SELF-MONITORING (OF AIR EMISSIONS, DISCHARGES TO WATER AND WASTE) IN FINLAND

HIETAMÄKI, MARKKU

Environmental Counselor, Ministry of the Environment of Finland, P.O. Box 380, Helsinki, FIN-00131 Finland

SUMMARY

The paper discusses compliance monitoring based on self-monitoring. Self-monitoring is understood in quite different ways by the environmental protection community. The paper explains how this procedure is implemented in Finland. Some ideas are provided on how compliance monitoring based on self-monitoring will be developed in Finland.

Compliance based on self-monitoring can be implemented in different ways and on different levels. Self-monitoring can be an effective tool only if it is taken into consideration from permitting to the enforcement of the permits. There should be cooperation between authorities and operators, but equally important is that the public be given sufficient access to information collected under self-monitoring procedures. The public must be able to see that the authorities and the operators have not made any hidden agreements that might jeopardize environmental protection.

1 INTRODUCTION

Self-monitoring can partly replace emission measurements made by authorities, and as an extra bonus get operators to contribute to the development of environmental protection. The legal system must allow the use of self-monitoring data against the operator, if the operator reports that limit values have been exceeded. To be able to use self-monitoring as a part of compliance monitoring, there should be clearly defined limit values, a detailed emission-monitoring program (including provisions for reporting), and authorities must periodically check the self-monitoring system or use third-party auditors. Furthermore, authorities must have a system where they can compare reports from one installation with the results from others. It is also essential that authorities have the legal right to take actions against those operators who have exceeded limit values. To earn the public trust, much of the self-monitoring procedures, reports and results must be open to the public.

Finland has implemented European Community (EC) legislation such as the Integrated Pollution Prevention and Control Directive (IPPC Directive) and other directives. However, environmental legislation in Finland covers more installations and, in some cases, limit values are lower than those in the corresponding directives. Also, public participation is broader than the Community legislation requires. In order to develop administrative practices, permit writers and inspectors meet regularly. To implement self-monitoring effectively, it is necessary that limit values be clearly written. Detailed monitoring programs are a second condition for implementing self-monitoring. Monitoring programs must include which pollutants are measured, how they are measured, and how the operator can show that the required quality of the measurements has been reached. The required quality of the

continuous emission measurements (CEM) should be expressed as an uncertainty. The operator must report according to an agreed plan. There are periodical reports (monthly, yearly) and reports due to the exceeding of limit values. It is necessary that the authorities check the monitoring system, or a third party, such as the auditor of the quality management system (ISO 9000) or the environmental management system (like ISO 14000 or EMAS), checks the system during the periodical audit. The authorities must have systems that make it possible to compare information from one installation with the information coming from other installations. "Self-monitoring must be seen only as one, hopefully potential, means to achieve good environmental results."

2 GENERAL ASPECTS

If self-monitoring is to work properly, then all the environmental protection procedures have to comply with the following requirements:

- The emission limit values in the permit are clear and technically and economically achievable.
- The permit contains specific requirements for emission monitoring.
- The authorities understand the self-monitoring system in the plants in question.
- Reporting from the operator to the authorities is specified.
- The authorities periodically check the self-monitoring system.
- The authorities have systems that allow them to crosscheck with other similar plants.
- The public has access to the relevant parts of the system and the right to give an opinion.

National practices may or may not have an effect on whether the above-mentioned conditions are understood differently in different parts of the world. For instance, there is no "universal" agreement on the meaning of technically and economically achievable permit conditions. When assessing the usefulness of self-monitoring, one has to look for the results and not to stick to all small bureaucratic details. However, this means that there have to be results on which most of the stakeholders can agree.

3 PERMITS/LIMIT VALUES

Environmental requirements concerning Finland can be set either on the European Community level or on the national level. However, not all requirements can be set on these levels, so some must be determined on the plant level. This gives a certain freedom to the permit-writing authorities, but requires much more skill. On the other hand, the higher the level that the requirements are set, the less the local circumstances can be taken into account.

In Finland, permitting is carried out on three levels: there are three environmental permit authorities, thirteen regional environment centers and about 450 municipalities with local authority. The three permit authorities are responsible for permits to major installations and the regional centers to the medium-sized ones. Local authorities are responsible for the small installations, for example, power plants under 50 MW and small operations for agricultural animals.

The European Community legislation covers the main parts of environmental protection. However, the Finnish legislation covers more installations under the permitting procedures than does the Integrated Pollution Prevention and Control Directive (IPPC Directive). Some limit values are also lower than those in the EC directives.

In the permitting procedure, appli-

cations are open to the public and the authorities can also arrange public hearings. The public and the operator can appeal to regional Administrative Courts if they are not satisfied with the permit and its conditions.

The clear limit values are the first basic building block of self- monitoring, because the operator must know exactly what limit values to monitor. The permit may also order the operator to measure, calculate or estimate the emissions of other pollutants that do not have limit values. In Finland, for instance, we require that the operators of large plants must know the emissions of those pollutants that must be assessed and reported under the requirements of the European Pollutant Emission Register.

4 EMISSION-MONITORING PROGRAM

The second basic building block of self-monitoring is the monitoring program. The program must provide answers to the following questions:

- Which pollutants are measured?
- How are measurements carried out?
- Which procedures are used to show that the required quality expressed as uncertainty is reached?

The environmental permit, or a separate decision (given by a compliance-monitoring authority) concerning emission monitoring, must contain a description of the emission-monitoring system and detailed monitoring requirements. An operator must include a proposal for a monitoring program already in the permit application. However, in many cases concerning large installations, such as pulp and paper mills, the monitoring program is developed during the permitting procedure or the permit contains requirements, which order the operator to present in a given time a detailed monitoring program for the approval of the competent compliance-monitoring authority.

