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IPPC, BAT, and voluntary agreements

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Abstract

It is argued that the current discussion on Best Available Techniques (BAT) may not foster true sustainable production. Other instruments from the Integrated Pollution Prevention and Control (IPPC) Directive, such as reporting, may be more effective in this respect. The Irish Integrated Pollution Control (IPC) system has operated for more than 5 years. Its emphasis is on prevention, environmental management systems (EMS), and reporting. Initial results are encouraging. In this paper, the system is used as a case study to illustrate the potential power of the Directive.

EMS, if solely voluntary, may be less than effective. It is thus argued that the regulator can become involved in the process — so that EMS can be ‘guided’. © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

It has been widely acknowledged that legislation is the main driving force for environmental improvement [1–3]. However, the type of legislation and regulation is extremely important.

While emission limit values are necessary in certain instances, legislation based solely on this concept is unlikely to favour sustainable production¹ in the EU. It is thus prudent to examine different approaches to regulation and enforcement.

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¹ Sustainable production is taken, herein, to mean production which is consistent with the concept of sustainable development. The concept has developed in recent years due to the activities of Professor Hans Schnitzer of the Technical University of Graz (among others). *Sustainable* production is a wider and more holistic notion than *cleaner production*, but shares many common components.

At the same time, there has been a tendency in recent years to rely on free market activities and voluntary agreements, whereby industry can ‘regulate’ itself. Many of these are based on environmental management systems (EMS), such as ISO 14001. By common consent, such initiatives are also not working [3].²

One attempt to address these problems has been the development of the Integrated Pollution Prevention and Control (IPPC) Directive [4]. Council Directive 96/61/EC of September 24th, 1996 sets down requirements for the establishment of legislation leading to Integrated Pollution Prevention and Control licensing within the member States.

The Council recognised that while air pollution and water pollution are dealt with under Directives 84/360/EEC and 76/464/EEC, respectively, no comparable legislation exists aimed at preventing or minimising emissions into soil. Furthermore, the Commission recognised the inadequacy of single medium permitting.

The main points of Directive 96/61/EC are prevention, multi-media licensing, reporting, freedom of access of information, the use of Best Available Techniques (BAT), and the setting of Emission Limit Values (ELVs). The relevant sections of the Directive are given in Appendix A. The extracts from Directive 96/61/EC have been chosen specifically from the text. They serve to illustrate certain key points. These are directly relevant to the promotion of *Sustainable Production Activities*.

In summary, the Directive gives a legislative framework for certain important instruments. These are:

1. Prevention
2. Reporting
3. ELVs
4. BAT
5. Accessibility of information to public
6. Description of Activities, materials, emissions, and proposed prevention measures
7. Derogations/Variations

Within the above framework lies the possibility of legislation and regulation to ensure that companies move towards sustainable production. However, it is also possible that only a reactive response from industry is forthcoming, if all the opportunities inherent in the Directive are not grasped. For example, simple publishing of ELVs and an inflexible attitude towards their attainment will almost certainly lead to end-of-pipe solutions.

There is currently considerable effort going into the derivation and eventual publication of BATs under the Directive. In the main, the ensuing documents will be the result of long deliberations involving expert groups comprising regulators, industrial representatives, technical experts, etc. It would be a major failing if these BATs became

² Quote from Jeff Smoller of Wisconsin’s Department of natural resources: “ISO 14001 of itself is not adequate.” ENDS Report 291, April 1999, p. 11.

technology abatement, and end-of-pipe focused, or if they concentrated solely or mainly on a type of United States MACT³ system. Potentially, the BAT process may represent a kind of ‘negotiated’ voluntary agreement with the industry. While such a concept is not wrong in itself, there is a danger of becoming locked into the status quo. It would be preferable if the BAT approach was aimed at stimulating innovation, and that ‘negotiations’ were on the basis of improvement programmes. Examination of the current state of the EU BAT proposals indicates some worrying trends. For example, the Cement and Lime draft BREF [5] quotes Article 2(11) of the 1996 Directive, which among other things defines “... techniques for providing in principle the principle of emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions...” The BREF then goes on to describe, among other things, a number of abatement technologies. Whilst it is important that the existence of such technologies is known to regulators, etc., it is not in keeping with the principles of sustainable development that they should be the focus of documents designed as back-ups to the legislative process. It may be that the word ‘prevent’ in Article 2(11) implies the prevention or limitation of emissions. It certainly seems to. This would appear to be in conflict with paragraph 13 of the preamble of the Directive which talks about “... preventive or pollution control measures...”, thereby appearing to (correctly) distinguish between prevention and abatement.

