

## **IMPORTANT PROJECTS UNDERTAKEN**

### **MEASUREMENT OF HAZARDOUS ORGANIC COMPOUNDS - DIOXIN (PCDDs) AND FURAN (PCDFs) IN ENVIRONMENTAL SAMPLES**

Polychlorinated dibenzo-para-dioxins (PCDDs) and polychlorinated dibenzo-furans (PCDFs) are environmental contaminants usually present in diverse environmental matrices. Out of total 75 PCDD congeners and 135 PCDF congeners, 7 PCDD congeners and 10 PCDF congeners are known for their considerable toxicity. These congeners are monitored as per internationally practiced convention in various environmental matrices, which may vary from sub ppt level and may reach upto ppm level.

Under the purview of project, continuous development of infrastructure and various sub activities as below are proposed to be undertaken:

#### ***Monitoring of Dioxin – Furan Levels in Stationary Source Emission***

The monitoring of Dioxin – Furan levels in stationary emission sources of waste treatment facilities and industrial processes will be undertaken as and when requested by other divisions of CPCB, various State Pollution Control Boards/Pollution Control Committees etc.

#### ***Monitoring of Dioxin / Furan levels in Ambient Air of Critically Polluted Areas (CPAs)***

Central Pollution Control Board is monitoring Dioxin (PCDDs / Furan (PCDFs) levels in ambient air of ten Critically Polluted Areas (CPAs) in the country on quarterly basis with active involvement of its concerned zonal offices. Major part of the planned monitoring have been completed in the preceding financial years, the remaining part of the monitoring program will be undertaken in this financial year. In addition, other Critically Polluted Areas will be identified and monitoring of Dioxin / Furan levels will be undertaken.

### **VOLATILE ORGANIC COMPOUNDS (VOCs) MEASUREMENT IN GROUND/SURFACE WATER SAMPLES BY PURGE AND TRAP GC-MS IN CRITICALLY POLLUTED AREAS**

Volatile Organic Compounds (VOCs) readily evaporate at normal air temperature. The most common sources of VOCs in water include gasoline and fuel oils from leaking tanks and spills; solvents, paints, pigments, and dyes from leaking tanks and improper waste storage and disposal; leaching of chemicals from atmospheric deposition of automotive and industrial emissions; and residuals from well disinfection. US-EPA had listed 68 most common VOCs for monitoring ground water contamination from the known sources. These 68 VOCs cover a wide range of chemical compounds that have different chemical and physical properties and levels of toxicity. Chlorinated VOCs are associated with commercial and industrial use and include dozens of chemicals that are typically very mobile, persistent, and toxic in the environment. Non-chlorinated VOCs are associated with gasoline, fuel oils, and industrial solvents.

The project study will include monitoring and assessment of about 43 Volatile Organic Compounds (VOCs) in ground water and surface water samples collected from about 20 sampling locations each from ten most Critically Polluted Areas (CPAs) in the country by Purge & Trap pre-concentration technique followed by GC-MS analysis. The identified top Critically Polluted Areas (CPAs) would include Ankleshwar and Vapi in Gujarat; Ghaziabad and Singrauli in Uttar Pradesh; Korba in Chhattisgarh; Ludhiana in Punjab, Bhiwadi in Rajasthan, Chandrapur in Maharashtra, Talchar in Odisha and Vellore in Tamil Nadu. The monitoring and assessment at maximum possible CPAs will be covered during the year considering limited analytical infrastructure.

## **ASSESSMENT OF PERSISTENT ORGANIC POLLUTANT RESIDUES (POP's) IN HUMAN POPULATION OF DELHI WITH SPECIAL REFERENCE TO ADVERSE HEALTH EFFECTS AND MORBIDITY (COLLABORATIVE PROJECT WITH UCMS AND GTB HOSPITAL) – COMPLETED PROJECT, LAST INSTALMENT OF FUNDS TO BE RELEASED**

Persistent Organic Pollutants (POPs) are most dangerous amongst all the pollutants released to the environment, because of human activities. The POPs persists in the environment at very low levels and linked to many health and environmental effects. Most of the organo-chlorine pesticides are persistent toxic contaminant having long half-life and tendency to accumulate in fatty tissues. The organo-chlorine pesticides are highly hazardous chemicals, their widespread use makes these available in food chain and absorbed in human body through skin, inhalation, oral and placental routes.

