

## PN CDI - II

**PROGRAM „CAPACITAIES”- Module 1**

**CONTRACT:** 23 CP//14.09.2007

### **PROJECT TITLE**

IMPROVEMENT OF THE RESEARCH CAPACITY IN THE DOMAIN OF THE ENVIRONMENTAL FACTORS CONTROL (AIR, WATER, SOIL, WASTES) BY MODERNIZING/ EXTENDING THE EXISTING INFRASTRUCTURE

**Project acronym:** INFRAMED

**Leader project:** Mona BARBU

**Autoritatea contractanta:** Autoritatea Națională pentru Cercetare Științifică

**Finanțare:** Buget de Stat – Autoritatea Nationala pentru Cercetare Științifică

**DURATION OF CONTRACT:** 2007-2009 (17 months)

**VALUE OF CONTRACT** (source - budget of government): **1.796.064,69 lei**

### **SUMMARY OF THE PROJECT**

**The objective of the project** was to develop the research infrastructure in order to monitoring and control of the environmental factors (air, water, soil, wastes) in order to transpose the EU Directives requirements in the national legislation. **The infrastructure** allow the researchers to work with performing equipments, under quality management conditions, to participate in national and international research, development and innovation programs.

- **improve** the research activities performance in order to effectuate the **control of the quality of the environmental factors (air, water, soil, wastes)** in accordance with the to the EU performance Directives transposed into the national legislation;
- **endow** with modern and performing equipments necessary for developing new techniques and for **analyzing the conventional/alternative fuels** in order to evaluate the **greenhouse gas emissions (CO<sub>2</sub>)**;
- **develop the** existing infrastructure and completing it with specific equipments for the determination of the **air pollutants (emissions, imissions, noise)**;
- **develop the quality control of the soil and wastes environment compounds by** completing the existing infrastructure;
- **endow** with appropriate laboratory equipments that can assure good analytical determinations, achieving limits assessed/standardized by settlements for **water** environmental factor control and for evaluating the effects of the **dangerous chemical substances**;
- **develop the analytical control** activities under **quality management**, that can assure internal and external control of the **results quality**.

The research development unit has implemented an integrated quality system, the research activity is carry on according to SR EN ISO 9001:2001 quality management system, certificated by BVQI, and the activity of testing in accordance with the SR EN ISO/CEI 17025:2005 requirements, the laboratories being accredited by the Accreditation National Organism- RENAR; also, the testing laboratories from our institute are authorized by the Health

Minister of the effectuation of the drinkable water control monitoring and starting with December 2005, The National Agency of Chemical and Dangerous Substances and Products emitted the first BPL Attestation Certificate on national level, which confirms the competence of the laboratories from the testing installation organized in our unit, to achieve acute lethal toxicity tests according to the *OECD-C01 Method, described in G.D. no. 490/2002, Annex 3- part C and according to the Good Laboratories Practices Principles*.

The control, monitoring and quality evaluation of the environment is according to the national/international standardized methods (EN/ISO norms), and the personnel is specialized and trained in specific domains to chemistry, biology, biochemistry, ecology, toxicology and participated in time alongside the Romanian public authorities, in adopting/transposing the European settlements referring to control and prevent the environmental pollution and in collaboration with the National Agency of Standardization (ASRO) they assured and developed the necessary infrastructure for the assimilation of the European/international norms (EN/ISO).

Complying with all those presented previously, achieving the present project the research INCD ECOIND unit propose **to extend its research domain and environmental testing in order to implement the present legislation with reference to the improvement of the quality endowment of the laboratories and to the development of the facilities from the research development unit specialized in the environmental factors control, evaluation and monitoring.**

**The objective of the project** Develop the research infrastructure in order to allow the researchers to work with performing equipments, under quality management conditions, to participate in national and international research, development and innovation programs

**Specific objectives:**

- Develop the research infrastructure
- Increase the using rate of the existing research infrastructure