In any event, it is a number of the tenets, other than BAT, which can form the bedrock for fostering a proactive and innovative industrial response to environmental degradation. In particular, the clearly enunciated notions of ‘prevention’, ‘reporting’, ‘accessibility of information to the public’, and potentially ‘derogations’, can if properly applied, lead to altered industrial thinking.

2. Case study — Irish IPC licensing

The IPPC Directive was anticipated in Irish law under the Environmental Protection Agency Act, 1992 which in PART IV (Articles 82-99) established Integrated Pollution Control licensing [6]. Apart from minor harmonisation aspects (such as alignment of schedules and activities), the Act covers all articles of Council Directive 96/61/EC and sets the framework for additional regulations.

Since the Act is now 6 years old, the older term BATNEEC (Best Available Technology Not Entailing Excessive Cost) is used instead of BAT. However, the two terms clearly have the same meaning within the context of Irish law. This can be seen from Box 1, which contains extracts from the BATNEEC Guidance Note indicating the emphasis on *prevention*.

³ MACT: Maximum Achievable Control Technology is a system, which bases expected standards on the performance of the top achievers in a sector. See <http://www.epa.gov/ncepihom/Catalog/EPA453R94026.html> and <http://www.epa.gov/ncepihom/Catalog/EPA450392007B.html>.

The preceding paragraphs illustrate some aspect of the framework of the law in Ireland. It is not possible to see from these aspects how that law might give rise to Statutory Instruments, or how implementation and regulation of the licensing system can be used to foster sustainable production. This can best be illustrated with regard to examining the actual licence. The basis of this licensing system is in the law. The key points are:

- BATNEEC
- Reporting
- Sustainable development, processes and operations

In order to implement a regime whereby sustainable production activities become the norm, it has been necessary to carefully formulate and regulate a licensing system using the full scope of the environmental legislation outlined above.

Relevant Extracts from the Guidance Note [7]

BATNEEC Guidance Notes — section 2

“BATNEEC . . . Technology itself is taken as the techniques and the use of techniques, including training and maintenance, etc . . .”

Environmental Protection Agency Act

Article 5 sub-section 1:

“ . . . a reference in this Act to the use of best available technology not entailing excessive cost [BATNEEC] to prevent, or eliminate, or where that is not practicable, to limit, abate, or reduce an emission from an activity, shall be construed as meaning the provision and proper maintenance, use, operation and supervision of facilities which, having regard to all the circumstances, are the most suitable for the purposes.”

sub-section 3: subparagraph (a)

“The Agency may, from time to time as occasion demands, specify the best available technology not entailing excessive cost for preventing, limiting, abating, or reducing such emissions as may be specified either from an activity of a particular class or description, and regard shall be had . . . to any such descriptions”

Article 52 sub-section 2: subparagraph (b)

“ . . . In carrying out its functions, the Agency shall . . . have regard to the need for a high standard of environmental protection and the need to promote sustainable and environmentally sound development, processes or operations”

Article 83 sub-section 3: subparagraph (f)

“ . . . The Agency shall not grant a licence or revised licence for an activity unless it is satisfied that . . . the best available technology not entailing excessive cost will be used to prevent or eliminate or, where that is not practicable, to limit, abate or reduce an emission from the activity”

Article 84 sub-section 1: subparagraph (i)

“ . . . conditions attached to a licence . . . may . . . require . . . the keeping of records, and the furnishing of information to the Agency or to any other person or body who may be specified . . .”

BOX 1: Extracts from the BATNEEC Guidance note emphasising Prevention.

2.1. Licensing

The Irish licensing system has three main components. These are

- The BATNEEC Guidance Note
- The IPC Licence
- The Annual Environmental Report (AER)

These are not implied in any order of preference. There are, of course, other aspects to the licensing procedure, but the three listed are of prime importance if sustainable production is to be achieved.

