

# An In-depth Look at the United Kingdom Integrated Permitting System

Exploring Global Environmental  
Protection Perspectives





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Exploring Global Environmental Protection  
Perspectives

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This report is the culmination of a two-year effort to research, assess, and document the United Kingdom (UK) integrated permitting system. The report is based on literature reviews and research along with site visits undertaken by United States (US) Environmental Protection Agency (EPA) staff, materials and feedback provided by officials from the Environment Agency for England and Wales (EA), and input from additional EPA office personnel, state environmental agency representatives, and other interested parties. In addition to personal communications, sources of information for the report include material from EPA's research efforts, UK internet and agency files, and texts and treatises by UK and US experts in the field.

EPA takes responsibility for any inconsistencies or misstatements in the report. We have striven to incorporate comments and consider feedback from those knowledgeable and willing to provide input about the topics discussed. To that end, we appreciate any additional thoughts readers may have to offer regarding this report specifically or the collaborative effort more generally.

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## LIST OF ABBREVIATIONS/ACRONYMS

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AFD	Air Framework Directive (EU)
BAT	Best Available Techniques (UK), Best Available Technology (US)
BACT	Best Available Control Technology (US)
BATNEEC	Best Available Techniques Not Entailing Excessive Cost (UK)
BCT	Best Conventional Control Technology (US)
BPEO	Best Practicable Environmental Option (UK)
BMPs	Best Management Practices (US)
BOD	Biochemical Oxygen Demand
BPT	Best Practicable Control Technology (US)
BRE	Better Regulation Executive (UK)
BREF	BAT Reference Document (EU)
CAA	Clean Air Act (US)
CAFO	Concentrated Animal Feeding Operation (US)
CAP	Compliance Assessment Plan (UK)
CAR1	Compliance Assessment Report (UK)
CCS	Compliance Classification Scheme (UK)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (US)
CIA	Chemical Industries Association (UK)
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
COD	Chemical Oxygen Demand
COMAH	Control of Major Accident Hazards (UK)
CoPA	Control of Pollution Act of 1974 (UK)
CWA	Clean Water Act (US)
DEFRA	Department for Environment, Food and Rural Affairs (UK)
EA	Environment Agency (UK)
EAL	Environmental Assessment Level (UK)
EC	European Commission
EU	European Union
EIPPCB	European IPPC Bureau
ELV	Emission Limit Value (EU) (UK)
EMS	Environmental Management System
EPA	Environmental Protection Agency (US)
EPAC	Environmental Protection Advisory Committee (UK)
EPP	Environmental Permitting Programme (UK)
EP OPRA	Environmental Protection Operator and Pollution Risk Appraisal (UK)
EP Regulations	Environmental Permitting Regulations (UK)
EQS	Environmental Quality Standards (EU)
ETS	Emission Trading Scheme (EU)
GBP	Great Britain Pound
H1	IPPC Horizontal Guidance Note for Environmental Assessment and Appraisal of BAT (UK)
H <sub>2</sub> S	Hydrogen Sulfide

HAP	Hazardous Air Pollutant (US)
HMIP	Her Majesty's Inspectorate of Pollution (UK)
HSE	Health and Safety Executive (UK)
IPC	Integrated Pollution Control (UK)
IPPC	Integrated Pollution Prevention and Control - EU Directive 96/61/EC
IP ICE	Integrated Permitting International Collaboration Effort (US)
ISO	International Organization for Standardization
LA	Local Authorities (UK)
LAER	Lowest Achievable Emission Rates (US)
MACT	Maximum Achievable Control Technology (US)
MCERTS	Monitoring Certification Scheme (UK)
MPP	Multi-Product Protocol (UK)
NACEPT	National Advisory Council for Environmental Policy and Technology (US)
NEPA	National Environmental Policy Act of 1969 (US)
NCEI	US EPA National Center for Environmental Innovation
NGO	Non-Governmental Organization
NM VOC	Non-methane volatile organic compound
NOV	Notice of Violation (US)
NO <sub>x</sub>	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System (US)
NPS	National Permitting Service (UK)
NSR	New Source Review (US)
NSSC	Neutral Sulfite Semi-Chemical
OMA	Operator Monitoring Assessment (UK)
P4	Pollution Prevention in Permitting Program (US)
PM <sub>2.5</sub> , PM <sub>10</sub>	Particulate Matter (of 2.5 or 10 micrometers or less, respectively)
PPC	Pollution Prevention and Control (UK)
PPC Act	The Pollution Prevention and Control Act of 1999 (UK)
PPC Regulations	The Pollution Prevention and Control (England and Wales) Regulations of 2000 (UK)
PPD	Public Participation Directive (EU)
PSD	Prevention of Significant Deterioration (US)
RACT	Reasonably Available Control Technology (US)
RCEP	Royal Commission on Environmental Pollution (UK)
RCRA	Resource Conservation and Recovery Act (US)
SIP	State Implementation Plan (US)
SPG	Strategic Permitting Group (UK)
SPP	Sector Permitting Plan (UK)
SO <sub>2</sub>	Sulfur Dioxide
TCM	Technically Competent Management (UK)
TRI	Toxics Release Inventory (US)
TRS	Total Reduced Sulfur
TWG	Technical Working Group (EU)
UK	United Kingdom
UK EA	United Kingdom Environment Agency
UK EPA	United Kingdom Environmental Protection Act of 1990



US  
VOC  
WET  
WHO

United States  
Volatile Organic Compounds  
Whole Effluent Toxicity (US)  
World Health Organization



## EXECUTIVE SUMMARY

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Permitting industrial facilities is essential for regulating environmental pollution in the United States (US) and in many nations across the globe. Presently in the US, permitting is carried out through multiple regulatory programs organized by environmental media (air, water, land). In contrast, an increasing number of governments, most notably in the European Union (EU), have been transforming their industrial pollution permitting regimes to an integrated approach, thus regulating facilities in a more comprehensive and holistic way.

At the invitation of the UK Environment Agency (EA), the US Environmental Protection Agency (EPA) initiated the Integrated Permitting International Collaboration Effort (IP ICE). The UK EA has been a dedicated partner throughout the effort. The objective of the effort was to study the EU-mandated Integrated Pollution Prevention and Control (IPPC) permitting system as implemented in the UK. In order to carry out the study, a network was created consisting of interested EPA and state environmental agency representatives, as well as a multi-disciplinary research team led by EPA's National Center for Environmental Innovation (NCEI) and including members from EPA headquarters, EPA regional offices, and a state. The research team embarked on a detailed analysis of the UK IPPC permitting system; the report is the product of that effort. In order to accomplish this undertaking, the research team drew on available literature and personal interactions and site visits with EA officials, UK industry representatives, and members of the IP ICE network.

In brief, the report introduces the historical and cultural setting for the UK integrated permitting system and provides information regarding the legal and organizational permitting structure and function. In order to understand the UK system, detailed information is offered about the permitting process and permit requirements. In addition, a comparative analysis is provided of several individual permits in the UK and US for the pulp and paper sector and the specialty organic chemical sector. Finally, the report delivers a series of findings regarding features of the UK permitting system that are of particular note to US observers.

The report is not intended to render overall judgments on the relative merits of either the US or UK system, and it does not represent or recommend changes in any current EPA permitting policy, practice, or procedure. Rather, the report provides a foundation for – and hopefully will further stimulate – additional consideration of innovative permitting practices in both countries.

### **UK Integrated Permitting**

The UK integrated approach to permitting is more than just a consolidation or “stapling together” of single-media permits. An integrated permit addresses each aspect of a facility's operation that has an environmental impact, including energy, water, and raw material use. Integrated permits also address pollution prevention, multi-media or cross-media interactions, facility management, and long-term effects of facility operation.

Integrated permits were officially mandated in the EU in 1996 by the IPPC Directive. The IPPC Directive establishes a goal of first preventing emissions to air, water, and soil (also taking into

account waste management) and second (where prevention is not practicable) reducing emissions “to achieve a high level of protection for the environment as a whole.” The IPPC Directive also defines key permitting terms (including pollution and Best Available Techniques – BAT), creating a permitting institution with common terminology EU-wide. The UK translated the IPPC Directive into national law, passing the Pollution Prevention and Control Act of 1999 (PPC). Building on the preceding UK Integrated Pollution Control regime, the PPC Act provides the statutory framework for issuing integrated permits in the UK. The resulting UK IPPC system is managed and implemented using a risk-based and sector-based approach.

The central component of an IPPC permit is the application of the common standard BAT designed to prevent, abate, and control substance emissions to all three environmental media (air, water, and land); address sensory effects and non-substance emissions (e.g., odor, noise, heat, vibration); and ensure sound facility management practices and sustainable use of natural resources. BAT in the UK context is a broader concept than similar standard-setting terms in US statutes (which tend to emphasize specific technology-based pollution controls). Determination of BAT in a UK permit relies on EU sector-specific technical guidance (BAT Reference Documents or BREFs) and corresponding UK Technical Guidance Notes, while also taking into account site-specific factors, such as geographic, local, and facility-specific conditions.

Given the expanded scope of the IPPC Directive, IPPC permits contain a number of provisions not found in most US media-specific permits. A typical IPPC permit includes conditions for the following:

- Management techniques (e.g., use of an environmental management system)
- Materials inputs
- Main activities and abatement
- Emissions to groundwater
- Waste handling
- Waste recovery and disposal
- Energy
- Accidents and their consequences
- Noise and vibration
- Monitoring
- Decommissioning
- Emission benchmarks (including emission and effluent limits like those in US permits)

To obtain a permit, a UK facility operator must demonstrate in the permit application that BAT has been, and on an ongoing basis will be, systematically applied to all activities with environmental consequences. Final permit terms are fashioned by the EA subsequent to further information exchange and negotiation with the operator as well as review and comment by government and public stakeholders. The EA also maintains a public register throughout the permit process and life of the permit.

The EA relies on the Environmental Protection Operator and Pollution Risk Appraisal (EP OPRA) tool, which provides approximate risk information, to plan and manage the internal EA permitting workload and resources, target inspection and monitoring activities, and set permit fees. EP OPRA does not assess risk directly but consists of a scoring system based on five attributes that gauge the potential for environmental hazard and demand for agency resources from the facility, operator performance, and compliance. EP OPRA is a central component to what the EU and UK term “better” and “modern” regulation, that is, the government-wide effort for regulation to be risk-based, targeted, and proportionate.

Lastly, the UK culture itself supports a collegial partnership between the regulatory agency and the regulated community. The cooperative approach relies on continuing dialogue and consensus-building between the EA and an individual regulated facility, beginning with permit application and lasting throughout the life of a permit. For example, while the PPC regulations contain formal enforcement mechanisms, the EA uses such actions rarely and tends to rely instead on a setting of mutual cooperation. Generally, the EA views its primary objective as ensuring the safety and protection of the environment and public health rather than punishing polluters.

## Findings

As noted earlier, EPA’s goal for this report is to foster increased understanding both of the IPPC system as a whole and of specific practices that, if successfully tested in the context of US permitting systems, might improve permitting in this country. It is important to remember that the UK system operates within a social, political, and historical context different than that of the US. Therefore, it is unlikely that the UK permitting model could be replicated in the US wholesale, even if that were deemed desirable. Rather, it is the hope of the research team that these findings might stimulate thinking about ways to improve the US environmental permitting system.

To that end, certain aspects of the UK integrated permitting system may interest policy and permit experts alike. The findings that follow may assist the reader in (1) better understanding and assessing the potential benefits and drawbacks of an integrated system in the context of the US permitting approach; (2) identifying additional research and analysis on integrated permitting approaches; and (3) exploring opportunities for applying lessons and aspects of the IPPC approach and methodology in the US. Chapter 8 explores the following key findings in greater detail.