**PHASES AND EQUIPMENT ACQUISITION**

**Phase I:** *The development of the infrastructure in order to improve the analyses processes for characterizing the environmental components: water, air, soil.*

**Equipment:**

Elemental Analyzer; Calorimeter with bomb calorimeter; laboratory sample grinding equipment laboratory permeameter + kit for soil sampling in undisturbed structure; shaker, bi-distillate; micro-bio-tests equipments for the determination of the algae's toxicity, research microscope

**Phase II:** *Creating a material base for modernizing the infrastructure in order to improve the evaluation processes of the environmental factors: water, air, soil*

**Equipment:**

Manual drilling equipment, automatic system for laboratory glass purifying, installations filtrate membranes for the determination of the suspensions from the water sampling, spectrometer with inductive coupled plasma (ICP-OES), anti-acid modular niche, gas chromatograph, sampling equipment with a PM 10 powder system, controlled atmosphere room for the PM 10 and PM 2,5 powders, ECD detector for gas chromatograph

**Phase III:** *Developing a material base for the evaluation of the air emissions/imissions and for improving of the software techniques for pollutant dispersion mathematical model and realizing noise maps.*

**Equipment:**

Portable pumps for gaz prelevation, portable izocinetic pump for dust prelevation, distillator for 1'st quality water, microwaves digestor, automatic gazes analizor for NO<sub>2</sub>+CO, automatic gazes analizor for SO<sub>2</sub>, automatic gazes analizor for TOC, fast evaporation/concentration system, acoustical software for noise maps, calcination oven

**Access condition for the third persons:** pag. Web

## **ST Services Quality**

### **1. Services rendered to customers**

Accredited methods accordind to SR EN ISO 17025 -2005 Standard (LI 137/06.10.2008)

- Characterization solids/ liquids fuels (standard/alternative) for evaluation and monitoring greenhouse emissions (CO<sub>2</sub>), rrecommendation: [www.eu-ets.ro](http://www.eu-ets.ro) for accreditation laboratory's EN ISO 17025 to analysis on emission factor and oxidation factor, carbon contents, net of calorific power on solids and liquids samples in according of Ord 1175/31.10.2006for Guide for monitoring and reporting greenhouse gas emissions - Source *RENAR*
- Determinations of dangerous substances (Ni, Cd, Pb, Hg) with low detection limits, according with limits impose by the legislation and extension of the services through development of new methods for the parameters: Bi, B, Be, Li, Sb, Sn;
- Determination of priority dangerous compounds (organochloride, organopghosporous and triazine pesticide, PCB, VOC,etc) at low detection limits, according to the limits imposed by the legislation
- New services for heteroatoms containind compounds analysis like sulfur containing compunds in oil and derivatives
- Biodegradability determination of soluble organic compounds; (PIS 19)
- Toxic potential determination of chemicals contaminants (specific) and residual waters on aquatic organisms and active sludge microorganisms;
- Realzation the maps of industrial noise
- Improvement performances for sampling drawing and preparation of water, air, soil, wastes for determination the organics and anorganics polution materials

### **2. The Network of known Customers**

- To develop research projects of programs: PN II
  - Impact assessment of pollution with PM 2.5 breathable dusts from urban areas with intense road traffic on the inhabitants health status” - (Lab. PA)
  - Management system of resources for monitoring and environment evaluation of risk for prevetion negative effects and administration of crisis” - (Lab. PA)
- To finish some projects related to the analysis of toxic compounds containing heteroatoms, like organophosphorous pesticides ;
- to develop new research projects related to the introduction of new techniques and methods used in environmental forensic, to monitorize new heteroatoms compounds classes like sulfur containing compounds;
- **development of new research projects** regarding the monitoring of drinking water quality from the distribution systems of Bucharest, Timisoara, Tg. Mures, and also the monitoring of influents / effluents from drinking water treatment plants of Buzau and Focsani;
- Application in **research projects – Nucleu Program**