The crucial point is the regulation. Legislation in itself provides the framework. The means of regulation determines the exact effect on industry, in terms of response.

It is thus instructive to examine the Irish regulatory regime. To this end, the three key points outlined above will now be detailed.

2.1.1. The BATNEEC guidance note

In order that companies can fully understand their obligations, the Irish Environmental Protection Agency (EPA) provides a BATNEEC Guidance note for each sector. Companies are required to achieve BATNEEC. Those companies outside BATNEEC in certain respects are given a timeframe for compliance. They must include the item in their Environmental Management Programme (EMP), and must agree to a specific programme of improvements with the agency. This gives the EPA an opportunity to push for a clean technology solution.

The Guidance Note contains, not only ELVs that must be attained, but also gives general rules for environmental programmes, as well as alternatives for achieving BATNEEC. Box 2 gives extracts from the BATNEEC Guidance Note for the Chemical sector which serve to illustrate its function.

Section 2:

“In the identification of BATNEEC, emphasis is placed on pollution prevention techniques, including cleaner technologies and waste minimisation, rather than end-of-pipe treatment... Measures such as in-plant changes, raw material substitution, process recycling and improved material handling and storage practices, may also be employed to effect reductions in emissions. As well as providing for the installation of equipment and the operation of procedures for the reduction of possible emissions, BATNEEC will also necessitate the adoption of an on-going programme of environmental management and control, which will focus on continuing improvements aimed at prevention, elimination and/or progressive reduction of emissions...”

Section 4:

“... The approach to be used in selecting BATNEEC is based on the following hierarchy:

- Process design/redesign changes to *eliminate* emissions and wastes that might pose environmental problems.

- *Substitution* of materials/solvents etc. by environmentally less harmful ones.
- Demonstration of waste *minimisation* by means of process control, inventory control and end-of-pipe technologies etc. . . .” (emphasis added)

Box 2: Extracts from the BATNEEC Guidance Note for the Chemical Sector.

Various possible technologies are usually listed in the document. As an example, the following are taken from 52 technologies listed in the Guidance note for the Chemical sector:

- Improved phase separation.
- Countercurrent product rinsing.
- Minimisation of tank filling losses by, e.g., vapour return systems.
- Closed transfer systems from reactors to centrifuges to filters to dryers.
- Separate organic and aqueous phase drains
- Refrigerated condensers on reactor overheads
- Optimisation of condensation capacity after distillation resulting in at least 95% efficiency for all solvents in multi-purpose plants and at least 99% for dedicated plants.

The type of control exercised by the EPA can clearly be inferred from this information. The following (fictitious) examples illustrate how the system might work.

Example 1 — BATNEEC: A company exceeds the ELV for emissions of a VOC from a distillation column. Simply routing the vapours to a fume incinerator to achieve ELV would be considered as not meeting BATNEEC. The company must first ensure that condensation efficiency is > 99% (for a dedicated plant). If not the plant must be upgraded. Possible methods might include use of a refrigerant as the cooling medium to the condenser.

Clearly, an end-of-pipe solution can be avoided.

However, it is not merely the appliance of BATNEEC which results in success. It is the EMP which is the driving force.

Example 2 — EMP: In the above example, supposing the company finds that its condenser efficiency is not 99%. The company can devise a programme of improvements. This might involve trials, process modification, condenser redesign, etc. The programme must be agreed with the licensing inspector, and a timetable of work set and adhered to.

Under these conditions, the Agency may give a derogation/variance on achieving the ELV, since the successful solution will be a true cleaner production option, rather than an end-of-pipe one.

2.1.2. The IPC licence

All Irish IPC Licences take the same form. The following is a standard contents page. This serves to illustrate the general form of the licence.

