1. PROJECT TASK GROUP MEMBERS

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2. INTRODUCTION

Arsenic currently threatens millions of people in West Bengal and Bangladesh, as a result of their exposure to contaminated groundwater. High levels of arsenic in drinking water have also been found elsewhere in Asia (e.g. Cambodia, China) as well as in the USA and South America. The WHO and USEPA recommended limit for arsenic in drinking water is currently 10 µg/L. It is not so much the difficulty of removing arsenic from water, as the extremely low levels to which it must be reduced to ensure safety, that presents the challenge to water treatment initiatives, especially in developing countries where the issues of cost and expertise often make 'high-tech' solutions impractical.

The challenge is to find cheap and efficient treatment technologies, aiming to find a sustainable solution for the removal of arsenic from point of use sources. Finding a sustainable solution for the removal of arsenic from point of use sources would attract a million $ award from the US National Academy of Engineers.

3. PROJECT OBJECTIVES

The aim of this project is to provide practical advice to local decision makers at local and government level in developing countries who face the problem of arsenic contamination in water supplies. It aims to:

- Produce a critical and independent evaluation and assessment of available technologies, with respect to the effectiveness for remediation
- Conduct critical analysis of appropriate methodologies and evaluate their appropriateness for different situations
- Address the transferability of specific technologies which are currently associated with local conditions
- Coordinate with the related IUPAC project 2003-050-1-021 “Solving the problem of arsenic contamination in water in Bangladesh” which is conducting workshops.

4. METHODOLOGY: Critical review of available solutions/technologies and their relationship with local conditions; and the use of multi-criteria analysis to assess solution/technology transferability

- Source term
  - Natural sources
  - Anthropogenic sources
  - Behavior of arsenic in the environment
  - Concentrations in the environment
  - On-site analysis of arsenic.
  - Assessment of commercially available field kits compared to reliable lab-based methods
  - Reliability of industrial measurements particular very low concentrations

- Solutions/Technologies
  - Multi-criteria analysis for decision making (detailed examples in Table 1)
  - Low cost technologies
  - Advanced technologies
  - Case Studies

- Health effects
  - Toxicological profile
  - Health risk assessment
  - Risk mitigation

Table 1: Multi-criteria analysis for decision making

<table>
<thead>
<tr>
<th>Criteria (CR)</th>
<th>Indicators (IND)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Aquifer</td>
<td>Alternative圣水源</td>
</tr>
<tr>
<td>Surface Water</td>
<td>Reclamation</td>
</tr>
<tr>
<td>Desalination</td>
<td>Membrane Technology</td>
</tr>
<tr>
<td>Chemical Treatment</td>
<td>Physical Treatment</td>
</tr>
<tr>
<td>Hybrid Technologies</td>
<td>Weighting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source Exposure</th>
<th>Indicator</th>
<th>Groundwater supply</th>
<th>Surface water (Mining, Smelting, Coal burning)</th>
<th>Soil &amp; Surface Waters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Risk</td>
<td>Toxicology (Behavior/Form)</td>
<td>NOAEL, Body burden and aqueous levels (Cancer &amp; Non-Cancerous)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>Capital cost</td>
<td>O&amp;M costs including Arisings disposal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community Attitudes</td>
<td>Technology acceptance</td>
<td>Organisational capability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical Skill Base</td>
<td>Local competence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL SCORE</td>
<td>sum score of x weight</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. TIMETABLE

- Team meeting: January 2005
- Literature review: January 2005 (completed)
- Draft contributions April 2005 (Partially completed)
- Full draft September 2005
- Final report January 2006

6. FURTHER INFORMATION

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Open Call: Contributors or suggestions are Welcome