## **UK Integrated System Uses Single Standard-Setting Concept to Set Limits and Address Pollution Prevention and Sustainability**

Fundamentally, the IPPC permitting system is a comprehensive multi-media, pollution-prevention approach to environmental protection that also promotes sustainable practices (e.g., consideration of water and raw material use and energy efficiency). Implementation of the IPPC system is based on a single standard-setting approach, BAT. In short, BAT is based on the most effective and advanced stage of techniques and their associated performance ranges. BAT is designed to achieve a high level of protection for the environment as a whole. In order to facilitate the determination of BAT at each facility, the UK relies on a variety of cross-cutting tools that support standard-setting across all environmental media. *In contrast to the UK system, the US approach relies on statutes that operate independently with relatively little comprehensive, national direction by overarching statutes. In most cases, pollution prevention and sustainability objectives, if considered at all, are approached through non-regulatory partnership strategies. However, in many cases, the performance of US technology-based standards is consistent with and falls within IPPC BAT performance ranges. On the other hand, in contrast to the UK, cross-cutting multi-media tools and methodologies are applied rarely in the US permitting process.*

### **Regulation of Whole-facility Footprint is Foundation of UK Permits**

A single IPPC permit is used to address all aspects of a facility's environmental footprint, including conditions that prevent or reduce air, water, and land emissions; manage, recover, and dispose of waste; and address pollution prevention and sustainability considerations. *In contrast, the US relies on separate media-specific permits for air, water, and waste, which in some cases include conditions that address only certain portions of a regulated facility's operations. As such, several US permits may be needed for any one facility, each focusing on individual media and the impacts of specific pollutants. Few US permits, if any, include sustainability or pollution prevention factors as permit conditions.*

### **UK Permits Tailor Standards to Facility-Specific Conditions**

Through the permit issuance process, a UK permit writer fits plant-specific conditions (facility characteristics and local conditions) with sector-wide BAT indicated in the BREF or UK technical guidance. For example, BAT-based numeric limits (known as Emission Limit Values or ELVs and derived from sector benchmarks) may be adjusted in a permit to reflect local and site-specific conditions. This includes both BAT-based limits adjusted to reflect environmental quality standards or local geographic conditions (e.g., depletion of local aquifer) *and* facility-specific characteristics and conditions (e.g., equipment and technology already in use at the facility). Using this approach, IPPC permitting is able to mesh local and facility-specific conditions with sector-wide considerations. In addition, existing UK facilities not operating to BAT indicated in guidance may be subject to improvement program conditions tailored to the individual facility that move the facility towards (but not necessarily always as far as) the indicated BAT. On the other hand, because of the facility-specific nature of the BAT determination, some facilities will be able, and therefore required, to achieve or even surpass the BAT indicated in guidance for some aspects of facility operation. *In comparison, US technology-based standards are established through national regulations and apply broadly to sectors (with some accommodations within a sector, but not to the level of an individual facility).*

*US regulators may make adjustments to national standards within a permit based on environmental quality considerations; but except under limited circumstances, US standards are not changed in a permit to take into account the circumstances of an individual facility, nor are facilities legally subject to permit requirements for performance beyond the national or state standards.*

### **UK Permits Require Ongoing Focus on Continual Improvement**

An IPPC permit is a living document – both reflecting the current performance at a facility and driving continual improvement on the part of the operator. Permit conditions that include implementation of an environmental management system and scrutiny of material inputs require operators on an ongoing basis to seek opportunities for performance improvement. Moreover, regulators and industry alike have an ongoing responsibility to keep abreast of the latest developments and improvements in BAT. On a real-time basis this knowledge may be directly applied to permit terms. *In contrast, a US permit typically contains nationwide, sector-specific emission limitations that offer little regulatory incentive for improving performance beyond applicable limits. On a voluntary basis, US companies may participate in leadership programs designed to motivate continual improvement, beyond-compliance performance, and stewardship practices. In the US, rulemaking is often a necessary step for keeping standards aligned with new technologies.*

### **UK System Manages Environmental Permitting on a Sector Basis**

Sectors play a significant role in the regulation of industrial emissions for both the EU and UK. Sectors are the basis for the delivery of integrated and multimedia standards for IPPC (through sector-based technical guidance on BAT). The UK also phased roll out of BAT standards on a sector basis (through the PPC regulations that required demonstration of BAT in permit applications within a specific window of time). On a strategic level, the UK manages IPPC permitting and compliance assessment through sector-based planning, priority-setting, indicators, and performance targets. *In a number of cases, the US also uses sectors in the delivery of regulatory requirements for media-specific statutes; however, except on very limited occasions, promulgation of media-specific standards is not coordinated across a sector. Using sectors as an overarching strategic management tool (e.g., for prioritizing, targeting, and measuring) is at best piecemeal in the US – more often than not driven by narrower federal (sometimes voluntary) program or state interests.*

### **UK Legal and Permitting Structure is Flexible and Fluid**

The PPC legal authority in the UK is less prescriptive and detailed than corresponding legal authorities in the US (even the PPC regulations do not contain the complex detail of many US statutes). Detail on determining BAT conditions is contained in non-binding guidance documents, which allows the regulator to exercise additional technical discretion in setting permit conditions. *Such discretion is not generally provided to similar agencies in the US.* In part, the overarching legal framework in the UK results in a greater capacity to expeditiously address new issues. *The US does not have a corresponding, all-inclusive environmental statute to address emerging challenges on a comprehensive, ongoing, and straightforward basis.*

## ***New Sources, Existing Source Modifications, and Permit Changes are Treated Differently than in the US***

For a new source in the UK, no IPPC permit or review is required until the source begins operation (i.e., the facility operator does not obtain a construction permit). As a practical matter, most new sources apply for their IPPC permit well before operation is scheduled to begin, and often even before construction begins, so that BAT requirements can be ascertained prior to committing resources to construction. *Construction permits are not required by the US water permitting program, but by contrast, the US has extensive pre-construction review for air emission sources, which means that permits must be obtained before construction begins.*

All permitted UK facilities must employ BAT. While new facilities will normally be expected to comply with, or go beyond BAT indicated in the BREF or UK technical guidance, existing facilities may be allowed to operate initially using techniques not at the indicated BAT. Where existing facility operations fall significantly short of the indicated BAT, an improvement program may be required. Despite this allowance for variation at particular existing installations, the presumption under IPPC is that all facilities, new and existing, are subject to BAT standards. *In the US, it is typical for separate federal standards to be set for new and existing facilities (where both types of facilities are regulated), with new facility standards being the more stringent and roughly on a level with IPPC BAT performance ranges. As in the UK, new facilities must meet standards upon startup; while existing sources will be given time to install controls to meet applicable standards. However, particularly in the air program, some existing facilities may be subject to little or no regulation, despite the fact that new facility counterparts are subject to a federal standard. In general, the US federal system does not require existing facility upgrades in areas of good air quality, unless an existing source makes a modification.*

Changes to IPPC permits may be initiated by the facility or the EA to reflect operational or process changes at the facility, changes in BAT, or changes in facility performance. Permit revisions can tighten or loosen permit obligations, but must continue to reflect BAT for the facility. Prior to making an operational or process change, an operator must notify the EA and assess the environmental effect of the proposed change before it is actualized. The EA (usually the area inspector) then determines whether a change requires a permit variation. *In the US, permit modifications are not generally initiated by the permitting authority to reflect changes in facility performance. In contrast to the UK system, the US air permitting system includes complex applicability provisions and thresholds to determine what permits are required before physical (construction) or operational modifications may occur.*

## ***UK System Fosters High Expectations and Shared Responsibility by Operators and Regulators***

Fundamentally, the IPPC system requires facility operators to assume responsibility for the entire footprint of a facility. The onus is on the operator (in the permit application) to propose and demonstrate BAT for all environmental impacts of facility operations (rather than leave it exclusively to the regulator to prescribe controls for specific sources and emissions). On an ongoing basis, operators must also identify, and where feasible, implement performance improvements. UK integrated permits also include a requirement of implied BAT whereby facility operators are expected to prevent or reduce emissions from an activity, even if that



activity is not explicitly covered by a permit condition. Cumulatively, these comprehensive requirements and expectations under the IPPC system are designed to promote a stewardship ethic among facility operators. At the same time, EA staff must be technically equipped to regulate all aspects of a facility covered by IPPC. On a facility-specific basis, EA permit writers both set performance targets and evaluate techniques used to achieve targets. Some of the time, this level of expertise results from prior experience in industry. *Generally, US facility operators have relatively limited obligations beyond the need to meet emission standards and do not have to determine and address sources left unregulated or residual environmental effects. In contrast to the UK, most attempts to influence stewardship behavior in the US stem from federal and/or state voluntary programs, company or industry initiatives, international business standards, or citizen group pressures – and are distinctly extra-regulatory. Additionally, broad, cross-media technical expertise is not typically required of US permit writers, where permits usually are media-specific and not generally subject to determination of emission limits on a facility-specific basis.*

### ***UK Compliance and Enforcement Model Emphasizes Consultation and Underlying Behavior Changes***

The UK approach to compliance and enforcement can be described as a collaborative negotiation. Beginning with the permit process, there is continual dialogue between the UK EA and a regulated facility. Maintained throughout the permit cycle, this partnership is supported by the IPPC system's reporting, monitoring, and inspection regime and the respective expectations and responsibilities of both the UK regulators and the regulated community. During inspections, EA inspectors and facility representatives may openly discuss operational issues. The facility receives written results at the end of an inspection and can expect prompt written notification of violations within days following the inspection. Once in the enforcement mode, cooperative consultation (buttressed by the significant threats of unilateral, permit variation and revocation, and ultimately criminal prosecution) continues to be the preferred method for addressing noncompliance. Currently, no administrative penalty authority exists in the UK for the EA. *In practice, US federal and state permitting authorities also engage in frequent dialogue with permittees during the permitting process. It is standard procedure for US inspectors to hold closing conferences with facility representatives; however, a formal notification of violation may take an extended period of time to arrive. For addressing issues of noncompliance, the US system usually relies on its civil enforcement authorities, including judicial and administrative penalty authority, as well as criminal sanctions where warranted.*

All IPPC permit terms and conditions are enforceable and include traditional numerical limits; equipment and work practice standards; and details on management system plans, pollution prevention programs, waste minimization programs, and energy efficiency programs. Each permit condition has accompanying requirements for testing, monitoring, recordkeeping, and reporting. In fact, the EA places more emphasis on “upstream” facility management, than on “downstream” limit violations. In this regard, the EA prefers to bring an enforcement action for underlying behavior, such as a failure to train employees adequately or to maintain and operate equipment properly, in order to prevent a more significant environmental breach and consequence. *In comparison, because US permits seldom include requirements related to activities such as management systems and pollution prevention and resource use, US*

*enforcement actions tend to focus on violations of numerical limits and other specific permit terms, rather than on the underlying behavior that might lead to a violation.*

### **UK Culture of Trust Shapes Public Expectations and Involvement**

The degree of public involvement in the UK appears inextricably linked to its cultural and historical backdrop – that is, one of public trust in the government complemented by a strong cooperative relationship between regulators and regulated. Formally, the UK IPPC public participation procedures are generally analogous to those in the US. The EA keeps the public informed of permitting determinations by public registry and regular national reports. However despite the effort, environmental groups (one type of public entity) appear less likely to challenge national rulemakings, permit issuance or enforcement decisions than in the US. *US environmental groups frequently take legal action at the federal level to challenge the validity and substance of national rules and at the state level to challenge individual permits.*

### **Agency Organization and Management Differs from that in the US**

In the UK, regulatory responsibilities are split between the political, rulemaking Government department, DEFRA, and the implementing agency, the EA. As the corporate body financially responsible for environmental permitting, the EA must offset permitting expenses with revenues – EP OPRA being the tool that allows the EA to do this. *In contrast, at the federal level in the US, political leadership and national rulemaking are functions of the US EPA whereas implementation and enforcement are shared between EPA and the states. The EPA is also not subject to the same revenues and expenses balance sheet pressures on a program-by-program basis as is the EA.*

### **UK System Linked to Broad Technological and Regulatory Developments and Trends**

The EU and UK IPPC system is designed to track changing conditions. On the standard-setting front, the EU EC periodically updates BREFs in response to advances and changes to sector-level BAT. Once this EU process is complete, the UK will reflect these changes in domestic technical guidance on BAT. Ideally these changes will coincide with the EA periodic review of individual IPPC permits, which would then be modified to reflect updated BAT standards. *Similar requirements and expectations exist in the US for updating standards and adjusting permits to reflect such change; however, this is primarily a regulatory process which may occur over a longer time period.*

Additionally, in order to reduce burden on both business and government resources, the EU and the UK are engaged in carrying out a “Better Regulation Agenda” in an effort to modernize, rationalize, simplify and streamline government regulation. This has a significant influence on the design and functioning of UK environmental regulatory programs (including integrated permitting). *Similar regulatory reform initiatives have been launched in the past in the US and, although less clearly identifiable, may be present today.*

## Next Steps

At this time, EPA is not recommending specific actions relative to the findings of this report. Rather, we extend the work as a platform for encouraging further dialogue and possible expansion of the integrated permitting experience in the US. Specifically, EPA continues to invite interested stakeholders to develop opportunities for future research and for experimenting with UK IPPC concepts that may lead to improvements in the US permitting system.

Readers interested in learning more can visit the EPA website at [www.epa.gov/permits/integrated.htm](http://www.epa.gov/permits/integrated.htm). In addition to the complete report and appendices, other documents discussing potential research, programmatic, and policy options for experimenting with integrated permitting approaches in the US will be available online. The report appendices housed online include a great deal of supplemental information, such as the history of US multimedia permitting efforts, further details on enforcement authorities and procedures in the UK, among other topics.