Condition 1	Scope
Condition 2	Management of the Activity
Condition 3	Interpretation
Condition 4	Notification

Condition 5	Emissions to Atmosphere
Condition 6	Emissions to Water
Condition 7	Waste Management
Condition 8	Noise
Condition 9	Non-Process Water
Condition 10	Monitoring
Condition 11	Recording and Reporting to Agency
Condition 12	Emergency Response
Condition 13	Financial Provisions
<i>Schedule 1(i)</i>	Emissions to Atmosphere
<i>Schedule 1(ii)</i>	Monitoring of Emissions to Atmosphere
<i>Schedule 2(i)</i>	Emissions to Water
<i>Schedule 2(ii)</i>	Monitoring of Emissions to Water
<i>Schedule 3(i)</i>	Hazardous Wastes for Disposal/Recovery
<i>Schedule 3(ii)</i>	Other Wastes for Disposal/Recovery
<i>Schedule 4(i)</i>	Groundwater Monitoring
<i>Schedule 5(i)</i>	Recording and Reporting to the Agency

The main areas with regard to sustainable production are:

- (a) Condition 2: management of the activity
- (b) Schedule 5(i): recording and reporting to the Agency

These are discussed below.

2.1.2.1. Condition 2: management of the activity. The EPA requires companies to adopt an EMS. This is quite unusual in environmental licensing. The precise requirements can be seen with respect to Section 2 of all licences:

2.1 The licensee shall establish and maintain an Environmental Management System (EMS) which shall fulfil the requirements of this licence. The EMS shall assess all operations and review all practicable options for the use of cleaner technology, cleaner production and the reduction and minimisation of waste, and shall include as a minimum those elements specified in the Conditions 2.2 to 2.9 below:

2.2 A schedule of Objectives and Targets

2.2.1 The licensee shall prepare a schedule of Objectives and Targets. The schedule shall include time frames for the achievement of set targets. The schedule shall address a five year period as a minimum. The schedule shall be prepared to the satisfaction of the Agency and shall be submitted to the Agency within 4 months of date of grant of this licence. The schedule shall be reviewed annually and amendments thereto notified to the Agency for agreement as part of the AER (Condition 2.9).

2.3 Environmental Management Programme (EMP)

2.3.1 The licensee shall, not later than 6 months from the date of grant of this licence, establish and maintain an Environmental Management Programme, including a time schedule, for achieving objectives and targets. The EMP shall thereafter, form part of

the AER and shall be agreed with the Agency prior to implementation. It shall include: (i) designation of responsibility for targets; (ii) the means by which they may be achieved; (iii) the time within which they may be achieved.

2.3.2 A report on the programme, including the success in meeting agreed targets, shall be prepared and submitted to the Agency as part of the AER. Such reports shall be retained on-site for a period of not less than 7 years and shall be available for inspection by authorised persons of the Agency.

2.4 Pollution Emission Register (PER)

2.4.1 The substances to be included in the PER shall be agreed with the Agency each year by reference to the list specified in the AER guidance note. The PER shall be prepared in accordance with any relevant guidelines issued by the Agency and shall be submitted as part of the AER.

2.4.2 The licensee shall, not later than 6 months from the date of grant of this licence and thereafter as part of the AER, agree with the Agency the list of substances to be included in the PER, and the methodology to be used in their determination.

2.5 Documentation

2.5.1 The licensee shall establish and maintain an environmental management documentation system which shall be to the satisfaction of the Agency.

2.5.2 The licensee shall issue a copy of this licence to all relevant personnel whose duties relate to any condition of this licence.

2.6 Corrective Action

2.6.1 The licensee shall establish procedures to ensure that corrective action is taken should the specified requirements of this licence not be fulfilled. The responsibility and authority for initiating further investigation and corrective action in the event of a reported non-conformity with this licence shall be defined.

2.7 Awareness and Training

2.7.1 The licensee shall establish and maintain procedures for identifying training needs, and for providing appropriate training, for all personnel whose work can have a significant effect upon the environment. Appropriate records of training shall be maintained.

2.7.2 Personnel performing specifically assigned tasks shall be qualified on the basis of appropriate education, training and/or experience, as required.

2.8 Responsibilities

2.8.1 The licensee shall ensure that a person in charge, as defined under the terms of the Environmental Protection Agency Act, 1992 shall be available on-site at all times when the activity is in operation. The person in charge shall also be available to meet with authorised persons of the Agency at all reasonable times.

2.9 Communications

2.9.1 The licensee shall put in place a programme to ensure that members of the public can obtain information concerning the environmental performance of the licensee. This programme shall be submitted for agreement to the Agency within 6 months of the date of grant of this licence.

