

## **Approaches and Milestones:**

### **Objective 1: Identify innovative technologies.**

#### Approaches:

- Perform a literature review of qPCR, microarray, microfluidics and lab-on-a-chip technologies to understand the state of the technology
- Organize a workshop to solicit ideas, suggestions and recommendations on the use of qPCR, microarray, microfluidics and lab-on-a-chip technologies for waterborne pathogen detection and/or monitoring
- Perform a product review of commercially available products related to each respective technology, namely qPCR, microarray, microfluidics and lab-on-a-chip, which could be used for waterborne pathogen detection
- Perform market research of vendors selling the various consumables, reagents and instrumentation needed for qPCR, microarray, microfluidics and lab-on-a-chip technologies

#### Milestones:

- Office of Water has performed a literature review of microarray technologies and it is available on CD-ROM. The work was completed on March 31, 2005 and is available at [www.epa.gov/safewater/ucmr/pdfs/summary\\_workshop\\_microarrays\\_bibliography.pdf](http://www.epa.gov/safewater/ucmr/pdfs/summary_workshop_microarrays_bibliography.pdf)
- A workshop to solicit ideas, suggestions and recommendations on the feasibility of using DNA microarrays for high-throughput detection of waterborne pathogens was held on March 21-22, 2005, at Cincinnati by the Office of Water. The proceedings of the workshop are posted at [www.epa.gov/safewater/ucmr/pdfs/summary\\_workshop\\_microarrays.pdf](http://www.epa.gov/safewater/ucmr/pdfs/summary_workshop_microarrays.pdf)
- Based on a need identified at the above workshop, a second workshop was organized jointly by OW and ORD to discuss a wide variety of techniques for detecting, capturing and concentrating waterborne pathogens from large volume of water, in April, 2006 at Cincinnati
- As a consequence of the second workshop a memorandum of understanding was signed between EPA and Sandia Labs for pursuing research on Insulator based Dielectrophoresis (IDEP) technology for concentrating pathogens for water samples
- Literature review on qPCR, microfluidics and lab-on-a-chip technologies will be completed prior to workshop in May, 2007 (details in objective 2)
- Product review will be completed by December, 2007
- Market research of vendors will be completed by September, 2007

### **Objective 2: Identify the research gaps.**

#### Approaches:

- Plan and organize a workshop with EPA and external environmental scientists, utilizing the literature review performed earlier, to identify the research gaps for consideration by ORD's Research Program and extramural programs.

Milestones: This workshop will be completed by May, 2007

**Objective 3: Provide support for the expansion of methods.**

Approaches: Provide and suggest research topics to AwwaRF, SBIR and STAR programs

Milestones: Ongoing and will provide topics towards the 2007 solicitations

**Objective 4: Quantify economic and human health benefits for the use of these methods**

Approaches: Use a quantitative risk analysis approach to determine effectiveness of these methods to monitor multiple pathogens, rapidly. Either help of contractors or scientists from NCER, ORD will be sought

Milestones: To be completed by December, 2007