The organo-chlorine pesticides can interfere in normal endocrine system, resulting into reproductive disorders and breast cancers. The OCPs exposure in human being can result into health problems such as birth defects like preterm and low birth weight babies, nerve damage, breast and prostate cancer, The study had been undertaken as collaborative project by Central Pollution Control Board with University College of Medical Sciences (UCMS) to generate epidemiological data and establishment of relative risk / relationship between the incidence of adverse health outcomes including cancer due to exposure to pesticides with special reference to organo-chlorine Persistent Organic Pollutants residues and Poly-chlorinated Biphenyls. The salient objectives of the project was as below:

- Determination of blood POPs levels such as organo-chlorine pesticides in infants with special reference to pre-term and IUGR infants.
- Determination of blood POPs levels such as organo-chlorine pesticides, organochlorine residue levels in children and teenagers of various age groups.
- Determination of blood and tissue organo-chlorine and Polychlorinated biphenyls (PCBs) residue levels in adult and senior citizen populations with special reference to breast cancer tissue and prostate cancer patients.

The three years study initiated during year 2008-2009, had already been completed and the report of study has been submitted by UCMS & GTB Hospital during February, 2012 and presentations on findings has been made by Principal Investigator at Central Pollution Control Board. The final installments of funds to be released during current financial year

## **ASSESSMENT OF POLYCHLORINATED BIPHENYL (PCBs) IN RIVER WATER & SEDIMENTS OF RIVER YAMUNA IN DELHI STRETCH**

Polychlorinated biphenyls (PCBs) are chlorinated organic compounds which in the early to mid of twentieth century were primarily synthesized for electrical insulation, flame retardation and sealant as their major applications. Although their manufacture has been banned for more than three decades now but these compounds are still detected globally in various environmental matrices in varying concentrations mainly due to their persistent nature, long range transportation, bio-accumulation and non-biodegradable characteristics.

The project has been proposed for assessment of toxicologically significant 28 individual congeners of Polychlorinated Biphenyls (PCBs) in surface water and bottom sediments at various locations along the stretch of river Yamuna flowing through Delhi region. The study will be conducted by sampling at the selected locations during four seasons i.e. monsoon (June – August), post monsoon (September – November), winter (December – February) and summer (March – May) and analysis of 28 individual congeners on GC-ECD.

## **MONITORING OF PESTICIDES RESIDUES AT NATIONAL LEVEL - SPONSORED PROJECT BY MINISTRY OF AGRICULTURE / IARI, NEW DELHI**

Department of Agriculture and Cooperation (DAC), Ministry of Agriculture is conducting national level monitoring of pesticide residue - including Organochlorine pesticides, organophosphorus pesticides, synthetic pyrethroids and herbicides in agricultural products and surface water used for irrigation of crops. The project is National level project executed by Indian Agricultural Research Institute (IARI) in collaboration with more than 25 laboratories in various parts of the country. The project includes sampling of water from surface water bodies in areas having intensive agricultural activities, as well as application of pesticides.

CPCB is one of the executing and participating laboratory in National Project "Monitoring of Pesticide Residues at National Level". The expenditure for major equipments, manpower, travel as well as consumables and contingencies are funded by the Ministry of Agriculture. The surface water samples being collected from the identified surface water resources in National Capital Region, subject to utilization in Agricultural irrigation and being analyzed at National Reference Trace Organics Laboratory at CPCB HQs Delhi. Samples being processed and analyzed as per the recommended methods by IARI as well as USEPA methods for surface water. The monthly report / Annual Report being submitted to Project Coordination Cell at IARI, New Delhi.

