRINCIPAIS PRODUTOS FABRICADOS	% RELATIVA DE ÁGUA	QUANTIDADE PRODUZIDA	UNIDADE	ÁGUA NECESSÁRIA	UNIDADE	

OBS.: A porcentagem relativa de água é em relação ao consumo total de água utilizada pela indústria, menos a água de uso sanitário.

8. INFORMAÇÕES COMPLEMENTARES

33-10-418/9

Quadro 9 - Formulário levantamento industrial - I - 33-10.418/9 (CETESB, modificado) (continuação).

8. RESÍDUOS LÍQUIDOS				
CARACTERIZAÇÃO (TIPO)	VAZÃO MÉDIA	UNIDADE	horas/dia	DISPOSIÇÃO FINAL
				<input type="checkbox"/> REDE PÚBLICA <input type="checkbox"/> INFILTRAÇÃO NO SOLO <input type="checkbox"/> SISTEMA DE TRATAMENTO <input type="checkbox"/> CORPOS D'ÁGUA SUPERFICIAIS (Rios, Córregos, Ribeirões) NOME DO RIO, CÓRREGO, OU RIBEIRÃO: _____

10. ESGOTOS SANITÁRIOS			
CARACTERIZAÇÃO (TIPO)	VAZÃO MÉDIA	UNIDADE	PERÍODO (HORAS/DIA)
ESGOTO SANITÁRIO			
DISPOSIÇÃO FINAL:			
<input type="checkbox"/> REDE PÚBLICA <input type="checkbox"/> INFILTRAÇÃO NO SOLO <input type="checkbox"/> SISTEMA DE TRATAMENTO <input type="checkbox"/> CORPOS D'ÁGUA SUPERFICIAIS (Rios, Córregos, ou Ribeirões) NOME DO RIO, CÓRREGO, OU RIBEIRÃO: _____			

11. SISTEMA DE TRATAMENTO DOS RESÍDUOS LÍQUIDOS E ESGOTOS			
ESPECIFICAÇÃO DO TRATAMENTO DOS RESÍDUOS LÍQUIDOS:	VAZÃO TRATADA	UNIDADE	HORAS / DIA
ESPECIFICAÇÃO DO TRATAMENTO DOS ESGOTOS SANITÁRIOS	VAZÃO TRATADA	UNIDADE	HORAS / DIA

12. REGIME DE LANÇAMENTO			OBSERVAÇÕES
<input type="checkbox"/> DESPEJOS INDUSTRIAIS	<input type="checkbox"/> SEPARADO		
<input type="checkbox"/> DESPEJOS SANITÁRIOS	<input type="checkbox"/> EM CONJUNTO		

13. RESÍDUOS SÓLIDOS				
CARACTERIZAÇÃO CITAR COMPOS. APROXIM.	QUANTIDADE T/MÊS	CLASSIFIC. CF. NBR 10004	DISPOSIÇÃO CONF. CÓDIGO	CÓDIGO
				1. ATERRO 2. LIXÃO 3. INFILTRAÇÃO NO SOLO 4. ESTOCAGEM 5. LANDFARMING 6. OUTROS (ESPECIFICAR)

14. CÁLCULO DA CARGA ORGÂNICA	
OBS: PARA USO DO ENGENHEIRO DA CETESB	- Estimar a carga orgânica doméstica e industrial, indicando a sequência de cálculos e todas unidades.

Quadro 9 - Formulário levantamento industrial - I - 33-10.418/9 (CETESB, modificado) (continuação).

15. FLUXOGRAMA DO PROCESSO INDUSTRIAL	
16. CROQUIS CONTENDO: VIAS DE ACESSO, LOCALIZAÇÕES DAS CAPTAÇÕES E LANÇAMENTOS	
17. RESPONSÁVEL PELAS INFORMAÇÕES	
NOME E CARGO: _____	
DATA: ____ / ____ / ____	ASSINATURA: _____
18. COMENTÁRIO DO ENTREVISTADOR	
NOME E CARGO DO ENTREVISTADOR: _____	
DATA: ____ / ____ / ____	ASSINATURA: _____

33 - 10 - 418/9

The assessments on non-point contamination sources of agricultural origin will be incorporated with similar level of detail as point sources, to be complemented by EMBRAPA^[3], State Secretariat of Agriculture, and CATI (Coordination for Total Technical Assistance) studies.