- Research for elaboration of determination methods of dangerous organic substances/prioritar from emissions by fix sources with new determination methods of PAH, phenols and halogenated compounds in concordance with legislation operative”;
- Researchs for elaboration new performance methods for determination volatile metals (selenium, telur, and besmuth) from emission fix souraces in concordance with operative legislation;
- Researchs about the posibilations for application CE directives for reduction level of ambiantal and industrial noise;

### 3. Scientific communiations

- Analytical method for low concentrations of sulphur in solid/liquid fuels: ECOIND conference, November 2009
- *Testing methods using FIAS coupled to ICP-EOS* – Chisinau, May 2009; Bucharest, ECOIND conference, November 2009; *monitoring of drinking water quality*- Greece, October 2009, COST conference; Bucharest, ECOIND conference, November 2009
- Analytical method for selenium determination from stationary sources by atomic absorption spectrometry -ECOIND Conference, November 2009
- Considerations concernig impact assessment of pollution with breathable PM 2,5 particulates maters -ECOIND Conference, November 2009
- Analytical method for low concentrations of sulphur in solid/liquid fuels - ECOIND Conference, November 2009
- Mathematical modelation of acoustical wavers from industrial souraces - ECOIND Conference, November 2009
- Removal of Surfactants from Household Cleaning Products and/or Cosmetic Detergents during the Ready Biodegradability Tests Performed in conformity with the New European Regulations (SIMI 2009)

### ST Services Quality

#### Performance of indicatorys

- **To extend it research domain and environmental testing for calculus emission factors and oxidation factors to with the view of greenhouse gas emissions (CO<sub>2</sub>) from solids and liquids fuels** to realized through equipments acquisition:
  - Elemental Analyzer;
  - Calorimeter with bomb calorimeter
  - Laboratory sample grinding equipment
  - Calcination oven
- **Improvement of the quality research of the laboratories for extension of the existing research infrastructure completing with new endowment equipments/components performance**
  - Portable pumps for gaz prelevation
  - Portable izocinetic pump for dust prelevation
  - System with filtrate membranes Microfil
  - Acoustical software for noise maps
  - Chemical exhauster niche
  - Shaker

- Bi- distiller
- Automatic system for laboratory glass purifying
- First quality water distiller
- **Develop facility in evaluation evaluation and monitoring factors environment**
  - Spectrometer with inductive coupled plasma (ICP-EOS)
  - ECD detector for gas chromatograph
  - Microwaves digester
  - Research microscope
  - Micro- bio -tests equipments for the determination of the algae's toxicity
  - Laboratory permeameter and sampling kit
  - The manual drilling equipment
  - Multi-parameter having special oxygen electrodes
  - PM10 powder system Paul Gothe
  - Automatic gas analyzer for the determination of the atmospheric for NO+CO
  - Automatic gas analyzer for the determination of the atmospheric for SO2
  - Controlled atmosphere room for the PM 10 and PM 2,5 powders
  - Gas chromatograph with nitrogen phosphor detector (NPD), flame photometer detector (FPD) AND ELECTRON capture detector (ECD)
- **Numbers of equipments acquisition** -28 equipments
- **Numbers of entitys which participated of project by INCD ECOIND**

As part of project have participation **4 (four)** laboratorys/departments:

- EVMT
- Analiza Instrumentala
- Poluare Aer
- Bioteste

- The use of equipment will allow :
  - Development of work productivity increase of analysis quality, a big number of chemical analyses that can be performed and of course the increase of clients number
  - Realization of new research projects and scientific communication (national and international).
    - The acquirement of new equipment brought the improvement of the under structure and the increase of the professional skill level and the quality of the staff from the laboratories involved in this program by the use of some new and performant techniques for sampling, preparation and analyse of the pollutants from air, water, soil and waste.

#### **Quality personal:**

- For realizing the proposed activities it was established a work team formed by experts whose experience and obtained results in the environmental protection domain are an assurance of the realization of the scientific and technical proposed objectives. The team has a multidisciplinary character and contains personnel having the following branches: chemical engineering, chemistry, biology, analytical chemistry, geography, ecology and medium studies personnel.