## **OPERATIONAL CONTRACT FOR AIR HANDLING UNIT (AHU), ELECTRICAL & FIRE FIGHTING SYSTEM MAINTENANCE**

To ascertain proper trouble free and continuous operation of Air Handling Unit (AHU), Electrical system and Fire fighting system, these systems will be covered under Annual Maintenance / Operation Contract during current financial year. The AMC will be undertaken with the firms having thorough technical expertise in trouble shooting and maintenance of the systems installed at National Reference Trace Organics Laboratory

## **ANNUAL MAINTENANCE CONTRACTS OF HRGC-HRMS AND OTHER EQUIPMENT / INSTRUMENTS – GCs, HPLC, GC-MS, UPS SYSTEMS ETC.**

To ascertain proper trouble free operation of various instruments / equipments, these systems will be covered under Annual Maintenance / Operation Contract during current financial year. The AMC will be undertaken with the Indian representative of Principal suppliers having expertise and training in maintenance of the systems installed at National Reference Trace Organics Laboratory.

## **METHODOLOGY DEVELOPMENT AND STANDARDIZATION OF TRACE ORGANICS PARAMETERS (PHENOL & PHENOLIC COMPOUNDS) AS PER NOTIFICATION UNDER THE ENVIRONMENT (PROTECTION) ACT, 1986**

Under Environment (Protection) Rules 1986, several trace organic pollutants have been notified as Environmental Standards for various categories of Industries. Phenols and phenolic compounds are among the most important organic contaminants, owing to their toxicity and persistent in the environment. Both US Environment Protection Agency (EPA) and The European Union have included these organics among priority pollutants.

Phenols and phenolic compounds are aromatic hydroxyl compounds classified as monohydric, dihydric or polyhydric depending on the number of hydroxyl groups attached to the aromatic benzene ring. These are present in the environment as a result of their uses and the processes, in which they are implicated. Although they can also be originated naturally due to the degradation of humic substances, tannins and lignins, however their discharge from many industrial processes such as production of drugs, textiles, dyes,

pesticides and paper, are the major sources of these compounds in the environment. Phenols and phenolic compounds are subject to regulations as water pollutants due to their toxicity. Phenols and their derivatives reveal peroxidative capacity, they are hematotoxic and hepatotoxic, provoke mutagenesis and carcinogenesis towards humans and other living organisms. The environmental standards of Phenol and Phenolic compounds have also been notified under the Environment (Protection) Rules, 1986 for various categories of industries.

The project has been proposed for development and standardization of methodology for measurement of phenols and phenolic compounds in environmental samples by HPLC/Gas Chromatographic method.

### **INTER-LABORATORY PT PARTICIPATION FOR HQS LABORATORY & CPCB ZONAL OFFICE LABORATORIES**

Quality assurance is the definite programme for laboratory operation that specifies the measures required to produce reliable data of known precision and accuracy. Quality system which includes quality assurance policies and all quality control processes to ensure the quality of analytical data produced by the laboratory and to demonstrate the competence of the laboratory.

To maintain the quality assurance, Central Pollution Control Board Laboratories are participating in Interlaboratory PT programmes undertaken by various national and international PT organizers since past several years. The project will facilitate the PT participation having coverage of various physico-chemical, microbiological, metals, chemical, trace organics and air parameters including dioxin and furan with identified reputed international PT providers during FY 2012-2013 for all HQs Laboratories and CPCB Zonal Offices Laboratories.

### **RECOGNITION OF LABORATORIES UNDER THE ENVIRONMENT (PROTECTION) ACT, 1986**

The laboratories are essential corner stone of any effective pollution control programme. The analytical laboratories provide qualitative as well as quantitative data for good decisions making purpose. For generating this valuable data with desired accuracy and to quantify concentration of the constituents present in the samples, the laboratory should have the desired facilities and capabilities to achieve the above goal. Under Section 12 of the Environment (Protection) Act, 1986, the Ministry of Environment & Forests has delegated the powers to Central Pollution Control Board to recognize the environmental laboratories under Govt, Semi-Govt., Autonomous, Public Sector Undertaking and Educational Institutes to carry out the functions entrusted to an environmental laboratory under the Environment (Protection) Act, 1986. The activity will facilitate joint inspection of laboratories and other miscellaneous expenditure made for consideration of recognition of environmental laboratories under the E (P) Act, 1986.