2.9.2 The licensee shall submit to the Agency, 18 months from the date of grant of this licence, and each calendar year thereafter, an AER which shall be to the satisfaction of the Agency. This report shall include as a minimum the information specified in

Schedule 6.1 and shall be prepared in accordance with any relevant guidelines issued by the Agency.

The Environmental Agency regards condition 2 as perhaps the most important of all conditions. It is through this mechanism that they foster cleaner production and sustainable production. It may be argued that an EMS is voluntary. However, the role of a mandatory system has proved vital to the success of the Irish system.

2.1.2.2. Schedule 5(i): recording and reporting to the agency. The reporting requirements are as important as the EMS is. A typical sample of reporting is shown in Box 3 (extracted from the licence of a textiles company).

2.1.3. The Annual Environmental Report (AER)

An IPC licence sets down requirements for reporting back to the Agency on all the areas of environmental impact associated with a facility. The reports play an important role in the development of an environmental strategy in the industries involved as they necessitate the examination of issues in a structured, logical manner. The reporting requirements are demanding, particularly in the first year after a licence has been granted. The AER, which as part of the IPC licence is required to be submitted to the Agency, lays out in one document the environmental performance and the work completed by the company in the previous year and sets out the work to be completed in the following year. This report, in conjunction with the Audit report prepared by the Agency, conveys to any third party the overall performance of the facility as indicated by company reports and by independent Agency assessment.

Due to the broad range of information required for the AER, a guidance document has been prepared [8]. The recommended report structure is as follows:

Recurring Reports:

Monitoring of emissions to water	<i>Monthly 10 days after end of the month being reported on.</i>
Complaints (where these arise)	<i>Monthly 10 days after end of the month being reported on.</i>
AER	<i>Annually 18 months from the date of grant of license and each year thereafter.</i>

Once-off Reports:

Programme for public information.	<i>Within 6 months of the date of grant of licence.</i>
Toxicity Test Proposal	<i>Within 3 months of the date of grant of licence.</i>
Results of effluent screening programme for organic compounds.	<i>Within 6 months of the date of grant of licence.</i>
Harbour water quality assessment	<i>At the request of the Agency.</i>
Bund integrity assessment.	<i>Within 3 months of the date of grant of licence.</i>
Pollution emission register proposal	<i>Within 6 months of the date of grant of licence.</i>

Schedule of environmental objectives and targets	<i>Within 4 months of the date of grant of licence.</i>
EMP proposal.	<i>Six months from the date of grant of licence.</i>

Items to be addressed in the EMP

Use of alternative mothproofing agents
 Reduction/elimination in the use of heavy metal based dyestuffs
 Further reduction in COD emissions by optimising use of dyebath additives.
 Assess the feasibility of a separate effluent and surface water drainage system.
 Assess the feasibility of regular inspection and monitoring of site surface water.

AER Content

Emissions to atmosphere summary.
 Emissions to water summary.
 Waste management report.
 Resource consumption summary.
 Complaints summary.
 Schedule of Environmental Objectives and Targets
 EMP — proposal
 EMP — report
 Pollution emission register — proposal
 Pollution emission register — report
 List II substance reductions
 Groundwater monitoring summary
 Tank and pipeline testing and inspection report
 Reported incidents summary

Box 3: typical reporting requirements (textile company)

- Introduction and site description — the name and location of the site; company environmental policy (where available); a brief description of the activities at the site addressing local environmental conditions, main units and products.
- Summary information — a summary of emissions, waste management, energy and water usage, environmental incidents and complaints.
- Pollution Emission Register — if required.
- Environmental management — an outline of the facility's EMS, including human resources, training and education, and environmental objectives and targets. An EMP report (for the current year) and EMP proposal (for the following year).

Reports — other reports required on a specified basis by the IPC licence, e.g., groundwater monitoring, bund integrity testing, environmental liabilities risk assessment, etc.