The chosen contractor should be committed with presentation of a final report that properly summarizes the obtained results.

Survey of complementary information and groundwater monitoring during the period of execution of the Ribeirão Preto Pilot-Project

Tasks

The extent of area to be studied is approximately 2.500 km², having the City of Ribeirão Preto as main location reference, and River Pardo as the main axis for the area. The recommended working scale is 1:50,000. It is expect to acquire hydrogeological data for each linear length of 1000 m on the basis of field survey and monitoring, with no need of additional borehole drilling work.

According to information gathered at the region of Ribeirão Preto, the public water supply system operates of about 150 well while the private sector operates 1,000 wells approximately. The CETESB groundwater monitoring network performs monitoring of 12 wells situated in the area proposed for study (from a total of 38 monitoring wells located in the area of occurrence of the aquifer). It is also known that the municipality exploits at least 50 wells for public water supply. Therefore, it is supposed that the existing number of boreholes/wells will be enough to provide the necessary information on geological, hydraulic, hydrogeological, and hydrochemical conditions of the regional as well as of the study area. It is also expected that the existing information will be enough to select the wells that will comprise the local monitoring network so enabling the developments planned in the Pilot Project outlook.

The selection of wells to be monitored, as well as definition of parameters to be used and sampling periodicity will be done after discussions with participating organizations that will be held as appropriate.

.....
 [3] EMBRAPA Project: this is the first study, in Sao Paulo State, about the impacts caused by agricultural and range activities on groundwater. It included the use of pesticides and nitrate of agricultural and pasture activity origin, and part of the studies related with this project was developed in a pilot basin and involving a significant monitoring of indicators. In: Preparation of the Project Environmental and Sustainable Development of the Guarani Aquifer System, Activity 09, Preliminary Bid Reference Terms for the Development of a Pilot Project at the Region of Ribeirão Preto, by Alberto Calcagno, March 2001 (p. 15).

Set up and operation of a local monitoring network

In a set of selected wells, periodical measures will be taken. These will include static and dynamic water table depth, water quality (parameters related with register contamination sources listed in the Regulation nb. 1469/00 of the Ministry of Health, and groundwater exploitation parameters. Continuous record devices will be installed in a limited but representative number of wells in response to modeling requirements. By the end of local recharge analysis, a specific monitoring of hydro-climatic parameters will be undertaken, and this will include installation and operation of registering devices.

This task will be developed with full engagement of the selected contractor and participating organizations. The final product should be a monitoring network to be implemented in accordance with local objectives of the Ribeirão Preto Pilot Project.

The selected contractor should observe the recommendations for a preliminary monitoring network described in the work of Albert Mente (p.34)^[4] as methodological guidance for sampling and measurement parameters as follows:

.quantitative parameters: water table depth (piezometers), temperature and discharge of wells, with variable frequency.

.qualitative parameters: pH, electric conductivity, main ions (calcium, magnesium, potash, sodium, nitrates, chloride, sulfates, bicarbonates and others) heavy metals, organic compounds and pesticides.

.bacteriological

The frequency for sampling should be variable; every two years, bi-monthly (bacteriological), and monthly (quantitative and qualitative analysis).

BLOCK 2

BID REFERENCE TERM 6

January 2004 to March 2005

Scope: services

Potentially participating organizations (in kind): Geological Institute, CETESB, DAERP, EMBRAPA, CATI, mayoralities located in the region of the Pilot Project DAEE, IPT, universities and others.

Devising of conceptual hydro-geological model for groundwater flow simulation

.....
 [4] a) the roll of indicators and parameters to be used in the monitoring network is available in the text provided by the consultancy for the Definition of Relevant Information to Aquifer Monitoring Network (Component a. Expansion and Consolidation of the Current Knowledge, Activity a.2), by Albert Mente, Recife, Brasil, September 2000, 69 p.; b) another methodological reference to be taken could be the recently approved project by the Universities Fund: Hydrogeological Monitoring of the Pilot Basin of Ribeirão do Onça at the Outcropping Region of Guarani Aquifer in the University of São Paulo, São Carlos Campus; contact: Dr. Edson Cezar Wendland (ew@sc.usp.br).