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- Appendix B: EU Integrated Pollution Prevention and Control Directive 1996
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- Appendix D: Integrated Regulation – Experiences of IPPC in England and Wales
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# 1. INTRODUCTION

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Permitting industrial facilities is an essential tool for regulating environmental pollution in the US and in many nations across the globe. In almost all these countries, permitting programs were first designed to separately address specific environmental media (e.g., water, air, and land) or specific environmental concerns (e.g., smog or hazardous waste management and disposal). Under this type of regime, a major facility might be permitted, or otherwise regulated, under a variety of different controls – even by different regulators. However, an increasing number of governments, most notably in the European Union (EU), have been transforming their industrial pollution permitting regimes to a more integrated approach. In order to learn how this approach works, and at the invitation of the United Kingdom (UK) Environment Agency (EA),<sup>1</sup> the United States (US) Environmental Protection Agency (EPA) initiated the Integrated Permitting International Collaboration Effort (IP ICE) – an extended exploration of the environmental permitting system being adopted across the EU and in particular in the UK.

The report that follows is the final product of that effort. The report includes (1) a summary of the statutory, regulatory, and institutional structure for integrated permitting; (2) a comparison of UK and US permits for facilities in two sectors (a UK and US pulp and paper mill, and a UK and US specialty organic chemical plant);<sup>2</sup> (3) findings comparing the US and UK systems; and (4) a platform for discussion of potential application of the UK integrated permitting approach in the US.

The report does not seek to judge the overall merits of either the US or the UK permitting system as a whole (for each is too complex to make such an assessment), but rather aims to describe the UK system for those interested in US permitting approaches and policy. In highlighting noteworthy components of the UK system, EPA hopes to identify and inspire opportunities for testing integrated permitting tools and ideas in the US. Indeed, this work builds on more than two decades of interest in the US regarding the potential to improve environmental permitting and examines the UK approach in the context of that history. While much more remains to be learned about the integrated approach, this investigation has brought to light a substantial body of information that may help inform future policy development in the US. This report is primarily a research and comparative study and does not represent a position on current EPA policy or permitting practices in the US.

## Introduction to Integrated Permitting

An integrated approach to permitting is more than just a consolidation or a “stapling together” of single-media permits. Integrated permits address each aspect of a facility’s operation that has an environmental impact. In addition to standard pollution control found in US permits, integrated permits address pollution prevention, multi-media or cross-media effects and interactions,

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<sup>1</sup> The EA, with which US EPA worked on this study, has jurisdiction in England and Wales but not in Scotland or Northern Ireland. For simplicity throughout this document, where the context refers to the EA’s jurisdiction, the abbreviation UK is used as shorthand for England and Wales and not as a reference to the UK in its entirety.

<sup>2</sup> The integrated permits for facilities in the UK are compared to permits issued under the regulatory structure governing similar facilities in the US.

facility management systems, and those aspects of facility operation that affect long-term sustainability.

### ***The Expanding Use of Integrated Permitting in the EU and UK***

The integrated permitting regime in England and Wales, the focus of this report, was established by the UK Environmental Protection Act of 1990 and enhanced in the Pollution Prevention and Control (PPC) Act of 1999 (PPC Act), which moved the permitting system from multi-media to a fully integrated approach.<sup>3</sup> In fact, the UK describes its approach as “integrated regulation,” employing the EA as the single institution responsible for environmental regulation, including compliance and enforcement and sector management and communication, as well as permitting.<sup>4</sup>

During the same timeframe, and largely based on the UK experience, the EU issued its Integrated Pollution Prevention and Control Directive of 1996 (IPPC) requiring adoption of integrated pollution control in all of the EU member states<sup>5</sup> by 2007. The IPPC Directive is included as Appendix B.

### ***Relevance of Integrated Permitting in the US***

Environmental permitting in the US is not integrated; separate, well-established permit programs address air, water, waste, and other environmental concerns, on top of which facilities are subject to a variety of regulatory requirements not incorporated into permits. Therefore, the relevance of the UK integrated permitting experience to the US may not be obvious to some readers.

Certainly, adoption of an integrated approach does not appear to be on the near-term horizon in the US. Existing permitting systems are well institutionalized in regulatory agencies, regulated industry, and environmental advocacy organizations, and results of previous efforts to experiment with integrated and multi-media approaches in the US have been mixed. The transaction costs alone of overhauling the current system would make it unlikely that such a dramatic change would be undertaken without strong and compelling reasons to do so.

However, permitting has been a subject of much discussion and debate in the US practically since the inception of the current system. Any given permitting approach (integrated or media-specific) has benefits and limitations, advantages and drawbacks. Criticisms of the US system have included the expense associated with developing several permits for one facility, industry concerns about the economic burden of regulatory requirements, community concerns about effective access to permit information and participation in decision making, agency concerns about the administrative costs of reviewing and approving large numbers of permits in times of budgetary constraint, and objections that a model focused largely on compliance fails to encourage pollution prevention and resource efficiency. For these reasons alone, there has been considerable domestic interest and dialogue about alternative permitting strategies for decades.

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<sup>3</sup> The PPC Act is outlined in Appendix C.

<sup>4</sup> Appendix D contains an article by key EA managers responsible for the transition to integrated regulation and permitting in the UK.

<sup>5</sup> An EU member state is one of the 27 countries that comprise the EU since its inception in 1957 with the creation of the European Economic Community. For more information see [http://europa.eu/abc/history/index\\_en.htm](http://europa.eu/abc/history/index_en.htm).

In the context of this dialogue, regulating and permitting on a multi-media basis has been discussed with some regularity as a potential reform, and several efforts have even been undertaken to explore and test the idea. Appendix E summarizes the history of such efforts in the US. Furthermore, despite the “stove-piped” and single-media national permitting framework, multi-media or cross-cutting strategies are not completely absent in US practice. For instance, a growing number of organizations (private and public) are using comprehensive environmental management systems (EMSs) to assess their impacts and environmental footprints, and to develop appropriate responses. EPA and state agencies also have developed voluntary programs that address environmental concerns outside of traditionally regulated areas, such as energy use and waste reduction.<sup>6</sup> Some states have organized their permitting staff and activities along cross-media lines, such as by sector, or provide single points of contact to help permit applicants navigate multiple permitting processes simultaneously.<sup>7</sup>

Moreover, the growth of integrated permitting overseas makes it important for those in the US to understand how that system works and to assess possible lessons and opportunities for US policy. While it may be going too far to say that integrated permitting is the “wave of the future,” it is likely that economic globalization will create increasing pressure for uniformity across national systems and for streamlined (while effective) systems of environmental protection. Therefore, as a result of all the factors that have been mentioned, EPA believed the time was ripe to begin documenting the operations of an integrated permitting system.

### ***Potential Advantages of the Integrated Approach***

Advocates for an integrated approach have argued that it has a variety of potential advantages, including the following:

- **Developing better overall solutions.** Reviewing facility operations comprehensively may help identify better ways of controlling the overall environmental impact of production processes than examining air, land, water, and other impacts separately. For example, permitting pollution to a single environmental medium (e.g., air, land, water) can impact and sometimes increase environmental pollution to other environmental media. Thus, decreasing pollution to air using standards established in an air permit could (knowingly or unknowingly) increase pollution to water and/or increase the amount of solid waste generated at a facility. Therefore, permitting regimes implemented medium-by-medium may fall short of effectively achieving overall environmental and pollution reduction goals.

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<sup>6</sup> See EPA’s Partnership Programs ([www.epa.gov/partners/](http://www.epa.gov/partners/)) for information about and descriptions of EPA voluntary programs. Also see EPA’s National Environmental Performance Track State Programs ([www.epa.gov/performance-track/partners/linkage.htm](http://www.epa.gov/performance-track/partners/linkage.htm)) for information on state performance-based programs (one type of voluntary program).

<sup>7</sup> For example, the Mississippi Department of Environmental Quality Environmental Permitting Division organizes permitting by sector and issues multi-media general permits for selected operations, such as concentrated animal feeding operations (CAFOs) ([http://www.deq.state.ms.us/MDEQ.nsf/page/epd\\_epdhome](http://www.deq.state.ms.us/MDEQ.nsf/page/epd_epdhome)); and the Washington Department of Ecology Industrial Section handles permitting for all media for selected industries (<http://www.ecy.wa.gov/programs/swfa/industrial/>).

- **Creating efficiencies.** An integrated permitting system may reduce administrative costs both for regulatory agencies and for regulated facilities by consolidating multiple permits and overlapping permitting processes into a single permit and process. An integrated permit may also create opportunities for operational cost savings for regulated facilities – finding possible process efficiencies via the comprehensive, cross-media management of pollution control requirements.
- **Promoting pollution prevention.** It has been argued that an integrated facility assessment is more likely to promote pollution prevention and fundamental changes to production processes than simply imposing end-of-pipe controls.
- **Promoting sustainability.** In addition to the potential to encourage pollution prevention, because integrated permits address facility operational aspects, such as natural resource use, the generation and recovery of waste, and habitat impact, an integrated approach may promote long-term sustainability. Moreover, an integrated approach may also be more likely to emphasize environmental management practices in addition to environmental impacts.
- **Enhancing public participation.** In theory, an integrated permitting system may make public participation more meaningful by providing stakeholders with a broad facility-wide assessment of environmental impacts. An integrated approach may also foster greater dialogue among industry and other stakeholders.

## Goal of this Study

While not intended to be a comprehensive study, this report represents a first step toward a systematic, comparative assessment of the two regulatory models. In this regard, the report seeks to shed light for US practitioners on how integrated permitting in the UK works, and to the extent possible, on what results are achieved. On the basis of the findings at the conclusion of this report, EPA hopes in the future to identify specific actions that US regulators might consider to explore the potential for a more integrated system to protect the environment.

In light of this goal, it is important to note that integrated systems, and the UK system in particular, have developed and operate in social, historical, legal, and political contexts very different from that in the US. Therefore, it is unlikely, for instance, that the UK model would be replicated in the US wholesale no matter what its effectiveness. Rather, as noted above, the intent of this report is not necessarily to form an overall opinion on the value of the UK approach, but to learn about the approach and identify lessons that could be applied to improve (if not transform) the permitting system in the US.

## Methodology for Research and Analysis

To conduct this study and support this effort overall, EPA formed a research team based in the National Center for Environmental Innovation (NCEI) (in the agency's Office of Policy, Economics and Innovation). The research team included representatives from national program

and regional offices with expertise in air, water, and waste permitting, international environmental affairs, and the law.

The research team's principal activities were (1) gathering and analyzing information from available literature provided by the UK; (2) selecting UK and US facilities and permits for a comparative analysis; and (3) performing a detailed comparison of four permits issued to similar UK and US facilities in the pulp and paper and specialty organic chemicals sectors. The permit analysis included a comparison of requirements contained in each facility's permit (which in the UK includes a detailed review of the permit application, agency decision documents, as well as the permit itself).<sup>8</sup> Following that analysis, the team conducted extensive interviews in the UK with representatives of the EA and of the facilities whose permits were reviewed.<sup>9</sup>

EPA also formed an extended national integrated permitting network that includes states as well as additional EPA staff. Members of this network participated in a seminar in June 2005 designed to begin sharing information about the UK permitting system with EPA and state staff. Since then, the network has been updated on the research effort on a regular basis. The network also periodically shares information regarding relevant policy initiatives going on within the states.

In addition to the established network, EPA has conducted a complementary strategy to reach out to additional stakeholders in industry, academia, and other private and public organizations (such as the non-government organizations) as well as in additional states. Through this outreach effort, EPA has shared the research team's evolving understanding and gathered ideas for possible opportunities for testing integrated practices. At several national innovation conferences, EPA has presented preliminary observations and possible ideas for application and transferability of IPPC tools and practices in the US – in order to gain stakeholder reactions to, concerns with, and ideas about the report and the direction it should take. This outreach culminated in a workshop held at the Woodrow Wilson International Center for Scholars in October 2007. The workshop brought together a diverse group of participants from academia, private and public organizations, and federal and state governments, to learn about the UK system and consider opportunities for practical application of UK integrated permitting tools and practices in the US.

In all aspects of this effort, the UK EA has supported EPA by providing written materials, making staff available for discussion and review of various drafts of this report, and organizing the interviews conducted by research team members when they visited the UK. In addition, and of particular value to the effort, senior EA representatives visited the US on several occasions to make presentations and participate in discussions with EPA's Innovation Action Council and in the seminar, innovation conference and workshop described above. Appendix F contains a detailed listing of the milestones associated with the entire methodology just described.