The EPA views an IPC licence as dynamic in nature, reflecting ongoing improvements in technologies and use of BATNEEC at each site. The Agency sees the implementation of an EMS as critical to accomplishing ongoing improvement in waste reduction at source. A properly managed EMS implemented throughout the organisation

and appropriate to its scale is required. An EMS ensures that the licensee sets out clear environmental goals for their organisation and provides the management support to constantly review the success in reaching these goals and allows for corrective action to be taken when the goals are not being achieved. These goals take the form of objectives and targets to minimise and where possible eliminate adverse environmental effects.

The targets set are expected to be demanding of the licensee and require effort to achieve them. These targets are achieved through the implementation of an EMP, which involves the ongoing review of environmental work practices and the use of improved and cleaner technologies.

3. EMS

3.1. *Voluntary*

Two main EMS are prominent in Europe. These are ISO 14001 and EMAS. Opinions differ as to their effectiveness in pushing forward the concept of sustainable production.

While it is true that the discipline of formalising environmental documentation, record keeping, etc. can lead to better environmental performance, there is not necessarily any compunction to do so.

Within the ISO 14001 system there is emphasis on ‘continual improvement’, this is improvement of the system. Even if environmental improvements can result, they are not constrained to be innovative, cleaner technologies, or even process-integrated. The Standard has even replaced the term ‘Pollution Prevention’ with ‘Prevention of Pollution’ which has a less stringent meaning.⁴ This is dangerous, and it does not take too much imagination to see that a series of end-of-pipe improvements will more than satisfy the requirements for continual improvement. Indeed it could be argued that better documentation would satisfy this requirement. Furthermore, auditors have traditionally come from a quality background, and may be blinded by the beauty of the system — in other words a system for a system’s sake. There appears to be no systematic training of auditors in important environmental aspects.

The EMAS scheme, on the other hand, does require environmental improvements. However, again there is no explicit requirement to avoid end-of-pipe fixes. The public statement requirement of EMAS does, however, have the potential to overcome this barrier. Companies wishing to create the right image should prefer to have examples of reduction at source in their public documents — rather than a list of better filters. The status of voluntary EMS in Europe is briefly reviewed in Ref. [9].

3.2. *Mandatory requirements*

The concept of a mandatory EMS is alien to many. It is argued that such a system will fail, because companies do not feel true ownership, or because only voluntary improvements are sustainable, etc.

⁴ Clause 3.13 of the ISO 14001 Standard defines ‘prevention of Pollution’ as including ‘treatment’ (EN ISO 14001:1996). ‘Pollution Prevention’ is universally recognised as being a more inherent preventive strategy.

There is no legitimacy to these claims. Companies ‘voluntarily’ adopt ISO 14001 for a variety of reasons — many of which have nothing to do with the environment, for example marketing advantages. These range from peer pressure, to ‘follow the leader’, to hopes that the regulator will somehow act differently if a company has an EMS. There is no ‘ownership’ with such companies. There is often little understanding of environmental matters — let alone sustainable production.

If companies do indeed have these varying reasons for adopting an EMS, then let us use them to the advantage of the environment. It is here that the regulator can seize an advantage. If companies can be motivated by a desire for a different relationship with the regulators, then this can be used to advantage.

If companies adopt an EMS, let the regulator indeed adopt a new approach in dealing with the company — provided the EMS is truly leading the company towards sustainable production (SP), or at least cleaner production (CP).

The concept of cleaner or sustainable production, like any other, has to be learned. It has to be learned by industry. It has to be learned by certifying bodies and auditors. Sometimes it has to be learned by regulators.

Several studies have concluded that successful cleaner production programmes require an education process stretching over a long period. This refers not to education of a specific company, but the overall regime in the region. A slow build-up of information, dissemination of promotional and awareness-raising materials, and a period of innovative, creative, and flexible regulation, can combine to bring about a culture which is ripe for sustainable production.

A major part of this process is to condition the industrial organism to adopt CP/SP as the norm. The company then begins to think in this manner as a matter of course.

In Ireland, over the past 5 years, a repetitive process of companies having to consider all other options before resorting to end-of-pipe solutions has conditioned them to think creatively. *Companies now regularly search for cleaner production options as their first response to environmental problems. The legal requirement for an EMS has led to the beginning of a sustainable production ethos.*

It is clear that, when they adopt an EMS, many companies wish to be seen by regulators in a different light. The concept of regulators responding positively to this notion is beginning to surface. It can be a powerful and advantageous tool — provided regulators can be assured that the company improvement programme is on the right track. The Irish licensing system is an example of how this might be achieved.