- The quality of the tests and staff it is proved by very good results obtained by the participation to different programs which consist in comparison between national and international laboratories and by very good feed-back received from customers.
- The results obtained was analyzed on steps, the final pay check will be made within the signed statement of putting into service the equipments and within the evaluation effectuated by the auditors assigned by ANCS.
- The Director of the project will cooperate with the resort departments (**financial-accountship, supplying**) for assuring the necessary resources, according to the conditions from the financial agreement and to the requests imposed by the project, team. Will be analyzed the conformation with the proposed terms, by using the resources they dispose of. The administrative management will assure the aquisition of the equipments that will be done according to Law 337/2006 referring to the approval of GEO 34/2006 referring to the public aquisition contracts attribution.
- The activities for achieving the investment in the research development unit infrastructure in the project are the ones specific to the categories according to GD1579/2002 and in accordance with the Realization Plan of the project:

## **The work procedures**

### **The acquisition procedure** head principals activitys:

- Documentation for consultation vigour legislation and new standards;
- Documentations elaboration of assigning for publics acquisition (printed form, plans books, technicals specifications, notification publication in SEAP (System Electronic Public Procurement), etc.
- The organization of opening sittings the proposals;
- The analyses technical -economics of proposals and contractors settlement;
- Agreement signing with contractors;
- Taking delivery, putting in function the equipments acquisition and staff instruction

### **Works instruction/Specific Testing Procedure**

- With a view to the equipments acquisition maked works instruction (IU)
- With a view to submissive tests accredited with according of referential standard SR EN ISO/CEI 17025/2005, (Accredited of certificate LI 137/06.10.2008) work elaborated/revision procedures:
  - Determination physical-chemical charaterizations for pentru solids and liquids samples fuel classic /alternative (moisture; ash; heat and net of calorific power; elemental analyses: C, H, N, S) – (PIS 34; PIS-35) (Lab.PA)
  - Determination of metals from water and soil using atomic absorption and optical emission spectrometry techniques: The determination of 33 elements by inductively coupled plasma atomic emission spectroscopy. (PIS-06-5.2.16.) (Lab. AI)
  - Determination of organochlorine, triazine and organophoshorous pesticides from water and soil by gas chromatography (PIS-09) (Lab. AI);
  - Determination of some semivolatile compounds form water, soil and transformer oil by gas chromatography. ( PIS-11) (Lab. AI)

- Biodegradability determination of soluble organic compounds; (PIS 19) (Lab. Bioteste)
- Toxic potential determination of chemicals contaminants (specific) and residual waters on aquatic organisms and active sludge microorganisms; (PIS 20) (lab. Bioteste)
- Bacteriological analysis ( PIS 18 )

### ***The Network of known Customers***

Electrocentrale Oradea, Sucursala ROMAG-TERMO Turnu Severin, Paroseni, SC CAST SA, Colterm Timisoara, Electrocentrale Brasov  
 RMD Consult, Electrocentrale Bucuresti, Petrom Arpechim, Remat, Smithfield, Romball, Aquaserv Tg. Mures  
 SC CARMEUSE SA; Star Foods, Dayan Ecotehnic SRL; Scania SRL; Linde Gaze Romania; Sucursala de Exploatare Miniera Rm Valcea; SC PUROLITE SA; SC ASSA ABLOY ROMANIA SRL; SC VRANCART SA Auditeco, Petrom Arpechim, Smithfield, SC PRO AIR CLEAN SA; Expur Urziceni; Expur Slobozia; TAKATA, CRONO-SPAN; PRO-AIR CLEANN  
 SC Uzinele Sodice GOVORA-CIECH Chemical Group SA, SC SMITHFIELD Procesare SRL  
 SC ICERP PLOIESTI, PRISTA OIL ; TC AFFAIRES, INDCARF, CAROLI, URSUS, VITAL GAZ, MUSETESCU, DRUKFARBEN, etc.