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<sup>8</sup> To directly compare environmental requirements for each pair of similar facilities, the research team constructed a permit matrix to show a side-by-side listing of detailed requirements under each system. The permit matrix is available as a companion document to this report at [www.epa.gov/permits](http://www.epa.gov/permits).

<sup>9</sup> See Appendix F for details of EPA's 2007 UK site visits.

## The Report in Brief

The report is organized as follows:

- **Chapter 1** – Briefly introduces the concept of integrated permitting and explains the goal of this study.
- **Chapter 2** – Provides historic background and an overview of integrated permitting in the UK.
- **Chapter 3** – Describes the legal system for the UK integrated permitting regime.
- **Chapter 4** – Discusses the operational framework for integrated permitting in the UK.
- **Chapter 5** – Presents a comparative analysis of UK and US permits in the pulp and paper and specialty organic chemicals sectors.
- **Chapter 6** – Discusses the activities that take place following permit issuance.
- **Chapter 7** – Discusses some of the overall outcomes of IPPC implementation in the UK.
- **Chapter 8** – Presents findings and observations resulting from EPA’s research and analysis that create a platform for exploring potential application of integrated permitting tools and practices in the US.



## 2. OVERVIEW OF IPPC AND PPC IN THE UK

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This chapter provides an overview of the history and framework for the IPPC system as it is implemented in the UK, namely under the PPC regime. The history of environmental protection in the UK is briefly summarized – that is, how the integrated system developed, was ultimately adopted, and evolved along with the EU IPPC Directive. The chapter also discusses the contextual factors that have influenced the development of the integrated permitting system. Lastly, it takes a quick look at the organizational structure supporting the integrated permitting system, including the cultural elements that define relationships between regulators, the regulated community, and the public.

### Background of IPPC and PPC

#### *Beginnings of Pollution Control in the UK*

Pollution control legislation in the UK began in the late nineteenth century with the passage of laws and establishment of government agencies aimed at controlling pollution over specific geographical areas or for specific activities. For example in 1863, the Alkali Act was passed and the Parliament established the Alkali Inspectorate, the world's first pollution-control agency. Two years later, the UK Public Health Act of 1875 declared “black” smoke a nuisance. This trend continued through much of the twentieth century with the passage of the Town and Country Planning Act of 1947, the UK Clean Air Act of 1956, and several water pollution-related laws in the 1950s and 1960s. Throughout these decades, there was no consideration given to possible transfers from one environmental medium to another resulting from controlling one type of pollution at a time. However, by the mid- to late-twentieth century, UK policy-making began to shift towards looking across media and moving in the direction of integrating pollution control. (See Figure 2.1 for a graphic illustration of the EU/UK integrated pollution control history.)

#### *Shifting Toward More Integrated Pollution Control in the UK*

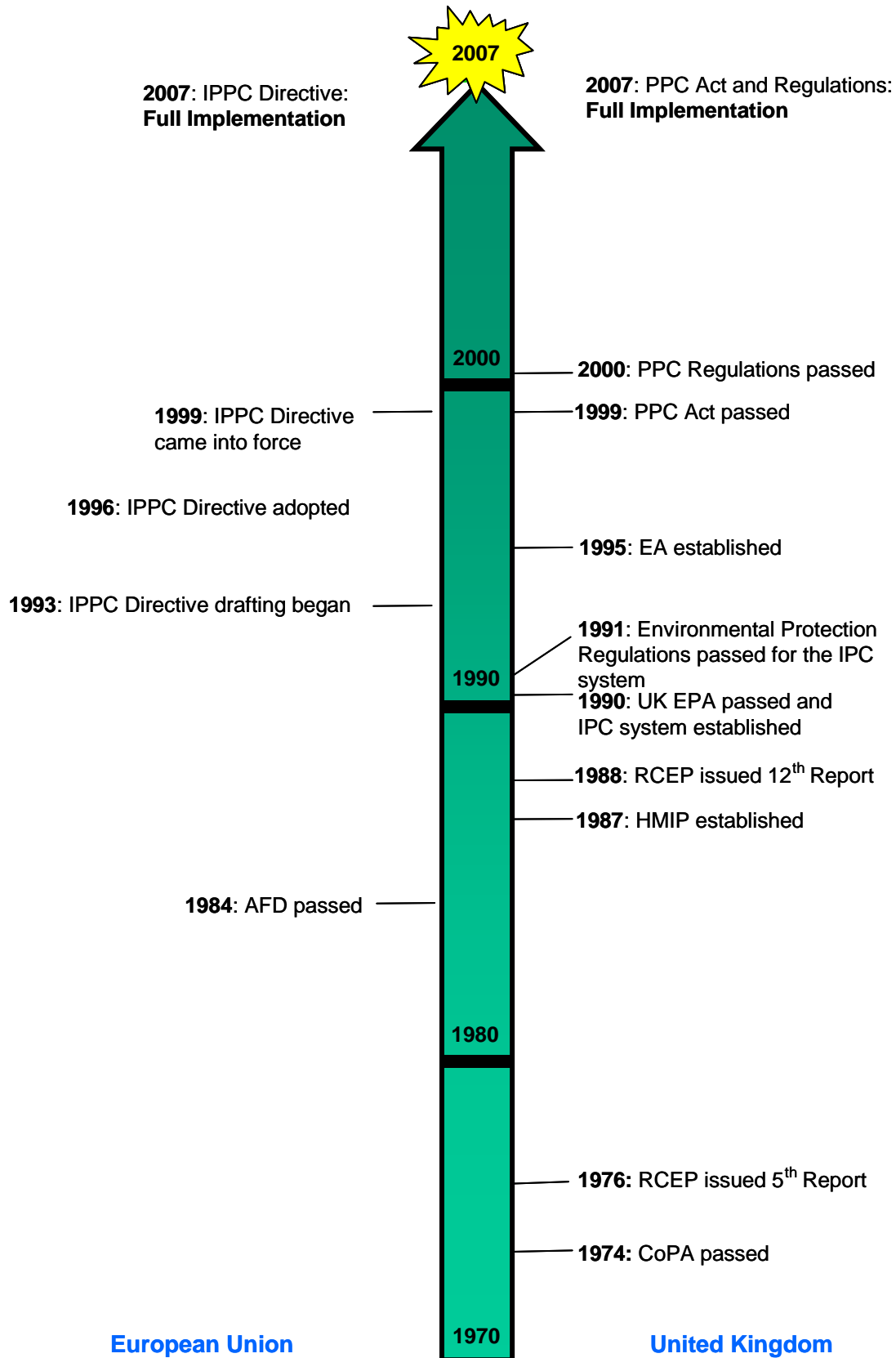
The transition to integrated pollution control in the UK was initiated by the passage of the Control of Pollution Act in 1974 (CoPA). This law sought to draw together earlier separate legislative strands and to treat pollution and waste together as a unified concept.<sup>10</sup> The CoPA addressed waste disposal, water pollution, noise nuisance and air pollution, and was described as “the first formal recognition of the environment as a single entity.”<sup>11</sup> Thus, the CoPA served as a conduit for integrating and coordinating environmental regulation among media (i.e., air, land, and water) as well as for providing information to the public on air emissions and water discharges.

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<sup>10</sup> Vogel, D. *National Styles of Business Regulation: A Case Study of Environmental Policy*. (Washington, DC: Beard Books, 1986) p. 44.

<sup>11</sup> Bennett, G. “Pollution Control in England and Wales.” *Environmental Policy and Law* 5 (1979): p. 95.

Figure 2.1 – Integrating Pollution Control in the EU and UK



In addition to the CoPA serving as an early driver for integrating environmental regulation, the UK Royal Commission on Environmental Pollution (RCEP) published its fifth report in 1976 entitled *Air Pollution Control: An Integrated Approach*.<sup>12,13</sup> This report made a significant impact in promoting integration through its analysis of integrated pollution control, sustainable development, and use of “best practicable environmental option” (BPEO) when combating pollution. BPEO established the idea of seeking the option that would lead to the least overall damage to the environment when considering all emissions from a process and all the environmental outcomes. Specifically, the Commission stated that, “pollution of air cannot be looked at in isolation from pollution of land or water” and that media-specific pollution control did not solve the problem of environmental pollution; it merely pushed it in a different direction. Therefore, the RCEP recommended that to achieve effective pollution control, it was necessary to take an integrated approach. One of the steps toward reaching this goal was to have an integrated pollution control system implemented by a unified pollution inspectorate.

### **EU Air Framework Directive**

In the meantime, the EU started its transition toward integrated pollution control with the enactment of the Air Framework Directive (AFD) in 1984.<sup>14</sup> The AFD suggested a shift in the nature of environmental permitting legislation from single-media to cross-media and integrated. This directive introduced the concept of using the best available *technology* not entailing excessive costs (BATNEEC) to control pollution (emphasis is added to highlight that the BATNEEC concept articulated in the EU AFD was focused narrowly by using the word *technologies* rather than the broader word *techniques* found in subsequent legislation). By 1988, the RCEP published its twelfth report, which explored and further discussed the concept of the BPEO.<sup>15</sup> These technological concepts have evolved and are present in other permutations in the current EU/UK integrated permitting system.

### **The UK Integrated Pollution Control System**

The RCEP reports and the EU AFD were catalysts in the development of the UK 1990 Environmental Protection Act (UK EPA). Part I of the UK EPA mandated a system of “Integrated Pollution Control” (IPC) for all environmental media (i.e., air, land, and water).<sup>16</sup> This new IPC system was established to augment and update pollution controls established by

<sup>12</sup> UK Royal Commission on Environmental Pollution (RCEP), established in 1970, is an independent standing body that advises the Queen, the Government, Parliament, and the public on environmental issues. The RCEP issues reports or special new releases to share its advice. Its main role, contributing to policy development, is served “by providing an authoritative factual basis for policy-making and debate and setting new policy agendas and priorities.” Along with scientific and technological aspects of any proposed measure it reviews, it considers economic, ethical, and social issues in order to reach balanced conclusions that account for wide societal implications. See <http://www.rcep.org.uk/>.

<sup>13</sup> RCEP, 1976. *Air Pollution Control: An Integrated Approach*. <http://www.rcep.org.uk/reports2.htm#5>.

<sup>14</sup> Council Directive 84/360/EEC of 28 June 1984 on the combating of air pollution from industrial plants. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31984L0360:EN:HTML>.

<sup>15</sup> RCEP, 1988. *Best Practicable Environmental Option*. <http://www.rcep.org.uk/reports2.htm - 12>.

<sup>16</sup> The Integrated Pollution Control (IPC) system was implemented by both a centralized regulatory body as well as Local Authorities. Initially, Her Majesty’s Inspectorate of Pollution (HMIP), established in April 1987 by combining the functions of several regulatory bodies including the Alkali and Clear Air Inspectorate, implemented the IPC system on a national level for “Part A” processes. Local Authorities implemented the IPC system for “Part B” processes. Part A and Part B processes are discussed in chapters 3 and 4.

the 1974 CoPA.<sup>17</sup> Borrowing from the EU AFD, the IPC system required that facility owners/operators be granted an IPC authorization (permit) based on a demonstration that they were using BATNEEC, at this point defined as the best available *techniques* not entailing excessive costs with regards to the BPEO.<sup>18</sup>

In 1995, the Environment Act mandated the creation of the EA, which came into being in April 1996. The UK government's intent was to create a unified environmental protection agency to carry out statutory obligations, responsibilities, and powers.<sup>19,20</sup> The EA was named as the central authority, albeit not the exclusive entity, responsible for protecting and enhancing the environment – and attaining the objective of sustainable development.<sup>21</sup>

### ***EU Integrated Pollution Prevention and Control Directive***

As the UK was implementing the IPC system, the EU was in the midst of composing a directive that integrated pollution control efforts. The EU looked to the UK delegation to provide experience and insight for mandating and implementing an integrated regime across the EU. UK representation lobbied for and supported the EU institution of an integrated system in order to protect UK industry's competitive economic position within the EU.<sup>22</sup> The UK had a vested interest in ensuring that not only the EU adopt an integrated pollution control regime, but also that it be similar to the UK approach in order to facilitate a smooth transition to the EU regime.

The EU Integrated Pollution Prevention and Control Directive (IPPC Directive) was passed in October 1996 (included as Appendix C of this report).<sup>23</sup> The EU required that all member states transpose this directive into national law by October 1999 and fully implement it by October 2007.

### ***UK Pollution Prevention and Control Act***

To come into compliance with the IPPC Directive, the UK government passed the PPC Act of 1999 (outlined in Appendix D of this report). This new law replaced the original IPC system established in 1990 by Part I of the UK EPA. Further, the UK government instituted the Pollution Prevention and Control Regulations in 2000 (PPC Regulations) (outlined in Appendix

<sup>17</sup> Pollution Prevention and Control (Scotland) Regulations, 2000.

