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REACH Protocol for Emissions and Accident Scenarios in Supply  
and Distribution of Fuels and Petrochemical products

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*SUB ACTION 3.2 Measurements and laboratory analyses of emissions, spills and  
exposures to water, soil and the atmosphere*

### **SUB ACTION 3.2**

**Executive Summary of the Deliverable “Laboratory  
analyses and its results” in English**



LIFE+ Environment Policy & Governance

## Executive summary

In this deliverable (sub action 3.2) priority substances and main dangerous compounds of petroleum products are examined and selected for measurements and laboratory analyses of emissions, spills and exposures of hazardous chemical substances to water, soil and the atmosphere at locations related to the lifecycle stages of the petroleum products. In addition, the analysis methodologies of water and soil samples and the measurement procedures of air samples are analysed. The selection of hazardous chemical substances is based on the main dangerous compounds of the petroleum products and priority substances as defined by the U.S. Environmental Protection Agency (EPA).

For each type of sample (water, soil, air) the following Hazardous Chemical Substances are selected to be examined:

- Air samples: Volatile Organic Compounds (VOCs)
- Water samples: Benzene, toluene, ethylbenzene, p-xylene, o-xylene (BTEX), Polycyclic Aromatic Hydrocarbons (PAHs), n-Alkanes and Isoprenoids
- Soil samples: Polycyclic Aromatic Hydrocarbons (PAHs), n-Alkanes and Isoprenoids

Emissions and concentrations in water, soil and air were sampled at locations where loading/ unloading, transportation and storage of hazardous chemicals takes place at high frequency e.g. ports, loading/unloading stations, road truck routes, pipeline routes, gas stations, etc. Sampling sites have been selected according to the transportation mode (vehicle, sea carrier/ vessel, rail vehicle and pipeline) and the following lifecycle stages:

- Loading and unloading installations/ locations
- Transportation of hazardous chemicals
- Temporary storage of hazardous chemicals
- Distribution of hazardous chemicals
- Other sites where hazardous chemicals are likely to be present

A number of samples from specific sites is collected depending on the nature of the petroleum hydrocarbons sought in the samples. Regarding water samples, an amount of water from the sea and the rivers surface is collected, due to the fact that substances are expected to be concentrated in the surface (because of their density). Regarding soil samples, an amount of sediment is collected, which is found several centimetres under the surface in order that it is not influenced by random external factors. Moreover, the appropriate preservation of the samples is very important during the analysis procedure in order to prevent the deterioration of the samples.

The samplings, the laboratory analyses and the measurements were carried out during the project period 2012-2013 in three different phases. The number of sampling sites, the analysed samples, the analyses and the parameters per type of sample, type of location and lifecycle stage are presented in the deliverable. Water, soil and air samples from 421 sites around Greece were analysed, 75 of which were water samples, 51 soil samples and 295 air samples. The sampling locations covered fuel routes and frequented fuel points in Greece. Regarding the number of analyses, 183 analyses were carried out in water samples, 103 analyses in soil samples and sediments and 539 in air samples. The total number of parameters analysed is estimated at 5037. Most parameters were examined in water and soil samples (2462 and 20136 parameters respectively).