Tasks

The tasks involve the development of various analyses for integration of recompiled data and information. Amongst these tasks, the following may be highlighted:

- .determination of aquifer system boundaries and hydro-stratigraphic tridimensional framework
- .water budget and direct recharge quantification
- .identification of recharge zones and characterization of border conditions through isotopic-hydrochemical studies and field trials for determination of hydraulic parameters
- .analysis of groundwater use and risks of conflict, determination of critical cases of overdraft interference or overexploitation

The analyses of groundwater use in critical cases of overdraft and over exploitation should simulate different scenarios for aquifer behavior in terms of quantity and quality, at current and future groundwater exploitation conditions. The analyses aim at determining patterns of distribution (density, separation) and criteria for the operation of wells in order to avoid overdraft interferences, shortage and overexploitation or induced problems of groundwater quality.

Tasks will be developed in close co-operation between the selected contractor and participating organizations. For the devising of the conceptual hydrogeological model for groundwater flow simulation, the involved parties should take into consideration the suggestions raised in Guarani Aquifer Seminar, described in Annex 1 – Consultant briefing (portuguese version).

Analysis of groundwater vulnerability and contamination risks; identification of areas and critical situations, measures and actions for management

A territorial zoning of the study area in terms of natural groundwater vulnerability and contamination risk will be performed at this stage of work. This should be subsidized by the paper “Map of Groundwater Vulnerability and Contamination Risk (IG/CETESB/DAEE, 1997) and applying the methodological concepts included in the paper or similar ones. The approach to be taken should consider the best mechanism for identifying point and non-point contamination sources, the availability of a computerized groundwater flow and contaminant transportation models, as well as the best work scale for the proposed analysis. The task should include the identification of remediation strategies for current cases of high risk and for prevention of potential risk.

The participating organizations will be committed with presentation of a final report including thematic maps compatible with local scale set for the Ribeirão Preto Pilot Project.

Devising and designing proposals for the implementation of management measures and actions

This task refers to the identification and design of criteria, measures and management mechanisms for sustainable use and aquifer protection. These should be oriented to the resource (land use zoning including preservation areas to protect springs, point contamination source control, handling of non-point contamination) and to the source (technology for construction of wells, well operation procedures, wellhead protection zones, wellhead warning or restricted use zones). Criteria, measures, and management

mechanisms should be expressed in the form of user guidance and technical requirements, legislation blueprints, decrees and regulatory acts, as well as other actions at governmental, non-governmental, user, and private sector level.

In special, the instruments devised should provide direct subsidy to municipal or urban structural plans, as well as they should support decision making related with authorizations for surface and groundwater use. Subsidy should also be provided to environmental licensing and controlling of any construction work or activities having direct or indirect impact on the Guarani Aquifer System.

BLOCK 3

BID REFERENCE TERM 7

Design and implementation of social communication actions for raising awareness and environmental education in relation to sustainable use and aquifer protection.

January 2004 to November 2006

Scope: services

To be implemented by: Ribeirão Preto Pilot Project Steering Group

Potentially participating organizations (in kind): Geological Institute, CETESB-Ribeirão Preto, DAERP, IPT, mayoralties located in the region of the Pilot Project, state and municipal secretariats for education, DAEE-Ribeirão Preto and others.

This task comprises identification, design and demonstration of methodologies for social communication, public information and community capacity building (with emphasis on available mechanisms of formal and informal education) about sustainable use and protection of the Guarani Aquifer System. Methodologies should be devised in a manner to allow full access and understanding by the social parties involved.

The accomplishment of the Ribeirão Preto Pilot Project offers multiple opportunities for purpose activity and materials to raise public awareness and for education and involvement of different sectors of the society. The monitoring work, modeling of hydrogeological and groundwater quality conditions including simulation of current and potential scenarios for the use, zoning of critical areas with reference to natural groundwater vulnerability and contamination risk (point and non-point), and measures for management, protection and sustainable use, if properly presented in audio-visual format and accessible to different representative parties, are examples of such opportunities. Here again, it is important to stress the need for suitable co-ordination with activities to be developed in the scope of Guarani Project at regional level.

Currently, at the region of Ribeirão Preto a project called “ Hemocenter Foundation Educational Project – Faculty of Medicine of the University of São Paulo” is being developed and should be taken into consideration in the scope of this specific bid reference term. As means of communication, this project has been using the “Journal of Sciences” available at: <http://ctc.fmrp.usp.br/education>; contact: Mrs. Silvia Cardinale, journalist, email: casadaciencia@pegasus.fmrp.usp.br

COMPLETION STAGE

BID REFERENCE TERM 8

Product dissemination, monitoring of indicators and actions for follow-up of the Pilot Program in subsequent stages

July 2004 to June 2005

Services to be contracted: individual consultancy

To be implemented by: Ribeirão Preto Pilot Project Steering Group

Potentially participating organizations (in kind): Geological Institute, CETESB, DAERP, IPT, DAEE, mayoralties located in the region of the Pilot Project, civil society organizations, universities and others.

