Changing the Environmental Inspection Style towards supporting Continuos Environmental Improvement and Better Integration with Environmental Permits for Companies

JENS PETER MORTENSEN & POUL KRAGH

Jens Peter Mortensen
Rovesta Miljø, Betonvej 12, DK-4000 Roskilde, Denmark.
Tel: +45 4677 3798 Fax: +45 4677 3795
E-mail: jpm@rovesta.dk

Poul Kragh
Department of Environment, Technology and Social Studies
Roskilde University, PO Box 260, DK-4000 Roskilde, Denmark
Tel: +45 4674 2686 Fax: +45 4674 3041
E-mail: pok@teksam.ruc.dk

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Abstract:
One of the elements behind the EU-directive on Integrated Pollution Prevention and Control is a link between environmental improvement and the environmental permitting system, by letting emission and performance standards and requirements to companies be based on information on Best Available Technology, and by improving the monitoring and inspection system accordingly.

This paper is focussing on, in which way this information in a shared responsible approach can be used by companies and environmental authorities in their dialogue during inspection procedures as part of the activities between renewals of the environmental permits.

In the paper it is argued that an important meeting place for a dialogue between companies and authorities is Site Visits as part of the inspection procedures. A good and well prepared dialogue at that time can pave the road for a genuine activity by industry in their environmental management and improvement activities.

Based on experiences from Denmark on dialogue based environmental inspection styles, it is suggested to continue and improve such dialogue oriented and systematic based inspection procedures, hence supporting the companies' activities on continuos environmental improvement. Furthermore, it is suggested to develop training courses for environmental inspectors to shape the tool box and qualifications needed in that respect.

1. Introduction

Knowledge and information today, based e.g. on the physical environment and insights into environmental impacts from technology have made it possible to develop extended descriptions on environmental standards, best available technology and good environmental practice. This gives a good background for more integrated environmental permissions. E.g., one of the elements behind the EU-directive on Integrated Pollution Prevention and Control (IPPC) is a link between environmental improvement and the environmental permitting system, by letting emission and performance standards and requirements to companies be based on information on cleaner technology and Best Available Technology (BAT), and by improving the monitoring and inspection system accordingly (IPPC 1996). We see two questions as interesting in this context:

- in which way is this kind of information used by industries in their own activities regarding inspection and continuos environmental improvement
- in which way is this kind of information used by environmental authorities in their concrete environmental administration and inspection style towards companies while hereby supporting innovation on better environmental performance.

Although a push for environmental improvements is taken care of by environmental regulation via regularly reassessment of the environmental permits incorporating the principle of Best Available Technology, the environmental standards and monitoring procedures laid down and the environmental inspections carried out, are not always supporting such an aim. Standard setting and monitoring are quite often referring to static environmental qualities or performance of the pre-treatment plant, while neglecting the performance of the production processes (Kragh and Mortensen 2001). Inspections are often focussed on controlling if the standards are met, and in Denmark from time to time at the municipal level shaped by decided themes for the year, it could be storage practices for hazardous waste or air pollution from certain substances.

However, the potentials for using the environmental inspections and especially well prepared site visits at the company to encourage a dialogue between authorities and companies on environmental improvement is seldom neither discovered nor explored. During several such dialogue meetings companies would constantly be inspired to reflect upon possible concrete, technological improvements, good practices and better environmental performance together with economic benefits.

A later dialogue between companies and environmental authorities on a renewal of the environmental permit would consequently also being improved. A part of this last activity is certainly supported by general knowledge via BAT-notes, national guidelines, and law based emission level values. However, important information derived from well prepared inspections based on systematic insights into the production flow and mass balance of the company in question, could make it possible to further an innovative attitude at the company, leading to more responsible and economy balanced decisions, better integrated permissions and increased environmental performance.

Based on an understanding of environmental inspection styles in Denmark at municipal level, and some results from more dialogue based inspection styles, we will look into the possibilities of letting systematical, environmental inspection procedures support the companies' activities on BAT and continuos environmental improvement.