[http://www.scottish.parliament.uk/business/research/pdf\\_res\\_notes/rn00-69.pdf](http://www.scottish.parliament.uk/business/research/pdf_res_notes/rn00-69.pdf).

<sup>18</sup> Environmental Protection Act, 1990. [http://www.opsi.gov.uk/acts/acts1990/ukpga\\_19900043\\_en\\_1](http://www.opsi.gov.uk/acts/acts1990/ukpga_19900043_en_1). (See Part 1, Section 7 at [http://www.opsi.gov.uk/acts/acts1990/ukpga\\_19900043\\_en\\_2#pt1-pb2-l1g6t](http://www.opsi.gov.uk/acts/acts1990/ukpga_19900043_en_2#pt1-pb2-l1g6t).)

<sup>19</sup> Earlier attempts (in the late 1980s) to create a unified environmental agency had been rejected – maintaining independent, local authority responsibility for environmental matters. Bell, S. and D. McGillivray. *Environmental Law*, Sixth Edition. (New York: Oxford University Press, 2006) pp. 124-129.

<sup>20</sup> The EA was the result of combining several existing regulatory agencies – the National Rivers Authority, the Waste Regulation Authorities, and HMIP.

<sup>21</sup> The EA is not responsible for drinking water matters, conservation, or landscape protection. That said, “the EA is one of the largest environmental regulators in the world and its responsibilities range from issuing fishing licenses to regulating the disposal of hazardous waste.” (Bell and McGillivray, p. 125)

<sup>22</sup> Farthing, J., B. Marshall, and P. Kellet. *Pollution Prevention and Control – the New Regime*. (London: LexisNexis Butterworths, 2003) 2, pp. 4-5.

<sup>23</sup> IPPC Directive (Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control). <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31996L0061:EN:HTML>.

G of this report) to establish more detailed requirements for implementing the 1999 PPC Act.<sup>24</sup> By 2007 the UK was required to fulfill all of its mandates through the PPC Act and PPC Regulations. In moving from IPC to IPPC/PPC, the UK took a significant step advancing beyond multi-media environmental permitting towards more integrated, sustainability-focused "modern regulation."<sup>25</sup>

## Brief Description of IPPC and PPC

### *The EU Integrated Pollution Prevention and Control Directive of 1996*

The purpose of the IPPC Directive is to achieve “integrated prevention and control of pollution” from certain industrial activities in order to attain “a high level of protection for the environment taken as a whole.”<sup>26</sup> This is to be accomplished by preventing or reducing emissions to air, water, and land, including measures concerning waste. In practice, a system of permitting is to be implemented using Best Available Techniques (BAT) as the standard. The directive applies to six main industrial categories:

- Energy;
- Production and processing of metals;
- Minerals;
- Chemicals;
- Waste management; and
- Other (including pulp and paper production, textile treatment, tanning, food production, and the intensive rearing of poultry and pigs).

Since its original adoption in 1996, the IPPC Directive has been amended several times. Most notably, it has been updated to (1) reinforce public participation procedures; and (2) clarify the relationship between the IPPC permit conditions established in accordance with the IPPC Directive and the EU greenhouse gas Emission Trading Scheme (ETS).<sup>27</sup> Subsequent chapters of this report will discuss how the IPPC has been transposed into UK law and regulations, and how it applies to the UK permitting process.

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<sup>24</sup> As of April 6, 2008, the PPC Regulations have been replaced by the Environmental Permitting (EP) Regulations. Because the research and analysis for this report focused on the initial transposition of the IPPC Directive into UK law through the PPC Act and Regulations, it does not consider the EP Regulations in any detail. Information about the EP Regulations can be found at [www.defra.gov.uk/environment/epp](http://www.defra.gov.uk/environment/epp). Please also note that because the PPC permitting regime has been superseded by EP, some PPC materials and documentation referenced in this report may no longer be available through UK and EA web pages. Copies of any documents no longer available may be obtained from EPA through [www.epa.gov/permits/integrated.htm](http://www.epa.gov/permits/integrated.htm).

<sup>25</sup> Gray, J., T. James, and J. Dickson. “Integrated Regulation – Experiences of IPPC in England and Wales.” *Water and Environment Journal* 21 (2007): pp. 69-73.

<sup>26</sup> IPPC Directive, Article 1.

<sup>27</sup> For further information on ETS, see <http://ec.europa.eu/environment/climat/emission.htm>.

It is interesting to note that in practice individual EU countries exercise some degree of flexibility implementing the IPPC Directive. Thus, although EU directives are binding, the EU recognizes the sovereignty of each member state. Member states also have some latitude interpreting and applying selected aspects in the directive, such as BAT. Moreover, there is no guarantee of absolute consistency in IPPC implementation. In the UK, for instance, sector-specific guidance documents (known as UK technical guidance notes) are issued based on the BAT information exchange mandated by the IPPC Directive.<sup>28</sup> The UK technical guidance notes provide information by industry and take into consideration national environmental conditions and priorities.<sup>29</sup> The UK-specific implementation of IPPC – including the use of guidance – is discussed in detail in Chapter 4.

### ***The UK Pollution Prevention and Control Act of 1999***

The UK adopted the PPC Act of 1999 in order to transpose the IPPC Directive into national law. This new law set into place the steps necessary to update the IPC system established by the UK EPA, though from its passage in 1999 until October 2007, both systems (i.e., IPC and PPC) co-existed in the UK. (As of October 2007, the permitting system established by the PPC Act superseded prior regimes.) The UK government adopted the PPC Regulations in 2000 to establish more detailed requirements for implementing the PPC Act of 1999.

Under the PPC Act and Regulations, a facility owner/operator is granted an IPPC permit when it demonstrates that its operation meets the standard of BAT, which minimizes pollution to air, land and water. In a nutshell, determining BAT can be thought of as a tool to drive environmental performance at industrial facilities. BAT is not focused only on techniques currently in use at the facility, but it is also encourages facilities to find “emerging techniques” that will drive innovation in techniques and technologies to minimize all types of pollution in all media.<sup>30</sup> BAT incorporates and balances both the cost to the operator of the facility and the benefits to the environment.

The PPC Regulations apply to a wide range of industrial activities, including food and drink manufacturers, large-scale intensive livestock production (pigs and poultry), and landfills.<sup>31</sup> Using tools (such as *Environmental Protection Operator and Pollution Risk Appraisal* (EP OPRA) and *IPPC Horizontal Guidance Note for Environmental Assessment and Appraisal of BAT* (H1), both discussed in Chapter 4), industry must assess all environmental impacts expected to water, air, and land as well as other effects, such as energy efficiency, site restoration, noise, odor, waste minimization, accident prevention, heat and vibrations.

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<sup>28</sup> IPPC Directive, Article 16(2): “The [European] Commission shall organize an exchange of information between member states and the industries concerned on best available techniques.”

<sup>29</sup> See Chapter 4 for more on the relationship between EU-level reference documents and ultimate permit terms.

<sup>30</sup> Joachim, L. and K. Sander. “Is the BREF Process a Success or a Failure? – an NGO Perspective.” Paper presented at the European Conference on The Sevilla Process: A Driver for Environmental Performance in Industry. Stuttgart, Germany. 6-7 April 2000. [http://www.ecologic-events.de/sevilla1/en/documents/Lohse\\_en.PDF](http://www.ecologic-events.de/sevilla1/en/documents/Lohse_en.PDF).

<sup>31</sup> DEFRA. *Industrial Pollution Control Regimes*.

<http://www.defra.gov.uk/environment/ppc/background/pdf/indpollution-controlregimes.pdf>.

Based on the IPPC Directive's expansive coverage of environmental impacts, the UK system takes into account cross-media and sustainability factors in the development and implementation of environmental permitting controls. In short, the UK permitting structure is more than just "multi-media" in nature and the permitting system more expansive than just permit issuance. In fact, the UK actually refers to its approach as an integrated regulatory (not just permitting) regime – of which the intent is to enhance and modernize the traditional permitting process by incorporating holistic management, operation, compliance assessment, and implementation of environmental protection in its entirety.<sup>32</sup>

## The Evolving Integrated Permitting Regime

### **"Better Regulation"**

In March 2000, the European Council meeting in Lisbon, Portugal, launched what has become known as the "Lisbon Strategy:" a series of targets and actions designed to make the EU the most competitive economy in the world. A desire to reconcile economic growth and competitiveness with government regulation – particularly with environmental laws and regulations – has been a long-standing global interest for both industry and government.<sup>33</sup> In Europe, and in the UK, reconciling these two pressures has been the goal of what has been labeled as the "Better Regulation Agenda."

In the UK, oversight of "better regulation" is the responsibility of the Better Regulation Executive (BRE).<sup>34</sup> The BRE is charged with driving regulatory programs toward greater efficiency and effectiveness through strategies that "regulate only when necessary and in proportion to risk; measure and then reduce administrative burdens; and rationalize inspection and enforcement arrangements for business."<sup>35,36</sup> Importantly, these strategies have influenced and shaped the development of the UK integrated permitting system – the legislation, guidance and tools. What the EA calls "modern regulation" is the response to "better regulation" for England and Wales.

<sup>32</sup> Gray et al., pp. 69-73.

<sup>33</sup> See Network of Heads of European Environmental Protection Agencies, 2005. *The Contribution of Good Environmental Regulation to Competitiveness*. [http://www.eea.europa.eu/documents/prague\\_statement/prague\\_statement-en.pdf](http://www.eea.europa.eu/documents/prague_statement/prague_statement-en.pdf): "We [the network] conclude that there is now significant evidence from international research that good environmental management and regulation does not impede overall competitiveness and economic development. On the contrary, it can be beneficial by creating pressure that drives innovation and alerts business about resource inefficiencies and new opportunities."

<sup>34</sup> The BRE, formerly in the Cabinet Office, is now located within the government department of Business, Enterprise and Regulatory Reform. The UK is also in the process of establishing a Local Better Regulation Office (LBRO) that is charged with driving forward best regulatory practices at the local level – "reducing burdens on business that comply with the law while targeting those who flout it" (see <http://www.lbro.org/introducing/>). With the passage of the Regulatory Enforcement and Sanctions Bill, the LBRO will convert to a statutory Non-Departmental Public Body in 2009.

<sup>35</sup> Kellett, P. "'Better Regulation': What the Modernising Agenda Might Mean for UK Environmental Laws." *Environmental Law & Management* 18 (2006): p. 174.

<sup>36</sup> UK regulating agencies are audited against a government-wide target to reduce administrative burden by 25 percent. The outcome of the EA audit may influence whether or not it is awarded the authority to levy administrative penalties against violators.

**“Modern Regulation”**

The EA describes its approach to “modern regulation” as risk-based (or proportionate), results-focused (or targeted), consistent, transparent, and accountable.<sup>37</sup> Table 2.1 below describes these goals and principles along with their practical applications in the integrated permitting system. For example, the EA EP OPRA tool is both a cornerstone of “modern regulation” as well as an integral part of integrated permitting. The EP OPRA tool and many of the other permitting applications and tools listed below are discussed in subsequent chapters of this report.

**Table 2.1 – “Modern Regulation” Goals and Practical Application in Integrated Permitting<sup>38</sup>**

<b>“Modern Regulation” Goals  (“Better Regulation” Principles)</b>	<b>Practical Application</b>
<b>Risk-based (proportionate):</b> Allocating resources according to a risk assessment and explaining [the EA] decision not to focus on low risks	Environmental Protection Operator and Pollution Risk Appraisal ( EP OPRA)
<b>Results-focused (targeted):</b> Focused on ensuring the best possible environmental outcomes.	Compliance assessment tools
<b>Consistent:</b> Common ways of licensing and permitting across all activities and geographic areas.	Core regulation Environmental Permitting Programme (EPP) Enforcement and Prosecution Policy
<b>Transparent:</b> Better communications with customers.	Building Trust with communities toolkit What’s in my backyard Spotlight report
<b>Accountable:</b> Explaining decisions.	Compliance Assessment Plans Industry sector plans

“Modern regulation” has also made it relatively easy for the UK integrated system to adapt and evolve in order to meet the steady flow of new legislative requirements coming from the EU.<sup>39</sup> Current PPC legislation has successfully incorporated or delivered a number of pieces of EU legislation within the confines of a single system.

<sup>37</sup> EA, 2006c. *A Guide to Modern Regulation, Getting Better Results*. EA Document No. GEHO0806BLCQ-E-P.