3.3. The Irish experience with mandatory EMS

While many countries encourage adoption of EMS by industry, it is not normally a legislative requirement.⁵

⁵ The final report of a five country project involving European regulators will indicate that environmental management systems are encouraged in all five (NL, SF, DK, F, IRL). However only in Ireland is such a system mandatory [Personal Communication from J. Moriarty, Environmental Protection Agency, Inisscarra, Cork, Ireland].

However, as outlined above, Irish IPC licensing requires that companies install an EMS. This does not have to be certified by an external body, and as such can be regarded as an informal system. Nevertheless, examination of conditions 2.1 to 2.9 of a licence clearly illustrates that all the elements of a traditional system are included. Thus, it is a short step for companies to formalise the system towards ISO 14001. Furthermore, IPC reporting requirements mean that all relevant environmental information is in the public domain. As a consequence, companies are also only a short step from EMAS.

The important difference between the ISO/EMAS and IPC lies in the auditors. The EPA requires cleaner production options. They demand an EMP which emphasises their adherence to the cleaner production hierarchy. They require true environmental improvement. They will not settle for end-of-pipe solutions, except after other options have been exhausted — and seen to be exhausted.

The EMP is a crucial part of this process. Companies not only have to submit such programmes annually, but must also review the previous year's programme. Furthermore, submission of the EMP alone is not sufficient to satisfy the Agency. The programme can be rejected, if deemed inappropriate or insufficient, and the company must resubmit. Of course, such programmes must also contain more mundane improvements, such as 'upgrading the wastewater treatment plant' or 'bundling the storage tanks'. However, review of a typical programme will immediately highlight a large number of the 'classic' cleaner production options.

4. Mandatory reporting as a mechanism for stimulating cleaner production

Reporting is the second crucial element of the IPPC system (along with EMS). Companies which are required to report will strive to have a good story to tell. However, since this story must be verifiable by the Agency (through the audit process), the company must indeed have performed well. This provides another incentive and tool for fostering cleaner production.

In the Irish context, all AERs are in the public domain. Furthermore, the Agency intends to publish lists of company performances. Already companies are required to submit an annual Pollutants Emissions Register (PER). This lists all inputs and outputs for selected substances (including fugitive emissions and 'unknown' fates) and incorporates all media. The PER includes environmental performance indices. These indices are used as one basis of judging the EMP. Companies are expected to improve the Environmental Performance Indices for their facility.

We have seen, in Ireland, the effect that this reporting regime has had on company performances. No company wishes to appear in a bad light in public. As a consequence, more and more companies are striving for improved performance. Additional resources are being allocated. Since their performance is open to public scrutiny, companies have realised that it is not only their actual emissions which are important, but the manner in which they conduct themselves, the programmes they adopt, and the type of solutions they employ.

This has led to a marked increase in prevention approaches, and is helping steer industry towards *Sustainable Production*.

5. IPPC and EMAS

Notwithstanding earlier comments regarding EMS, the concept of a structured approach by industry towards understanding, controlling, and improving their environmental performance is a good one.

However, it does not necessarily militate in favour of sustainable production, unless mechanisms are in place to ensure otherwise. The mandatory systems required under Irish IPPC licensing, on the other hand, offer greater possibilities. In these, not only the system, but the quality of the ongoing programme and projects is assessed. In particular, projects which are in line with sustainable production are encouraged. This, of course, requires the auditor to be familiar with the relevant concepts, and even technologies. This is the difficult part.

In order for companies to perceive benefits in terms of regulation, some reward for their endeavours is in order. The EPA, like regulators elsewhere, see the benefits of a more cooperative approach. They have no wish to be wasting resources continually checking on good performers. To this end a regulatory system based on trust can be envisaged.

The EPA have publicly stated their desire to alter their method of monitoring companies which adopt EMAS. It is proposed that a single audit can satisfy both the EMAS regulation and the IPC licence. Provided that the EPA inspector is satisfied with both the system and the quality of environmental performance improvements, no other auditing by the Agency will be carried out. The EMAS public statement can be combined with the AER.