5 AUTHORITIES MUST UNDERSTAND HOW THE SELF-MONITORING RESULTS ARE PRODUCED

In power plants, the processes and emissions are straightforward when it comes to emission monitoring. Low concentrations may, however, bring additional technical problems. However, it is more difficult to understand process industries, such as the pulp industry, where there are several parallel or connected processes. In these installations, self-monitoring systems (including measurements and calculation of results) are rather difficult to understand. The environmental administration organizes seminars where inspectors can discuss and exchange information on measurements and procedures to calculate emissions. In the future, we will encourage operators to include emission monitoring as a part of their quality control and environmental management systems (e.g. ISO 9000, ISO 14000 and EMAS). This way we will get independent third party auditing. If measurements are not included in those systems, then independent auditing by a consultant approved by the authorities may be required.

6 REPORTING FROM THE OPERATOR TO THE AUTHORITIES IS SPECIFIED

The monitoring program includes the following reports:

- Immediate reports if limit values are exceeded.
- Monthly reporting (only for large installations).
- Annual reporting.

Reporting can be done in several ways. Some operators must report by phone if limit values are seriously exceeded. Monthly and annual reports can be done either in a written or electronic format.

An installation must report its production data, fuels, emissions to air, wastewater discharges and wastes. The environmental administration has also started to collect information on the overall energy usage of an installation. Written reporting forms are available on the environmental administration's website or the authorities send them to the operator. Small and some medium-sized installations use this option. This results in a lot of 'paper' work both in the installations and in the environmental administration. That is why electronic reporting has been developed.

The first level of electronic reporting utilizes electronic forms. An operator has a user name and password. Electronic forms are available on the environmental administration's website. The operator must feed in his/her data and send it (via email) to the environmental authorities. Once the authorities receive a report, an inspector or inspectors (if more than one monitors the same installation) are informed that a new report has arrived. An inspector checks the report, takes the necessary actions (like asking for more information or making a site inspection), and after approval sends the data to the database.

The newest procedure in Finland is that the authorities define the interface between the operator and the authorities, and state which kind of data transfer is allowed. In this way, data production and transfer can be made more effective. In other words, the operator must rationalize his/her data production in the installation so that, as much as is possible, data production is automated and the authorities must adapt their compliance monitoring so that the procedures are effective and not tied any more to the 'paper age'. More and more emphasis must be put on the first building blocks of self-monitoring: there must be clearly defined limit values and parameters to be monitored and a specific monitoring program. Otherwise the operator's systems are only 'black boxes' that produce data but nobody knows what the data means.

The Finnish environmental administration has developed such a system with one Finnish internationally operating pulp and Paper Company. The test operation started in spring 2002. Three different types of installations are involved and from the authorities side, one regional environment center. The system makes it possible to transfer large amounts of data, including real compliance-monitoring data, for instance, not only emission data but also information on how long a period a single emission-monitoring device has been out of operation. In the installation this calls for a rigid quality system for all data collection and management.

This system makes it possible to transfer a lot of data. It is thus very easy to overload the authorities with data, resulting in a great danger that the data systems of the authorities turn into 'data graveyards' and the inspectors do not concentrate on the real compliance-monitoring data.

7 THE AUTHORITIES MUST PERIODICALLY CHECK THE SELF-MONITORING SYSTEM

The authorities have the main responsibility for supervising compliance with the permit conditions. In large and complex installations monitoring programs are quite complicated. Although a monitoring program may or may not contain self-diagnostic components, it is important that the authorities periodically inspect the monitoring system or a part of it. It could be of great help if the operator has included the monitoring program as a part of the quality management system or the environmental management system, including, for instance, the uncertainty assessment (with requirements set by the authority), in those systems. In this way the environmental

authorities get an independent third-party audit. We recommend this kind of procedure in Finland. In Finland the authorities' inspection reports must be stored in the VAHTI system. It is also a good practice that the authorities are present when an operator carries out parallel measurements of continuous measurements systems.

8 THE AUTHORITIES HAVE SYSTEMS THAT ALLOW THEM TO CROSS-CHECK WITH OTHER SIMILAR PLANTS

However carefully the authorities have set emission limit values and approved the monitoring program, it is important that they can compare data from one installation with data from others. In Finland, all permit-writing authorities and compliance-monitoring authorities are connected to a single nation wide system called VAHTI, which enables them to access relevant data such as environmental permits and reported emissions, waste and inspection reports. The inspectors who monitor a specific installation have a greater right to access files such as letters sent to the operator and those parts of the inspection reports that deal with business secrets. In 2002 about 350 inspectors will use the system and there are about 400 additional users who can access the reporting part of the system (excluding the input part).

During 2002-2003 a new version of VAHTI will be in use and then also the municipalities (about 450) will be able to use it.

9 PEOPLE HAVE ACCESS TO RELEVANT PARTS OF THE SYSTEM AND THE RIGHT TO EXPRESS AN OPINION

The trust of the public for these kinds of procedures must be earned. Emission data and information on the relevant parts of site inspections must be publicly available. The Finnish environmental legislation has, since the beginning, allowed broad public participation and also access to justice. Lately, these have even been expanded.

10 CONCLUSIONS

Compliance monitoring based on self-monitoring can be implemented in different ways or on different levels. Self-monitoring can be an effective tool only if it is taken into consideration from permitting to the enforcement of the permits. There should be good cooperation between authorities and operators, but equally important is that the public is given sufficient access to information collected under self-monitoring procedures. The public must be able to see that the authorities and the operators have not made any hidden agreements that might jeopardize environmental protection.