2. Environmental Permissions, Monitoring and Inspection

Today the environmental permits for companies in Denmark comprise in principle information from the Ministry of Environment and Energy about the possibilities of using cleaner production technologies (Danish Ministry of Environment and Energy 1999; Moe 1995).

However, as pointed out by Mortensen, who carried out analysis of the environmental permits for Danish electroplating companies and of the specific legislation connected to this branch, the shift in Danish regulation towards implementing a cleaner technology and life cycle approach has only to some extent influenced the environmental standard setting (Mortensen 1998).

All in all, the challenge is to take the environmental permitting process beyond the level of purely administrative decisions so that the granting of permits can contribute to continuous innovation, improved environmental performance and support the idea of shared responsibility. The latest regulation within the EU taking some notice to several of these elements is IPPC.

IPPC is a part of the EU environmental regulation, and puts integration and prevention in forefront. Information and control systems are important elements in this regulation as well. A core element is the environmental permission given to IPPC companies, allowing them to produce under specific conditions with certain environmental impact or performance. The environmental permission have to be based on two approaches, the Environmental Quality Approach and a technological based approach, Best Available Technology, BAT.

Especially the BAT-approach as backbone in environmental permissions gives the companies, the authorities and other parties rich opportunities to a dialogue, sometimes leading to gradually tightening BAT-based Emission Level Values from one permission to the following, and giving room for the companies to suggest Emission Level Values tightened in line with their overall investment plans. EU BAT-notes and national guidelines etc. offer alongside case to case experiences valuable information sources in that respect.

Focussing on the relationship between environmental permissions, standard setting, monitoring and inspection, the IPPC directive gives in brief following relevant information:

- Environmental quality standard shall mean the set of requirements which must be fulfilled at a given time by a given environment or part of such
- Emission limit values for substances shall normally apply at the point, where the emissions leave the installation, and be based on the best available techniques, without prescribing the use of any techniques or specific technology
- Techniques shall include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned
- The permit shall contain suitable release monitoring requirements, specifying measurement methodology and frequency, evaluation procedure and an obligation to supply the competent authority with data required for checking compliance with the permit.
- The permit shall contain measures relating to conditions other than normal operating conditions
- Where an environmental quality standard requires stricter conditions than those achievable by the use of the best available techniques, additional measures shall in particular be required in the permit

- Authorities must take necessary measures to ensure that the conditions of the permit are complied with, that the operator of the installation informs the competent authority of the results of the monitoring of the releases, and that operators of installations afford the representatives of the competent authority all necessary assistance to enable them to carry out any inspections within the installation, to take samples and to gather information necessary for the performance of their duties.

Concerning monitoring, an EU reference document on monitoring has been written in the framework of the IPPC directive (EC 1999). The document concentrates on monitoring and measurement, and describes in details good quality within this area, stressing sampling practices, data analysis, difference between quantitative and qualitative assessments etc.

In recent years industrial process operators have been increasingly required by a condition of permit to carry out monitoring by themselves or by contract skilled laboratory and report their results to the regulatory authorities. This is known as self-monitoring. In a self-monitoring scheme, the operator gives a proposal for the monitoring programme - a monitoring plan - to be approved by the authority. The authority can, if needed make alterations to the programme. The operator is required to comply with the monitoring programme. The plants carry out the measurements themselves or use a consultant. Self-monitoring normally provides more information than may be obtained by periodic inspections and monitoring by the regulator. Non-compliance becomes known to the permit holder first who should react accordingly and inform in time the authorities (EC 1999). Regarding periodic inspections, the report suggest following:

"Inspections. During unannounced inspections the authorities check different parts of the self-monitoring system to ensure that monitoring is carried out in an appropriate way. Inspections are also initiated in cases of process failures or other temporary malfunctioning, which may affect the environment or in case of complaints" (EC 1999).

Even though there is chapters on monitoring within other BAT reference documents for selected industries, an overall impression is that the role of periodic inspection is mostly defined by checking the monitoring or self-monitoring system or in case of complaints from neighbours or others to take due action.