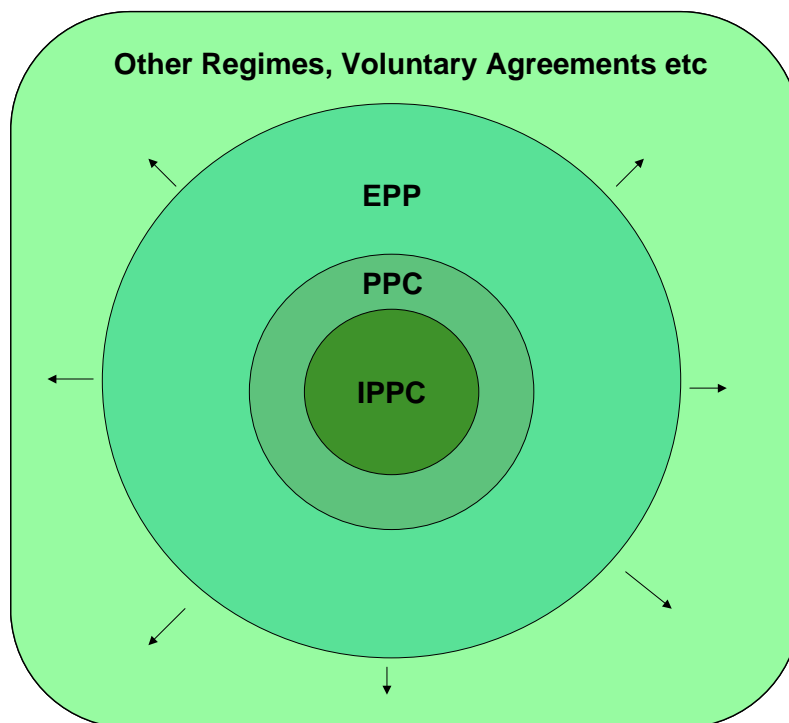
<sup>38</sup> Table adapted from EA, 2006c, p.3.

<sup>39</sup> This finding has been relayed to EPA on multiple occasions by colleagues at the UK EA.



This trend also continued with the release of the Environmental Permitting Regulations (EP Regulations, also known as the Environmental Permitting Programme (EPP)) in April 2008. The EP Regulations represent a capstone to the UK's recent efforts to modernize environmental permitting. The 2008 EP Regulations deliver a total of 11 different EU directives. They incorporate IPPC requirements but in addition, streamline, simplify and combine IPPC permitting with waste management licensing so that only a single permit is required. The EP Regulations contain new provisions for standard permits and a streamlined consultation process.<sup>40</sup> Figure 2.2 below schematically illustrates modernization and the expanded (as well as expanding) umbrella of integrated industrial regulation in the UK. With IPPC nested at the core, UK regulation has moved outward to harmonize and consolidate an increasing number of requirements that once operated independently of each other.

**Figure 2.2 – Modernization of Integrated Industrial Regulation in the UK<sup>41</sup>**

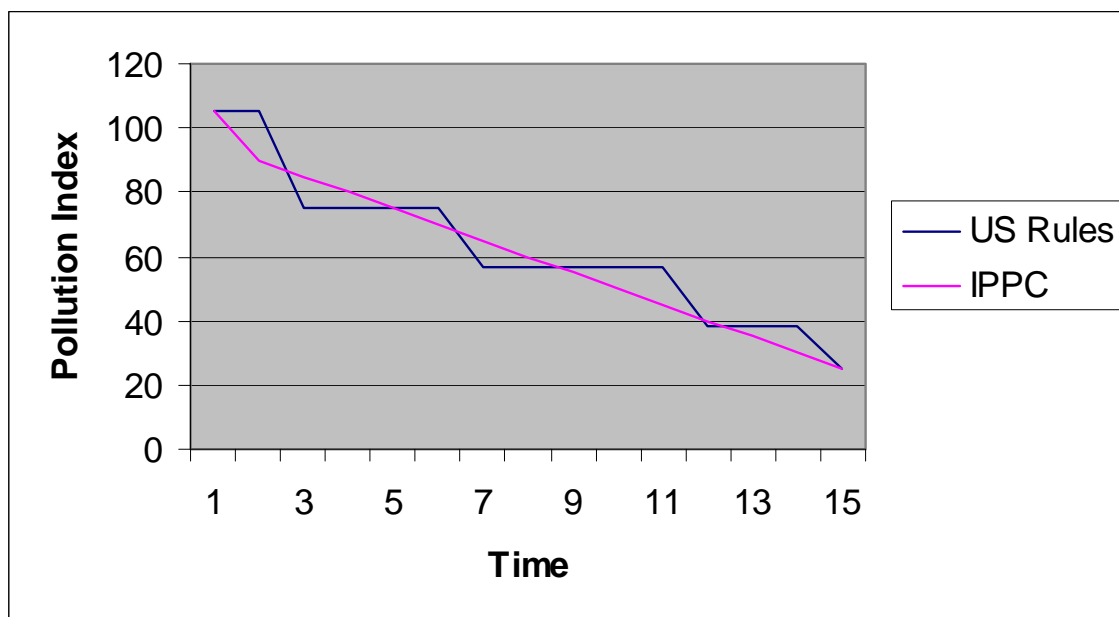


<sup>40</sup> For more information on the 2008 EP Regulations, see [www.defra.gov.uk/environment/epp](http://www.defra.gov.uk/environment/epp).

<sup>41</sup> James, T. "Integrated Regulation in the UK." Presentation at the workshop Lessons from the United Kingdom's Integrated Permitting Experience: Exploring New Directions for Environmental Permitting in the US. Washington, DC. 25 October 2007.

Some at the EA view this “modern” integrated regulatory system as having resulted in a relatively smooth, gradual and even path to environmental improvement over time.<sup>42</sup> Once into the system, improvements or “ratcheting up” occurs somewhat automatically as a result of features built into the regulatory system. In contrast, EA officials interviewed for this report perceive the US as having followed a much less even course – progress and improvement in the US occurs in bigger jumps and mainly as a result of exogenous factors. This is illustrated diagrammatically in Figure 2.3 below.

**Figure 2.3 – Path to Progress under IPPC and US Regulatory Programs<sup>43</sup>**



The two systems may, and probably do, reach similar environmental endpoints – in both cases ultimately determined by politics and technology, but the journey there may be rough or smooth, painful or less painful depending on system design. This observation may be useful food for thought as US readers learn more about the UK integrated permitting system in the remainder of this report.

<sup>42</sup> James, T. “Integrated Regulation in the UK.” Presentation at the workshop Lessons from the United Kingdom’s Integrated Permitting Experience: Exploring New Directions for Environmental Permitting in the US. Washington, DC. 25 October 2007.

<sup>43</sup> James, T. “Integrated Regulation in the UK.” Presentation at the workshop Lessons from the United Kingdom’s Integrated Permitting Experience: Exploring New Directions for Environmental Permitting in the US. Washington, DC. 25 October 2007.

## Organizations Responsible for Integrated Permitting

This section takes a closer look at the primary actors in the permitting process from EU legislators to UK national and local authorities.

### EU

In the EU, as in the US, a “federal-state” relationship exists in establishing and implementing environmental protection mandates and requirements. The European Commission (EC) (including the Directorate-General for Environment and the European IPPC Bureau (EIPPCB) in Brussels and Seville) constitutes the “federal” authority, and the individual EU member states (and sub-national authorities in the case of the UK) play a role very similar to the US states in implementing EU-wide legislation.<sup>44</sup>

The role of the EC is to define and initiate new legislation that mandates measures and practices that have been agreed to collectively by EU member states (e.g., in the form of environmental directives such as the IPPC). Member states must in turn translate EU mandates into domestic law and systems, much like states may do in the US.<sup>45</sup> As much as 80 percent of environmental legislation in the UK results from EU mandates.<sup>46</sup>

### UK

In the UK, the work of implementing the EU IPPC Directive falls to the government’s Department for Environment, Food and Rural Affairs (DEFRA) and the DEFRA-sponsored EA. DEFRA is the environmental policy-making body<sup>47</sup> while the EA, under some direction from DEFRA, is the agency with the technical and administrative expertise and responsibility for determining (issuing) permits to facilities covered by the IPPC Directive. While DEFRA and the EA are clearly differentiated organizationally, the lines dividing responsibility between them are not always as precise or brightly defined. Nominally the EA role is to translate government policy into practice, but the reality is that the EA contributes to policy making as well as to policy implementation.

DEFRA is headed by a Secretary of State, an Under-Secretary and three Ministers of State who are members of Parliament, all of whom report to the Prime Minister. In contrast to DEFRA and to EPA in the US, the EA is an independent regulatory agency – a “Non-Departmental Public Body” – that operates at arm’s length from the political arm of government (DEFRA).<sup>48</sup> The EA is governed by a board which legally constitutes the agency, and which is directly responsible to

<sup>44</sup> Vogel, D., M. Toffel, and D. Post, “Environmental Federalism in the European Union and the United States.” In *Handbook of Globalization in Environmental Policy: National Governments Interventions in a Global Arena*. eds., Frank Wijen, Kees Zoeteman, Jan Peters, and B.C.S. Zoeteman (Cheltenham: Edward Elgar, 2005).

<sup>45</sup> US states have the option of implementing federal programs. In some cases, the federal government retains the authority to implement an environmental program at the state level.

<sup>46</sup> Wolf, S. and N. Stanley. *Wolf and Stanley on Environmental Law*. Fourth Edition. (Coogee: Cavendish Publishing, 2003) p. 3.

<sup>47</sup> Among other things, DEFRA develops and implements policy and drafts environmental laws, and on an annual basis informs Parliament of its plans for new legislation. With most of the legislative mandates now coming from the EU, DEFRA is doing less legislatively.

<sup>48</sup> See <http://www.environment-agency.gov.uk/> and <http://www.defra.gov.uk/environment/index.htm>.

the government ministers (and in turn to Parliament through the ministers) for all aspects of the EA operations and performance. The EA Board delegates day-to-day management of the agency to the Chief Executive and staff. Thus, the EA functions much more like a private corporation than any environmental agency – state or federal – in the US. Consequences of this arrangement are discussed in subsequent chapters of this report.

The EA jurisdiction extends to England and Wales only.<sup>49</sup> The EA territory is divided up into eight regions and regional offices and approximately 20 area offices in England and Wales.<sup>50</sup> The EA has a budget of approximately \$2 billion and 11,800 staff.<sup>51</sup> Its funding comes through three main sources: grants from DEFRA, regulatory charges (approximately \$600 million), and flood defense levies.<sup>52</sup> Additional support comes through grants for capital expenditures and unspecified other sources.

The EA consists of a Head Office, and the aforementioned eight Regions and 20 or so area offices. The area offices are staffed by local area inspectors. At the start of the IPPC permitting process, the area office Inspectors were responsible for issuing IPPC permits. This function was eventually transferred away from the area offices to a centrally-located Strategic Permitting Group (SPG).<sup>53</sup> Centralizing the permitting function resulted in significant efficiency improvements.<sup>54</sup> Specifically, consistency and quality improved along with efficiency and it became easier to provide training and guidance to permit writers. The EA was also better able to manage its resource use against the income generated from permitting fees.<sup>55</sup> With the completion of the initial round of IPPC permitting in October 2007, the EA scaled back its permitting operations and replaced the SPG with a new (eventually smaller) National Permitting Service (NPS).<sup>56</sup> The NPS will focus on any residual IPPC permitting and assume responsibility for new applications, permit variations and permit review – permit variations and review are discussed in Chapter 6.

Traditionally, EA permitting personnel brought a significant amount of prior (private) industry experience to the job of regulating. As will be discussed in later sections of this report, the nature of integrated permitting – from standard-setting process to the comprehensive scope of the permits themselves – requires that local area inspectors as well as permit writers be particularly knowledgeable about the industry and facility they are regulating. While the ability of the EA to attract people from industry has diminished over time, this experience and expertise tends to be concentrated in the local area offices. As a result, area office inspectors are often called upon

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<sup>49</sup> Permitting in Scotland and Northern Ireland is regulated by the Scottish Environmental Protection Agency (SEPA) and the Department of the Environment for Northern Ireland (DOENI), respectively. (Bell and McGillivray, pp. 120-123) This report focuses on IPPC permitting in England and Wales exclusively.

<sup>50</sup> The eight EA regions are Anglian, Midlands, North East, North West, South West, Southern, Thames, and Wales.

<sup>51</sup> EA, 2006b. *Corporate Plan: Translating Strategy into Action*. <http://www.environment-agency.gov.uk/aboutus/275292/234823/?version=1&lang=e>.

<sup>52</sup> Bell and McGillivray, p. 129.

<sup>53</sup> The SPG was managed by a single overall manager with four locations across England, in Warrington, Bristol, Bedford and Nottingham.

