



The Radiation Protection Authority's air filter stations

The Norwegian Radiation Protection Authority currently has five air filter stations located at various sites throughout Norway. The stations are important for surveying airborne radioactivity, and for the assessment and composition of any emissions in the case of mishaps and accidents. There are similar stations throughout Europe, and the inter-state collaboration makes it possible to track any emissions of radioactive substances.



Air filter station at the Norwegian Radiation Protection Authority's Preparedness Unit at Svanhovd in Finnmark County.

Air filter stations

The Radiation Protection Authority currently operates five air filter stations that are part of the agency's own air monitoring system. The stations are located in Stavanger, at the Authority's head office at Østerås, near Oslo, at Skibotn, at Viksjøfjell and at the Radiation Authority's preparedness unit at Svanhovd.

All of the air filter stations employ the same principle for taking air samples, but vary to some extent in capacity and efficiency. In all of the stations the air is pumped through a special, very dense, filter that can capture small particles. The filters are replaced weekly and are sent to the Radiation Protection Authority's laboratories for analysis.

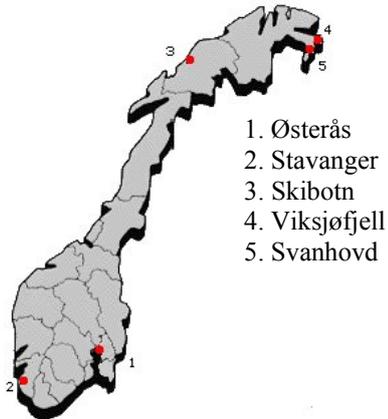
The air filter stations are also equipped with a special impregnated charcoal filter that can capture the short-lived radioactive gas, iodine, that is the indicator of a new emission.

Four of the air filter stations are equipped with a so-called "Radiation Dosimeter" system (RADOS). This system consists of a detector that is positioned over the filter, and which measures the radiation level continuously. This is an old system, which will be replaced by new technology consisting of new detectors with alarm function.

In addition, the Radiation Protection Authority operates a network of automatic measurement stations that monitor radiation levels in the environment. The system consists of 28 stations throughout Norway, and on Svalbard.

Station list

There are three air filter stations in northern Norway and two in southern Norway, making a total of five. The air filter station at Viksjøfjell, close to the Russian border has been in operation since 1995. The station at Svanhovd was established at the same time as the Preparedness Unit in 1993 and the air filter station at Skibotn is the oldest, as it came into operation in 1975. The station at our Østerås headquarters became operational in 1980, and the station at Sola Air Station in Stavanger was established in 2002.



Preparation and analysis

The air capacity of a filter station is around 800 m³/hour so that it has an intake of 120 – 140,000 m³ air in the course of a week. The air filter, after having been in place in the air intake for one week, is compressed and put into a sample box before being measured by a germanium detector. This is a sensitive method of measurement, and it can detect extremely low levels of gamma radiation from many different radioactive substances.

Results

Because of the efficiency of their gathering methods, the filters from these stations can still measure traces of caesium from the Chernobyl accident in 1986. Caesium-137 is the man-made radioactive substance that is most commonly measured in the air filters. It is found in all of the filter stations virtually every week. The concentration is somewhat higher for the stations in southern Norway than those in northern Norway. This is probably because there is generally more caesium from the fallout from the

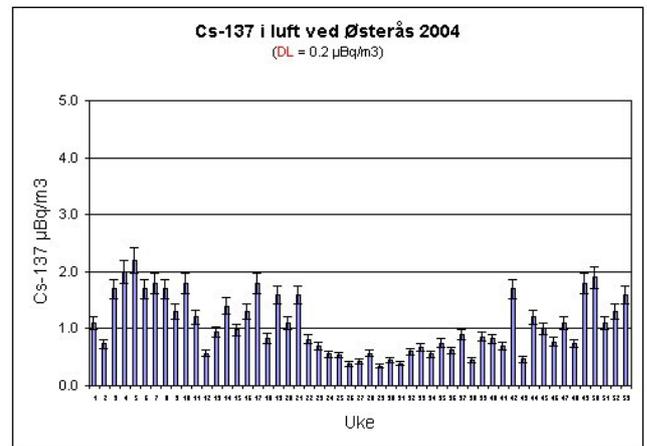
Chernobyl accident in southern Norway than there is in northern Norway, and this can be stirred up again in the air. In addition to radioactive caesium and iodine, there are also a number of naturally-occurring radioactive substances in the air filters.

Cs-137 in air (microBq/m ³)				
2000-06	2000-06	2000-06	2002-06	2002-06
Skibotn Mean value	Viksjøfjell Mean value	Svanhovd Mean value	Østerås Mean value	Sola Mean value
0,3	0,2	0,5	1,4	0,7

Cs-137 in air for the various stations 2000-2006

On three occasions between 2000 and 2006 (see the table above), values that were around 10 times the normal were measured. The reason for this is most probably Chernobyl caesium that was stirred up again, e.g. during a forest fire. These are, however, not values that represent any health hazard.

The values that are measured are also in agreement with other states' measurement from equivalent stations.



Cs-137 in air from the air filter station at Østerås - 2004.

In two cases, radioactivity has been measured from accidents that took place far from the air filters. In 1986, large amounts of radioactive fallout were measured in connection with the Chernobyl accident in the then Soviet Union, and in 1993, the air filter station at Svanhovd captured radioactive substances that proved to have originated from the accident in the reprocessing plant at Tomsk in Russia in April that year.