BID REFERENCE TERM 9

Final report (a proposal for the continuation of Ribeirão Preto Pilot Program should be included)

July to December 2006

To be implemented by: Guarani Project General Secretary and Ribeirão Preto Pilot Project Steering Group.

Potentially participating organizations (in kind): Geological Institute, CETESB, DAERP, IPT, DAEE, mayoralties located in the region of the Pilot Project, civil society organizations, universities and others.

EXECUTIVE DOCUMENT II

1. LOCAL MANAGEMENT PLAN FOR THE GUARANÍ AQUIFER

In order to start up the implementation of a local management plan for the Guarani Aquifer, it is vital to deepen the local studies incorporating new well log data and also fresh information on groundwater bacteriological and chemical analyses, definition of recharge areas and wellhead protection zones. This is a need for updating and refinement of the cartography and hydrogeological model for the area. It is also important to expand the current monitoring network held by CETESB, which operates only 12 wells (11 of them in Guarani Aquifer and one well in Serra Geral Aquifer; IPT, 2000, p.347; CETESB, 2001, <http://www.cetesb.sp.gov.br>).

The construction of a two-layer model (including Serra Geral Aquifer and Guarani Aquifer) could be applied, at first hand, to a modeling program. Another important step will be the availability of hydrogeological databank with remote access (e.g. Internet) to exploitation data, so that a public and stakeholder participation process of investigation could contribute for the knowledge and management of the groundwater reserve at the scale of Ribeirão Preto municipality and surrounding region. A reference paper to respond to such objectives is described in the work of Vives et al. (2001). It is applied satisfactorily to the Basin of Arroyo del Azul, Azul, Argentina (Vives et al., 2002a, 2002 b, <http://www.phi-g.org>).

On the other hand, with regard to the problems related to overexploitation of groundwater in the municipality of Ribeirao Preto, Monteiro (2003, p.176) suggests the following:

.the effective control of all borehole-drilling licenses, groundwater exploitation permits (according to Law 9.034/94, Decree 41.258/96, Decree Municipal 264/88, Complementary Law 204/92, Mineral Waters Regulation), as well as environmental licenses (Environmental Code of Practice blueprint), taking technical-scientific, socio-economic, environmental, and legal aspects into consideration

.re-location and location of new groundwater wells more distant from urban areas, aiming at reducing the overdraft interference and progressive lowering of the potentiometric surface that may lead to shortcomings

.update of well log inventory (according to Law 9.034/94) and charging the exploitation of groundwater through installation of meters in all wells and with differentiated pricing based on the type of user (according to Article 117 IV, of Environmental Code of Practice blueprint)

.environmental education in all aspects regarding information, formation, public awareness to problems related to water resource uses, aiming at a participating and sustainable society taking consideration to the effective commitment of the organized civil society, enterprises, NGO's and public administration.

Traditionally, decisions or policies to Integrated Management of Water Resources have been based on scientific, technical and economic data or information produced and presented by experts who are seldom exposed to third party scrutiny or liable to criticism or consultation by interested groups. It is also worth noting that technical experts are not used to interface with non-specialists and different background personnel. On the other hand, community knowledge and interest may not draw the necessary attention to scientific and technical developments (at least in the early instances of discussion). But after all, both realities must be put forward and taken into consideration. This constitutes the so-called collaborative planning (Ubbels y Verhallen, 2001), provided clear rules and premises are established to integrate scientific knowledge and to be conveyed into the discussion between the parties concerned. It is possible to conceive temporal stages for this integration process, although these stages do not need to be set in a sequential order.