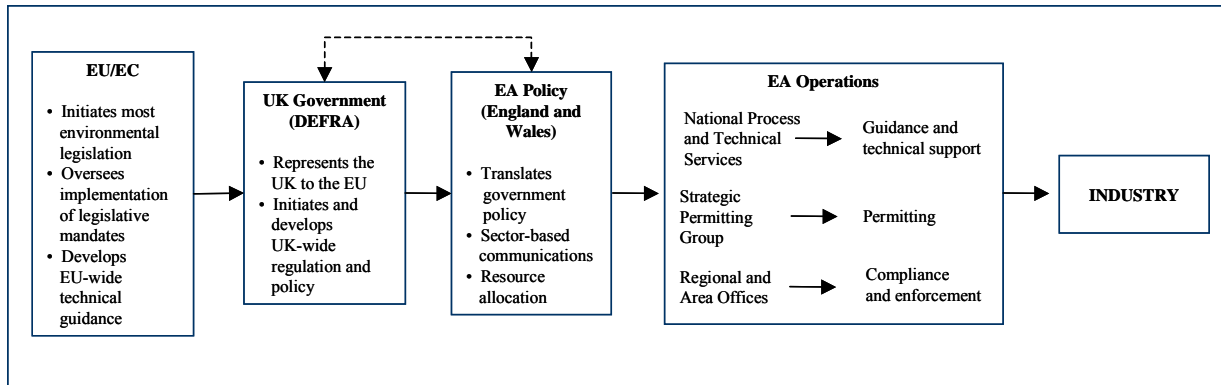
<sup>54</sup> The EA reported that hours spent per application went from 184 to 85 once the SPG took over the function.

<sup>55</sup> The organizational details of the initial and current models for permitting are found in Appendix H.

<sup>56</sup> The NPS was due to begin operations on November 1, 2007. SPG staff would remain a part of the NPS until April 2008 in order to complete any remaining processing of the initial round of IPPC permits.

to contribute to permitting operations in the central offices. In general, there is a fair amount of interchange between different parts of the EA – staff move frequently. Figure 2.4 summarizes the organizational roles and relationships that have just been described.

**Figure 2.4 – Organizational Roles in Industrial Regulation<sup>57</sup>**



The largest and most complex industrial facilities that must obtain an integrated permit under the IPPC Directive<sup>58</sup> are overseen and regulated by the EA. These facilities constitute approximately 85 percent of the IPPC facilities – and are the facilities central to discussion in this report.

Local authorities (LA) are those UK local agencies with specialized functions that focus on planning, public health, noise and air pollution control, waste collection and disposal, contaminated land, and sustainable development. Organizationally they include district, London or metropolitan borough councils in England, and county and borough councils in Wales.

The UK designates certain facilities (generally those that are smaller and less complex) to be regulated by LAs. These smaller facilities generally pose a lower risk or potential to pollute. In addition, the EA is required to consult with LAs – the “statutory consultee” role is described in Chapter 3 – on each IPPC permit application (not regulated directly by LAs).

### Cultural Factors in Regulatory Implementation

In understanding the UK integrated permitting regulatory structure, underlying and less tangible cultural factors should not be overlooked. Even limited exposure to the UK system reveals a cultural context that is quite different than that in the US. In particular, the UK system appears to rely more heavily on cooperation – a partnership of the regulator and regulated that capitalizes on relevant sector expertise applied to a facility’s “technical characteristics” as well as a facility’s “geographical location” and the “local environmental conditions.”<sup>59</sup> A key theme of

<sup>57</sup>James, T., EA Policy Manger. Personal communication. 16 July 2007.

<sup>58</sup> In the UK, IPPC facilities are classified as Part A facilities under the PPC Act and Regulations (as will be discussed in Chapter 3).

<sup>59</sup> Pollution Prevention and Control (PPC) (England and Wales) Regulations, 2000. <http://www.opsi.gov.uk/si/si2000/20001973.htm>, §2(12)(6).

IPPC permitting in the UK is the flexible approach to setting individualized emission and process standards.<sup>60</sup> This entails a continuing, collaborative relationship between the regulator and regulated parties for purposes of permit development and permit implementation.

A leading comparative study of the UK and US regulatory systems drew the following conclusions:<sup>61</sup> “Business participation in the making and implementation of [UK] environmental policy is both assumed and assured... While business does not always win, its views are always given careful consideration by government officials and its access to policy makers is assured by both law and custom... In America, however, the importance given to economic considerations is in large measure dependent on the lobbying and litigation skills of business... As a result, American executives have been forced to devote far more political and legal resources to influence environmental policy than their [UK] counterparts.”<sup>62</sup> “In general [UK] policymakers... have relied far more on the technical and scientific expertise and experience of industry than have their counterparts in the US.”<sup>63</sup>

The UK is characterized by a “highly respected civil service,” a business community that “to a great extent is prepared to cooperate with government officials,” and a public that is “not particularly mistrustful of large corporations.” These three components are interrelated; each stems from the “relatively subordinate role played by business and business values in British society and culture.” In contrast, America is a nation whose “business community remains suspicious of public authority and whose public has little confidence in either the ability or willingness of government officials to control corporate conduct effectively.”<sup>64</sup>

The UK’s less adversarial regulatory system affects the permitting process in a number of ways, as will be apparent throughout the remainder of this report. As these introductory chapters have described, the UK framework for environmental permitting consists of a foundation of UK national statutes built over time and influenced by EU directives, upon which is built a structure shaped by UK/EU guidance, applicable regulations, business and industry dynamics and pressures, organizational relationships, and finally, cultural factors. The next chapter will explore in detail the key components of the EU IPPC Directive and the UK PPC Act and regulations and the relationships between them.

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<sup>60</sup> Bell and McGillivray, p. 298.

<sup>61</sup> The two ideas described in the text derive from observations from Vogel, 1986. Although Vogel’s book is dated, it is useful in offering a general picture of the culture and society supporting UK environmental policy. (Changes in both the EU and UK may lead to updates and revisions to Vogel’s assessment. For commentary in support of this later point of view, see Bell and McGillivray, p. 252-253.)

<sup>62</sup> Vogel, 1986, p.172.

<sup>63</sup> Vogel, 1986, p.186.

<sup>64</sup> Vogel, 1986, pp.142-180, 226-258.

### 3. THE LEGAL FRAMEWORK FOR INTEGRATED PERMITTING

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The UK system is intended to be a comprehensive, cross-media scheme – integrating across all media and all aspects of a regulated facility’s operations with the goal of ecological sustainability. This chapter describes the legal structure for permitting in the UK, beginning with the requirements of the IPPC Directive and describing how those terms are carried forward and implemented in the PPC Act and the PPC Regulations (for England and Wales<sup>65</sup>). Focusing on the written law, regulations, and relevant ties to the IPPC Directive, this chapter sets the stage for exploring how the UK permitting process works in practice (Chapter 4).<sup>66</sup>

#### The UK Integrated Permitting Regime: General Structure

As Chapter 2 describes, the current integrated permitting system in the UK has evolved over nearly two decades. The UK implemented the 1996 EU IPPC Directive with the enactment of the PPC Act 1999.<sup>67</sup> The PPC Act builds on the UK IPC regime (enacted in 1990) and provides the statutory framework for the issuance of integrated permits in which a range of multi-media emissions and other environmental impacts are considered together. Under the PPC Act, regulations were adopted that define procedures for the operation and management of the permitting system: enforcement, permit conditions and variations, public notice, licensing fees, along with other pertinent elements.<sup>68</sup> Beyond the regulations, significant reliance on guidance is key for carrying out the procedural and substantive details of integrated permitting.<sup>69</sup> The IPPC system (in England and Wales) is implemented jointly by the UK EA and LAs.

The EU IPPC Directive is fundamental to the UK permitting structure – and works in tandem with the UK statutory authority (PPC Act) and implementing regulations. For instance, the UK relies on the IPPC Directive and other EU directives to define the permitting process and create timelines for implementation. The IPPC Directive definitions (including the terms pollution, emission, BAT, installation) support an integrated permitting institution that promotes ecological sustainability and covers emissions to air, water, and land; generation and recovery of waste; raw materials use; energy efficiency; noise; and the prevention of accidents and site remediation on closure.<sup>70</sup> Other related EU directives and UK statutes create an underpinning for the UK system as well, such as providing for further permitting authority.<sup>71</sup> The interaction of domestic and

<sup>65</sup> PPC Regulations 2000 apply only to England and Wales. The Secretary of State for the DEFRA must consult SEPA and the Department of the Environment for Northern Ireland, as well as the EA for England and Wales, before applying regulations under this Act. The Pollution Prevention and Control (PPC) Act, 1999. <http://www.opsi.gov.uk/ACTS/acts1999/19990024.htm>, §§2(4), 5, 7.

<sup>66</sup> There are numerous authorities describing, exploring, and critiquing the UK system and EU/UK relationship. See references cited in report bibliography, in particular, Bell and McGillivray.

<sup>67</sup> All member states of the EU were required to adopt necessary laws, regulations, and administrative provisions in compliance with the IPPC Directive within 3 years of its “entry into force.” The IPPC Directive was required to be implemented in all EU member states by October 2007.

<sup>68</sup> See the DEFRA website for PPC Regulations, guidance, and other information, at <http://www.defra.gov.uk/environment/ppc/index.htm>.

<sup>69</sup> Bell and McGillivray, p. 97.

<sup>70</sup> Farthing et al, p. 7.

<sup>71</sup> For EU directives and UK statutes relevant to the implementation of IPPC, see the discussion in the following sections of this chapter: EU IPPC Directive and UK Statutory Framework.

international sources for environmental law in the EU creates an overlapping, general framework for integrated permitting in the UK (and other member states).<sup>72</sup>

## The EU IPPC Directive

This section outlines the main features of the 1996 EU IPPC Directive, which provides the major underpinning for the UK legal framework (see Appendix C for the full text of the IPPC Directive). The stated purpose of the IPPC Directive is

...to achieve integrated prevention and control of pollution arising from [listed activities, through] measures designed to prevent or, where that is not practicable, to reduce emissions in the air, water and land...in order to achieve a high level of protection of the environment taken as a whole....<sup>73</sup>

The IPPC Directive requires member states to ensure that facilities<sup>74</sup> prevent pollution first and control pollution second by requiring the following:

- “All the appropriate preventive measures are taken against pollution, in particular through the application of BAT;
- No significant pollution is caused;
- Waste production is avoided...; where waste is produced, it is recovered or, where that is technically and economically impossible, it is disposed of while avoiding or reducing any impact on the environment;
- Energy is used efficiently;
- The necessary measures are taken to prevent accidents and their consequences; and
- The necessary measures are taken upon definitive cessation of activities to avoid any pollution risk and return the site of operation to a satisfactory state.”<sup>75</sup>

Member states are required to ensure that the IPPC Directive is fully implemented within a set time period.<sup>76</sup> The IPPC Directive does not state specifically that all permits must be fully

<sup>72</sup> Bell and McGillivray, p. 90.

<sup>73</sup> IPPC Directive, Article 1.

<sup>74</sup> To simplify, this report uses the term “facility” to stand in for both “installation” and “mobile plant” throughout this chapter, except where directly quoting the EU/UK laws or regulations. The IPPC Directive, Article 2.3 defines the term “installation” to mean “a stationary technical unit where one or more activities listed in Annex I are carried out, and any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution.” In the UK, the terms “installation” and “mobile plant” translate roughly to the terms “facility” and “mobile source” as used in US environmental law. Note that the term “facility” may not be defined identically in all US environmental statutes.

<sup>75</sup> IPPC Directive, Article 3.

<sup>76</sup> Requirements went into effect immediately for new installations (IPPC Directive, Article 4), with up to eight years allowed for new or revised permits at existing installations (IPPC Directive, Article 5).



integrated, but does provide that “the permit” must include “all measures necessary for compliance with the requirements” listed above.<sup>77</sup> The IPPC Directive then specifies essential permit conditions, ranging from emissions limits to conditions for waste management, monitoring, malfunction contingencies, and other terms.<sup>78</sup> Of particular importance is the following requirement:

The permit shall include *emission limit values* for *pollutants*...likely to be emitted from the installation...in *significant quantities*, having regard to their *nature and their potential to transfer pollution from one medium to another*...[These requirements] shall be based on the *best available techniques*, without prescribing the use of any technique or specific technology, but taking into account the technical characteristics of the installation concerned, its geographical location and the local environmental conditions... In all circumstances the conditions of the permit shall...ensure a *high level of protection for the environment as a whole* [emphasis added].<sup>79</sup>

By way of the IPPC Directive, the BAT requirement takes on a central role in the integrated permitting process. If BAT does not achieve ambient “environmental quality standards,” the IPPC Directive requires additional measures be taken to ensure a high level of protection.<sup>80</sup>

These terms and requirements may sound familiar to a reader knowledgeable about US environmental permitting. In general, the US system relies on a mix of technology-based standards and environmental quality standards to determine the requirements applicable to a particular facility. These standards often use similar sounding terms, such as Best Available Control Technology (BACT) under the Clean Air Act (CAA) or Best Available Technology under the Clean Water Act (CWA).<sup>81</sup> However, the similarity in terminology may be misleading: the UK term “best available techniques” is broader than the variations on “best available technology” as typically used in the US. Chapters 4 and 5 will explore further the UK practices for determining and using BAT and other permit requirements.

