DATA
ACCOMPANYING REPORT

AIR QUALITY

The realization of the intensive monitoring program for assessment of air quality in Bulgaria was organized in 3 stationary areas. The territories where the monitoring stations were located are attributed to two different climatic regions: Black sea climatic region – Eastern Balkan mountain subregion (site Staro Oriahovo) and Mountainous climatic region –Middle mountain subregion (sites Yundola and Vitinia). The stations are equipped with automatic devices collecting data for air quality parameters in real time. The following stations were determined:

- **Vitinia (0001)** - This area is situated in the western part of Middle Stara planina (the Balkan mountain), at an altitude of about 953 m. above the sea level, on the territory of Vitinia State forestry district. It is representative for the beech forests. The region is under the influence of local and regional pollution sources;
- **Staro Oriahovo (0004)** – It is situated in the eastern part of Stara planina, at an altitude of about 200 m above sea level in “Gorska baraka” area of the Staro Oriahovo State forestry district. The region is representative for oak forests. There are regional pollution sources;
- **Yundola (0003)** – This area is situated in the western part of the Rodopi mountains, at an altitude of about 1602 m above sea level, in the “Starina” area, on the territory of the experimental training forest station Yundola of the University of Forestry /UF/. It is representative for coniferous forests and is far away from local pollution sources.

Air Quality equipment

Sensor/ System	Manufacturer	Type	Specifications
Remote transmission	Siemens	Siemens GSM Dualband Modem TC 35T, antenna,	GSM Dualband Modem Terminal
Data logger	Infologica	Super Micro SBC-19	Data logger
Soft ware	Project Automation	Eco Remote	Data management, Import, Export; Meteorological and

			Air Quality data interpretation, remote transmission
SO2	Monitor Labs.	ML9850	Air quality measure
NOx	Monitor Labs.	ML9507	Air quality measure
O3	Monitor Labs.	ML9812	Air quality measure

Due to neglect low concentrations of ammonia it was accepted that pollutant to be not measured.

The monitoring activities in 2011 were prepared in compliance with the ICP Forests Manual and comprise the following activities:

- Assessment of ambient air quality – Air pollution concentrations are measured in every 1 hour. Data for automatically measured atmospheric pollutants - **SO_2, NO, NO_x, NO_2** and **O_3** are transmitted and monitored in real time; For the needs of FutMon project and ICP Forests, only **SO_2, NO_2** and **O_3** data were reported;

- Validation of the data

The present submission report for air quality is based on the more than 90% of validated data for each of the measured compounds. The percent of the valid data is as follow:

1. Vitinia (**0001**) – 95.5% for SO_2, 95.1% for NO_2 and 99.7% for O_3;
2. Staro Oriahovo (**0004**) – 98.5% for SO_2, 91.1% for NO_2 and 96.7% for O_3;
3. Yundola (**0003**) – 95.8% for SO_2, 91.2% for NO_2 and 99.9% for O_3.

- Submission of the data

Assessment of atmospheric pollutants

Vitinia - The average annual concentrations of sulphur dioxide and nitrogen oxides in 2011 were lower than the norm for protection of natural ecosystems, and during the last two years – below the lower assessment threshold. The highest AOT40 value was determined in 2011, in comparison with the previous five years, which exceeded the short-term target value for plant protection about 1,3 times.

Although an increased concentration of ozone was determined in 2011, damages were found only on one of the sample trees, and visible chloroses were observed only on 7,5% of the leaves.

Staro Oriahovo - The average annual concentrations of sulphur dioxide and nitrogen oxides were lower than the norm for protection of natural ecosystems, and in 2011 they were below the lower assessment threshold. The AOT40 values (May-July) gradually decrease since 2007 and in 2011 they were significantly lower than the level of the long-term target value.

Yundola - The average annual concentrations of sulphur dioxide and nitrogen oxides were lower than the norm for protection of natural ecosystems, and in 2011 they were below the lower assessment threshold. A decrease of the AOT40 values for plant protection (May-July), below the short-term target value, was determined during the last two years. The long-term target value was exceeded more than 2,5 times.