This system has many advantages, some of which are:

- For companies, less inspection.
- For the environment, a guarantee that the EMS stimulates sustainable production.
- For the Regulator, a reduction in repetitive work and better use of resources.

6. Conclusion

The current BAT discussions may have a tendency to preserve the overall status quo. They may lead to a technology ‘lock in’, and certainly have the potential to favour abatement over prevention. While the specification of appropriate technologies is useful, it should not form the bedrock of the IPPC system. Companies may be stimulated to more innovative responses by application of other tools available within the Directive.

The Irish licensing system is a useful case study in this respect. It is not a perfect system, but does seem to be fostering a prevention culture in industry. It is based on firm legislation, but uses the flexible instruments of EMS, reporting, and ‘negotiated’ EMPs. The Irish concept of BATNEEC appears to be wider than the current IPPC BAT debate.

In general, companies must be given freedom and be dealt with flexibly. Voluntary instruments, such as EMAS may encourage real improvement — but there is a danger if

they are allowed to replace regulation. The regulator has an important role to play. A combination of IPPC and EMAS can be a powerful tool, if the regulator has an input. The Irish system is beginning to demonstrate this.

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Appendix A. Extracts from Council Directive 96/61/EC of September 24th, 1996

A.1. Preamble

Paragraph 8: "...the objective of an integrated approach to pollution control is to prevent emissions into air, water, or soil..." (emphasis added)

Paragraph 13: "...environmental aspects should be taken into consideration by the operator; (those aspects should be communicated to the competent authority (so that they can satisfy themselves (that all appropriate preventive (emphasis added) (measures have been laid down..."

Paragraph 17: "...emission limit values, parameters or equivalent technical measures should be based on the best available techniques without prescribing the use of one specific technique or technology..."

Paragraph 23: "...public must have access, before any decision is taken, to information relating to applications for permits..."

Paragraph 24: "...establishment of an inventory of principal emissions and sources..."

A.2. Article 2

Paragraph 6: "...Emission limit values may also be laid down for certain groups, families or categories of substances, in particular for those listed in Annex III. The emission limit values shall normally apply at the point where emissions leave the installation, any dilution being disregarded when determining them (the effect of water treatment plant may be taken into account..."

Paragraph 11: "...'best available techniques' shall mean the most effective and advanced stage in the development of activities and their methods of operation..."

'techniques' shall include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned, 'available' ... shall mean ... under economically and technically viable conditions and taking into consideration the costs and advantages..."

A.3. Article 3

“... competent authorities ensure that installations are operated in such a way that ...

Sub-points:

- (a) all the appropriate preventive measures are taken ...
- (b) ... where waste is produced, it is recovered ...
- (c) energy is used efficiently”

A.4. Article 6

Paragraph 1: “... application to the competent authority for a permit includes a description of:

- (a) the installation and its activities
- (b) the raw and auxiliary materials, other substances and the energy used or generated by the installation
- (c) the source of emissions from the installation
- (d) the conditions of the site of the installation
- (e) the nature and quantity of foreseeable emissions ... identification of the significant effects of the emissions on the environment
- (f) the proposed technology and other techniques for preventing ...
- (g) ... measures for the prevention and recovery of waste generated ...
- (h) ... Measures planned to monitor emissions ...”

A.5. Article 9

Paragraph 3: “The permit shall include emission limit values for pollutants, in particular, those listed in Annex III ...”

Paragraph 4: “... emission limit values ... shall be based on the best available techniques ...”

Paragraph 6: “... The permit may also contain temporary derogations from the requirements of paragraph 4 if a rehabilitation plan approved by the competent authority ensures that these requirements will be met within 6 months and if the project leads to a reduction of pollution.”

A.6. Article 11

“Member States shall ensure that the competent authority follows or is informed of developments in best available techniques.”

A.7. Article 14

“...ensure that...the operator regularly informs the competent authority of the results of the monitoring of releases and without delay of any incident or accident significantly affecting the environment, ...”

A.8. Article 15

Paragraph 2: “The results of monitoring of releases . . . must be made available to the public”

Paragraph 3: “An inventory of the principle emissions and sources responsible shall be published . . .”

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