The impression remains that once an environmental permission is given, and the standards decided upon, the role of inspection is mainly securing a compliance with regulations via checking the monitoring and the results from these. As already mentioned above, the emission limit standards in the environmental permissions should be based on a combination of BAT-standards and EQ-standards.

However, once a decision is made regarding the emission limit values and the environmental permit is given, there is no automatic impetus for the company to improve the environmental performance before a renewal of the permission. The potential in actually using the periodic inspection to more than checking for compliance or non-compliance is often neglected.

Nevertheless, experiences show that the potential exist, and that periodic inspections combined with well prepared site visits can actually catch some unforeseen possibilities of environmental as well as economical gains.

3. Experiences with Dialogue Based Periodic Inspections

In different training courses carried out by Rovesta Environment in Denmark - a cooperative company with several municipalities as partners, several experiences in integrating a cleaner technology approach with the periodic inspections have been gained.

One of the activities is training environmental inspectors in making integrated environmental permits, and to carry out periodic inspections. An important part of the training sessions include case study work - based on real life and existing companies.

The historical background for these activities are in brief following: Even though it is often told that the Danish permit and inspection system was established in 1974 the local authorities were not until the late eighties established with a prober number of qualified people to actual carry out the inspections and make environmental permits on a paper longer than one page.

As for the integrated permit system in those days, it was a system based on an environmental quality system divided into different recipients. The sustainability of the recipient was stated on the behalf of what the society wanted in the exploitation of the recipient. Should it be salmon waters or a waste stream. Then the demands were calculated backwards the mass streams to the outlets from the companies.

Today only Poland and Denmark still have this original system, although in different modified versions. The Netherlands have tried to copy the Danish modified system but even though they have integrated the standards in one paper, they still hang on to elements of their own previous system with standards based on Best Available Technology for each type of waste stream, and different from sector to sector.

In the order to train the Danish environmental inspectors to change their attitudes towards cleaner production and away from the earlier dominant recipient orientated legislation, Rovesta Environment has introduced several training courses. The main example used in these courses has been an example of a company in Gladsaxe Industrial Park; Beck & Jørgensen Ltd., which produces paint for buildings.

The training sessions consist first of all of a presentation of how to make flow sheets of a company. Instead of using sheets of existing legislation and recommendations, the inspection is carried out in a way, so it is possible to register what is going on in the company. This is a quite fundamental and basic registration and seems obvious. However, the usual approach among the inspectors attending the courses is that they have to check that legislative rules and decisions are applied and complied with by the companies. Consequently, the inspectors usual start with the legislation, and then they do not see what kind of real processes actually are

taken place at the company.

Going through slides from Beck & Jørgensen Ltd., and at the same time showing a map of the location of buildings and machinery, it is possible to make a very good pedagogic introduction to an inspection approach and practice, bringing up to twenty inspectors together at the same inspection. It is not possible to bring twenty inspectors to one company at the same time because the noise and activities at the company would disturb the common impressions. Using the slides the inspectors at the course will all have the same experiences.

The first results of these exercises is that the inspectors all are looking for a whole range of minor details, despite the fact that they are told and presented for the concept of making a flow sheet based on input/output analysis. It seems extremely difficult for many inspectors to focus on the mass stream, although some manage. The idea behind the exercises, and what also was the experience from the real life inspection of the company, was that the focus on the mass stream made it very important for the company as well to focus on all these details. All these minor violations of the legislation was at the same time losses of raw materials and made the economy of the company unsound.

For a period, such an inspection procedure was actually carried out at the company now used as case in the courses. There was at the same time established a good dialogue atmosphere between the environmental inspection section at the competent authority and the responsible managers at the company. This shared responsible attitude towards improving economy and environmental performance at the same time gave following results - some of them albeit not alone pertained to the dialogue, though.