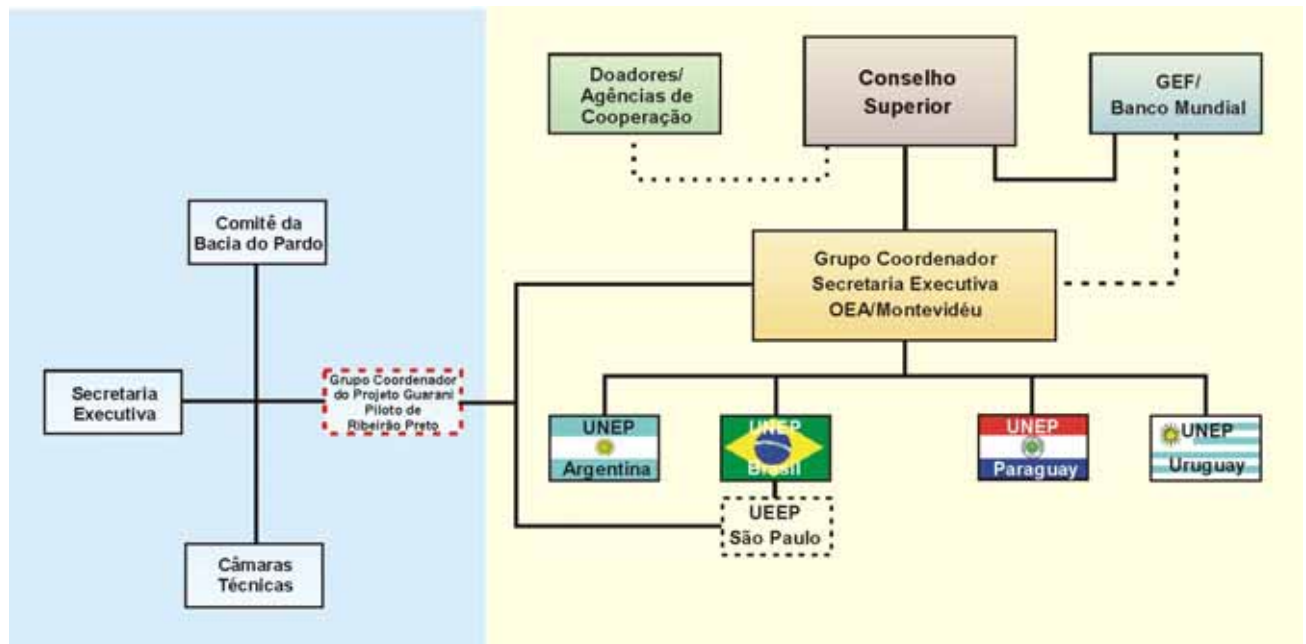
Besides that, according to the general orientation from UEPP/SP to the Guarani Project (meeting dated August 29,2003), it is proposed an early strategic action program to the pilot area of Ribeirão Preto in order to assure that management and protection measures are set up since the early stage of work. In the course of the project, these actions should be adjusted and consolidated.

I. Institutional Arrangement

In the scope of the “Sao Paulo State Water Resources Management System”, the pilot-area of Ribeirão Preto is encompassed in the jurisdiction of Rio Pardo Watershed Committee.

Therefore, it is recommended the establishment of a “ Steering Group of Guarani Aquifer Project” within the structure of the committee in accordance with the flowchart outlined below:

a. Organization



b. Structuring of the Steering Group

State(4)	Municipalities (4)	Users and Civil Soc. (6)	Universities (2)
DAEE	Ribeirão Preto		
SMA	Serrana		
CETESB	Sertãozinho		
SCTDE	Jardinópolis		
	Cravinhos		

- .the Steering Group duties will be the following: i) to supervise the accomplishment of the pilot project ii) implementation of strategic aquifer management and protection actions;
- .the Steering Group will be established according to the Watershed Committee directives;
- .the Steering Group will report to the Executive Secretary of the Watershed Committee, which will provide administrative support.;
- .the Steering Group will be also articulated with the federative state units, national units and the General Secretary of Guaraní Project.

II. Co-operation between Federative States and Municipalities

- .agreement between: a) DAEE and the Mayoralty of Ribeirao Preto for borehole drilling licensing; and b) with CETESB for environmental control of well operations, definition of recharge areas and wellhead protection zones aiming at restricting installation of potentially pollutant sources close to each other (similar agreements could be established with other municipalities and between these with other boards of the state of São Paulo).
- .share utilization of databank and information from Pilot Project.

III. Implementation of the social communication and environmental education plan, by the Steering Group

IV. Devising and implementation of legal and complementary mechanisms

- .amendments to the existing municipal structural plans in order to incorporate aquifer protected areas;
- .adoption of regulating measures for the use of groundwater, if applicable.