In a couple of years the company introduced:

- Autonomy working groups (two groups of six or seven workers) in the production which met every Friday with the crew from the stocks to plan the production of the coming week
- Reduction of the waste percent from two and a half to less than a half, which means a eighty percent reduction of the waste stream
- The company had approximately and due to waste minimization earned eight million Danish Crones per year. This is only stated in the bottom line, though, and it can not be uncovered where the profit originated from in the normal accounts
- The extra profit made it possible to by new production equipment and machineries.
- These investments halved the waste percent to a quarter which means that the total reduction could live up to a factor ten ambition.

The conclusion of the real life experiences as well as from the training sessions was that the environmental inspectors could see a promising perspective in changing their regulation strategy from a base solely in a legislative approach to a base in a dialogue based and input/output mass balance based method, with the objective to point out the win-win and cleaner production potentials.

For this last purpose - the ability to point out win-win and cleaner production potentials - the

inspectors at the course were presented to a new kind of inspection sheet, where they had to integrate the earlier produced flow sheet.

This inspection sheet is made up by a table with rows filled with the different sub processes in the production process, and the columns filled with use of resources, waste, environmental discharges etc. The sheet includes quantitative descriptions using volume, amount, emissions etc., as well as qualitative descriptions on products, types of emissions, flow illustrations etc.

The next step is to make two copies of the inspection sheet; one for the company and one for the inspector. The duty of the company is to mark where the company has an economic interest of reducing the costs with an O. The duty of the inspector is to mark where the inspector assesses the company to have its biggest environmental problems, with a X. After these individual duties the two copies of the inspection sheets are compared. Where the joint squares for O and X are, the common interest field between economy and environment is located.

This is a simple method to point at the prime objects of the dialogue between a company and an inspector. It makes it possible to take into consideration the economic rhythm of the company so that investments and environmental aims can be coordinated. By focussing on the win-win potentials, it becomes possible for the company at the one hand to accumulate money for later environmental investments not so profitable in a short term perspective and at the other hand limit the needs of investing in big treatment facilities etc.

4. Concluding remarks

Environmental inspections carried out by authorities in cooperation with companies form an interesting ground for an enhanced and concrete dialogue between companies and environmental authorities, possibly leading to uncovering some of the potentials for increased environmental performance and continuos improvement.

Important information and knowledge derived from well prepared inspections based on systematic insights into the production flow and mass balance of the company in question, can make it possible to further an innovative attitude at the company, leading to more responsible and economy balanced decisions, better integrated permissions and increased environmental performance.

One of the prerequisites for using such information from inspections is developing and conducting training courses for environmental inspectors and environmental managers with a focus on tools to use in the dialogue. Further developing of useful and tested tools in that respect is important as well.

Another prerequisite is that the roles of the inspectors and company managers are changed. Valuable information from BAT reference notes, national guidelines and standards on emission level values will definitely still be important as a backbone of knowledge to refer to,

but there exist some opportunities for making considerable progress on the local level as well - without having the starting point defined by legislation alone. This possibility is in hand of the environmental inspectors and company managers via a shared environmental responsibility, eventually leading to better knowledge background for environmental permits as well.

5. References

Danish Ministry of Environment and Energy 1999: *The Danish Nature and Environment Policy*. Copenhagen.

European Commission 1999: *Integrated pollution prevention and control - draft reference document on monitoring*, European IPPC Bureau. Seville. January 1999.

IPPC 1996: Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control. Official Journal L 257

Kragh, Poul and Jens Peter Mortensen 2001: *On-line Measuring as a Tool to Integrate Environmental Permits and Performance Indicators - a Case from Electroplating Industry*. A paper presented at the 7th European Roundtable on Cleaner Production. Lund 2001.

Moe, Mogens 1995: *Environmental Administration in Denmark*. [Environment News No. 17]. Ministry of Environment end Energy. Copenhagen.

Mortensen, Jens Peter 1998: *Miljøregulering af galvanoindustrien - en undersøgelse af regelgrundlag for implementering i miljøgodkendelser udført vinteren 1997 og 1998.* Arbejdspapir nr. 21/98. Department of Environment, Technology and Social Studies, Roskilde University. Roskilde 1998.