Measures indicated in items I, II and III are considered to be short-term and could be implemented immediately (in between 3 months). On the other hand, legal measures such as in item IV are long-term because they are dependent upon the studies planned in this Pilot Project.

V. Legal Basis

There is a specific legislation regarding groundwater in the State of São Paulo, as well as there is legislation about water resources in general. Such legal basis corresponds with the following:

- .State Law on Groundwater (Law Nb. 6.134, of 2 July 1988): it prescribes about preservation of natural groundwater resources (Annex 4, portuguese version).
- .Decree nb. 32.955 of 7 February 1991: it corresponds with a Regulatory Act in relation to Law nb. 6.134/88; it prescribes about groundwater quantity and quality; it establishes and classifies areas to be protected; it links the groundwater use with borehole drilling licensing and well registration. It also prescribes about reinforcement and penalties (Annex 4, portuguese version).
- .Decree nb. 41.258, 31/10/96 and DAEE Regulation nb. 717, of 12/12/96: it regulates rights of use on water resources.
- .State Law on Water Resources(Law nb. 7.663, of 30 December 1991): it establishes directives for “State Policy on Water Resources” and to the “Integrated System for Management of Water Resources”.
- .State Law on Environmental Pollution Control (Law nb. 997 of 31 May 1976): it prescribes about environmental pollution control.
- .Decree nb. 8468 of 8 September 1976: it approves the regulatory power of Law nb. 997.

2. POTENTIALLY PARTICIPATING ORGANIZATIONS

The proposed activities for the Guarani Aquifer Seminar for the potentially participating organizations are shown in worksheet 3 (a and b):

Potentially Participating Organizations (Key notes)

1. Mineral Resource Research Company
2. Secretariat for Planning and Environmental Management – the Mayoralty of Ribeirão Preto.
3. School of Engineering, University of São Carlos - USP/ACE-Pau Brasil Ribeirão Preto
4. SENAC – Environmental Technician (Cláudia Martinho Churata)
5. SENAC - Environmental Technician (Janete Franco Fonseca)
6. S.M. Gredpo Reflorestamento Ltda.
7. Public Attorney Office of the State of São Paulo
8. Department of Water Supply and Sewage Services of Ribeirão Preto- DAERP
9. Rubens Caldeira Monteiro
10. Cristiane Regina Stuchi
11. Institute of Geosciences - UNICAMP
12. Public Sanitation Company of the State of Paraná

13. University of Ribeirão Preto – Chemical Engineering/Water Resources lab
14. Coordination for Total Technical Assistance (CATI) - Ribeirão Preto/State Secretariat of Agriculture.
15. Brazilian Company for Agricultural Research (EMBRAPA)/Environmental Unit - Jaguariúna/SP
16. School of Engineering at São Carlos/University of São Paulo
17. Institute of Geosciences/University of São Paulo
18. Department of Water and Hydropower/Ribeirão Preto
19. Nuclear Technology Development Center CDTN/CNEN
20. Regional Health Authority - DIR XVIII/Ribeirão Preto
21. Endemic Diseases Control Bureau (SUCEN)/State Secretariat of Public Health Ribeirão Preto Headquarters.
22. Ribeirão Splash Park
23. ACAERP – Engineering, Architecture and Agronomic Association of Ribeirão Preto
24. Students Union Barão de Mauá/UFSCAR
25. Teaching Bureau – Sertãozinho Region
26. Tambori Organization
27. Jardim Progresso Dwellers Association
28. NGO - Vivacidade
29. OSCIP – Cultural, Artistic, Historical and Environmental Conservation Trust
30. UNAERP-Chemical Engineering and Masters Course in Environmental Technology
31. IPT – Technological Research Institute
32. CETESB/SMA
33. Geological Institute/SMA
34. Institute of Geosciences/UNESP
35. COC/Ribeirão Preto College
36. Forest Institute/SMA

QUADRO 3 a - ATIVIDADES PROPOSTAS E POTENCIAIS PARTICIPAÇÕES

Atividade - Proposta para discussão	Contra-partidas	Execução - Contrapartidas Potenciais														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ETAPA INICIAL																
a.2	Adoção, configuração e adaptação do SIG															b,c,d
a.3	Implementação do SIG. Recompilação de dados e informações, consistência e incorporação no SIG.															b,c,d
b	Elaboração e implantação de ações estratégicas para o gerenciamento do Aquífero Guarani através do estabelecimento de um esquema de gerenciamento participativo								e							
c																
d	Elaboração dos TRs detalhados de componentes e atividades do PPRP															
ETAPA DE DESENVOLVIMENTO																
e.1	Inventário de Poços e usos da água subterrânea*		c	b		b	b			c,d					b,c,f	b,c,d
e.4	Inventário de fontes de contaminação pontuais e difusas		c	b						c,d			b,c,e		d,c,t	d,c,d,e
e.5	*															
e.6	Estabelecimento e operação de uma rede de monitoramento local p/ o PPRP e manutenção no SIG		c	b						c,d				b,c,e		
f.1	Modelo Hidrogeológico Conceitual: Conhecimento do arcabouço hidrogeológico, estudo isotópico e hidroquímico, obtenção de parâmetros hidráulicos, com ensaios de campo e balanço hídrico. Análise de uso da água e riscos de conflito (interferências e/ou superexploração)												b,c,g			c,d
f.2														q		
f.3																
g																
h	Análises da vulnerabilidade e riscos de contaminação												b,c,d			c,d
i.	Elaboração e desenvolvimento de propostas de medidas e ações de gestão				c,d,e											
j.	Desenho e implementação de ações de comunicação social /educ. ambiental					b,c,e	b,c,e	b,c	g		b,c,d,e	c,e				
ETAPA DE ENCERRAMENTO																
K.	Difusão de produtos e monitoramento de resultados, sucessos e aprendizado															
l.																
m.	Informe final e ações estratégicas de prosseguimento			c												
	Coordenação									a						
	Workshops															

A=Grupo Coordenador; B=Apoio material/infraestrutura; C=Apoio recursos humanos; D=Disponibilização de informações/dados; E=Execução; F=Facilitador; G=Colaboração

QUADRO 3 b - ATIVIDADES PROPOSTAS E POTENCIAIS PARTICIPAÇÕES																									
Atividade - Proposta para discussão	Contra-partidas	Execução - Contrapartidas Potenciais																							
		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35				
ETAPA INICIAL																									
Adoção, configuração e adaptação do SIG				c,d														b,c,d,e	b,c,d,e	g	g				
Implementação do SIG. Recompilação de dados e informações, consistência e incorporação no SIG.				c,d														c,d	c,d	c,d	g	g			
Elaboração e implantação de ações estratégicas para o gerenciamento do Aquífero Guarani através do estabelecimento de um esquema de gerenciamento participativo				e												g	c,d	e	e			e			
Elaboração dos TRs detalhados de componentes e atividades do PPRP																									
ETAPA DE DESENVOLVIMENTO																									
Inventário de Poços e usos da água subterrânea*				b,c,d																	c,d				
Inventário de fontes de contaminação pontuais e difusas				g				b,c											b,c,d	c,d					
*																									
Estabelecimento e operação de uma rede de monitoramento local p/ o PPRP e manutenção no SIG				b	b,c	b,c,d														c,d	c,d	g	g		
Modelo Hidrogeológico Conceitual: Conhecimento do arcabouço hidrogeológico, estudo isotópico e hidroquímico, obtenção de parâmetros hidráulicos, com ensaios de campo e balanço hídrico. Análise de uso da água e riscos de conflito (interferências e/ou superexploração)		c,d,g		g	d,g															c,d	c,d	c,d	b,c,d	b,c,d	
Análises da vulnerabilidade e riscos de contaminação				g																g	c,d	b,c,d,e	b,c,d,e		
Elaboração e desenvolvimento de propostas de medidas e ações de gestão				a	d					d										g	c,d	c	c		
Desenho e implementação de ações de comunicação social /educ. ambiental		c,g		g	d			b,c		c,d	c	c								c,d	c,d	g	g	g	
ETAPA DE ENCERRAMENTO																									
Difusão de produtos e monitoramento de resultados, sucessos e aprendizado				~						b,c										g		g	c	c	
Informe final e ações estratégicas de prosseguimento				c						b,c												c	c	c	c
Coordenação				a,b,c																		a,b,c	c	a	a
Workshops																									

A=Grupo Coordenador; B=Apoio material/infraestrutura; C=Apoio recursos humanos; D=Disponibilização de informações/dados; E=Execução; F=Facilitador; G=Colaboração