Other fundamental differences exist between the EU IPPC permitting and US environmental permitting systems:

- In IPPC, all permit requirements are addressed together to achieve “a high level of protection for the environment *as a whole*” (emphasis added);

<sup>77</sup> Where more than one “competent authority” is involved (issuing separate permits), both the conditions of and the procedure for issuing permits must be “fully coordinated...in order to guarantee an effective integrated approach.” IPPC Directive, Article 7.

<sup>78</sup> IPPC Directive, Article 9 (Conditions of the permit).

<sup>79</sup> IPPC Directive, Article 9(3) and 9(4).

<sup>80</sup> IPPC Directive, Article 10.

<sup>81</sup> It should be noted that despite the single-media focus of US technology-based standards under the CWA and CAA, national air and water standards do take into account considerations beyond the individual medium. For example, energy use is inherent in the technology assessment done under CWA National Pollutant Discharge Elimination System (NPDES) effluent limitations guideline development inasmuch as it is linked to goals of the CWA. The same is true for CAA technology-based standard development.

- In IPPC, the same general standard (BAT supplemented by environmental quality standards (EQSs) where applicable) is used for all media and aspects of facility operation;<sup>82</sup>
- The IPPC Directive pulls together elements that are scattered across different statutes in the US, including not only pollution control, but also matters such as waste management and facility closure;
- IPPC permits address matters not within the scope of US federal environmental permits, such as energy efficiency, noise, odor, hazardous waste management,<sup>83</sup> and safety (and as will be shown below, the UK brings even more matters within the scope of its system); and
- A significant degree of discretion is granted to set facility-level requirements based on economic and local environmental considerations in IPPC implementation.

The IPPC Directive also includes requirements regarding public participation; this process is summarized later in this chapter.

## UK Statutory Framework

The PPC Act can be described as an umbrella statute that organizes overall UK environmental protection laws based on EU directives, national sector standards derived from those directives, and existing media-specific statutes.<sup>84</sup> (See Appendix D for an outline of the PPC Act.) The PPC Act's stated purpose is to implement the IPPC Directive "concerning integrated pollution prevention and control."<sup>85</sup> Rather than elaborating on the terms in the IPPC Directive or specifying details of a national permitting regime, the PPC Act simply gives the Secretary of State for DEFRA the power to promulgate regulations for achieving the objective of "progressive improvement," such as the following:<sup>86</sup>

<sup>82</sup> In the US, similar terms appear in most statutes. However, because rules and practices are developed separately under different regulatory programs, the terms have taken on somewhat different meanings in those programs. Furthermore, the US statutes address these issues in very different ways. Under the CAA, for example, air quality standards are set at a national level, whereas under the CWA, water quality standards can vary from state to state and even within a state.

<sup>83</sup> Hazardous waste permits are required in the US for treatment, storage, and disposal facilities. Many other facilities are subject to hazardous waste regulation but are not required to obtain permits.

<sup>84</sup> As such, the PPC Act serves as a mechanism for delivering new (and incorporating existing) regulatory requirements to affected facilities. James, T. "Integrated Regulation in the UK." Presentation at the workshop Lessons from the United Kingdom's Integrated Permitting Experience: Exploring New Directions for Environmental Permitting in the US. Washington, DC. 25 October 2007.

<sup>85</sup> PPC Act 1999, §1(1)(a).

<sup>86</sup> The PPC Act invests in the Secretary of State the authority to create regulations to provide for a range of relevant purposes, enumerated in PPC Act 1999, Sch I, Part I. For instance, the Secretary of State is given the authority for prescribing and imposing the conditions of permits; inspecting, monitoring, and enforcing activities related to permits; and other relevant activities. PPC Act 1999, Sch 1, Part 1, §§6-8,14-18. While the PPC Act provides specific purposes for which regulations may be issued by the Secretary of State, the PPC Act concurrently vests the

- “Establishing standards, objectives, or requirements in relation to emissions;”
- Making plans for “the setting of overall limits,” “allocation of quotas,” and “progressive improvement of standards or objectives;”
- “Prohibiting persons from operating any installation or plant...or otherwise carrying on any activities, except (a) under a permit in force under the regulations, and (b) in accordance with any conditions to which the permit is subject”;
- Prescribing the contents of permits and authorizing permits to be granted, modified and revoked by regulators;
- Determining which authorities have regulatory authority;
- Allowing the government to require the compilation of information on emissions, energy use, efficiency of energy use, and other matters; and
- Providing for the ETS.<sup>87</sup>

The PPC Act also provides the general authorization for activities such as enforcement, information gathering, and permit variation. It articulates the relationship between the PPC Act and other relevant and applicable statutory authorities, supplementing the Act by incorporating by reference media-specific UK environmental statutes and declaring PPC requirements

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Secretary with the power to attach to regulations “consequential, incidental, supplementary, transitional or saving provisions...as the Secretary of State considers appropriate.” PPC Act 1999, §2(3)(a).

<sup>87</sup> This report does not include discussion regarding the ETS concept in detail. In general, “[o]ver 1,000 installations throughout England, Northern Ireland, Scotland, and Wales are covered by the EU ETS. To be compliant, each installation is required to obtain a greenhouse gas (GHG) permit and to monitor and report its carbon dioxide (CO<sub>2</sub>) emissions. The full consultation on the proposed U.K. auction design for use in the EU ETS is available at <http://www.defra.gov.uk/corporate/consult/euets-phase2auction/index.htm>.” BNA (The Bureau of National Affairs, Inc.) Daily Environment Report, Number 248, 28 December 2007 (ISSN 1521-9402), p. A-5. The ETS is comprised of two phases: Phase II runs from 2008-2012 coinciding with the first Kyoto commitment period. Allocations are set forth in the UK National Allocation Plan, approved by the European Commission (EC) in November 2006 and published in final in March 2007. The UK allocated 246 million allowances (one allowance is equivalent to one tons/year of CO<sub>2</sub>), designed to deliver reductions amounting to 29 million tons/year of CO<sub>2</sub>. The results of all member states’ actions to reduce emissions under ETS were reported on the EC’s website in May 2006 (<http://www.defra.gov.uk/corporate/deprep/2007/chapter02.pdf> at pp.14-15). Using auctioning as an allocation methodology in its own right is discussed in the ETS consultation report – now open for comment until March 2008 (<http://www.defra.gov.uk/corporate/consult/euets-phase2auction/consultation.pdf>). ETS or GHG permits are separate from IPPC permits. EPA is not aware of plans to fold GHG permits into IPPC permits – or into the Environmental Permitting Program permits effective as of April 2008 ([http://www.opsi.gov.uk/si/si2007/uksi\\_20073538\\_en\\_1](http://www.opsi.gov.uk/si/si2007/uksi_20073538_en_1)). Also, see the 2004 and 2005 Explanatory Memoranda to the Gas Emissions Trading Scheme at [http://www.opsi.gov.uk/si/em2004/uksiem\\_20043390\\_en.pdf](http://www.opsi.gov.uk/si/em2004/uksiem_20043390_en.pdf) and [http://www.opsi.gov.uk/si/em2005/uksiem\\_20050925\\_en.pdf](http://www.opsi.gov.uk/si/em2005/uksiem_20050925_en.pdf).

incorporated into certain UK statutes.<sup>88,89</sup> In essence, the PPC Act acts as a “tool box,” coordinating existing and delivering new EU requirements to the UK regulated community.<sup>90</sup> Thus, the PPC Act is far more general in scope and direction than most US environmental statutes. It is less detailed, in fact, than the IPPC Directive (although the IPPC Directive is cross-referenced). The actual operational details of the integrated permitting system in the UK, including the terms applying key concepts in the IPPC Directive, appear in the PPC implementing regulations, discussed below (and are expanded upon in related UK guidance documents).

Another distinctive feature of the PPC Act is the very broad scope of regulatory authority given to the government. The statute authorizes regulation with regard to any of the following matters:

- Implementing the IPPC Directive concerning integrated pollution prevention and control;
- “Regulating...activities which are capable of causing any environmental pollution;”<sup>91</sup> and
- “Otherwise preventing or controlling emissions capable of causing any such pollution.”<sup>92</sup>

In regulating industrial and commercial activities, the PPC Act defines key terms in a manner that tends to maximize the scope of potential regulatory authority.<sup>93</sup> For instance, “environmental pollution” is defined as “any” pollution that “may” give rise to “any” harm on land, in the water and in the air (including air in buildings and air above or below ground in natural or man-made structures).<sup>94</sup> Environmental pollution also includes noise, heat, vibrations, or any other kind of energy release, in addition to a wide range of harms to the health of humans and “other living organisms” (e.g., harm to the quality of the environment, including interference

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<sup>88</sup> Schedules 2 and 3 of the PPC Act 1999 organize the amendments for and relationships with other relevant/applicable statutory authorities. For instance, the PPC Act discusses off-shore pollution (PPC Act 1999, §3), disposal licenses (PPC Act 1999, §4) and emissions permits (PPC Act 1999, Sch 1, Part 1, para 7) with some greater detail, but relies on cross references to the underlying statute that addresses each pollution area head-on. Schedule 3 contains a chart of the language repealed from other statutes in order to implement the PPC.

<sup>89</sup> Parliament intended that provisions made under the PPC Act should comply with other government agreements including the following:

- Implementing Council Directive 75/442/EEC on waste, as amended (PPC Act 1999, Sch I, Part I, para 20(2));
- Implementing any directive of the Council of European Communities designated by the Secretary of State by order made by statutory instrument (PPC Act 1999, Sch I, Part I, para 20(2));
- Applying the regulations of the Crown (PPC Act 1999, Sch I, Part I, para 20(3)); and
- Creating provisions in connection with a relevant directive of the 1999 PPC Act that are similar to any provision made by, under, or capable of being made under Part I, Part II, or sections 157, 158, or 160 of the Environmental Protection Act 1990 (UK EPA) as well as under section 2(2) of the European Communities Act 1972 (PPC Act 1999, Sch 1, Part 1, para 20(1)).

<sup>90</sup> James, T., EA Policy Manager. Personal communication. 16 July 2007.

<sup>91</sup> PPC Act 1999, §1(1).

<sup>92</sup> PPC Act 1999, §1(1).

<sup>93</sup> PPC Act 1999, §1(2).

<sup>94</sup> PPC Act 1999, §1(2).

with ecological systems),<sup>95</sup> “offence to the senses of human beings,” damage to property, and impairment or interference with “amenities or other legitimate uses of the environment...”<sup>96</sup>

To the reader familiar with US federal environmental statutes, this grant of authority appears expansive. Collectively, the same quantity and quality of activities may be regulated in the US, but throughout the entire system of federal, state, and local environmental, health-related, land-use and natural resource system of authorities – as opposed to via one comprehensive national mandate, such as the PPC Act. The PPC Act is an enabling and mandatory authority that leaves the details of regulatory requirements to agency judgment. The PPC Act does not contain deadlines, define minimum acceptable risk levels, or impose “hammers” such as found in US statutes to ensure or constrain action by US EPA or other authorized federal or state agencies.<sup>97</sup> Nor does the PPC Act prescribe how cost may (or may not) be considered in regulation, potentially leaving the government much discretion in balancing economic and environmental goals. These issues are explored further in chapters 4 and 5.

## UK Regulatory Framework

The regulations promulgated in the UK pursuant to the PPC Act are known as the Pollution Prevention and Control Regulations 2000 (see Appendix G for PPC Regulations – referenced are the PPC Regulations promulgated in 2000 and additional regulations promulgated after 2000 pursuant to the PPC Act<sup>98,99</sup>). As discussed in Chapter 2, a revised set of EP Regulations came into effect in April 2008.<sup>100</sup> The discussion of the existing regulations in this section focuses on the PPC regime. As stated above, the PPC statutory authority establishing such regulations is general:<sup>101</sup> the Act lays the foundation for regulations created to prevent and control “any” kind of environmental pollution caused by “any” substance.<sup>102</sup>

<sup>95</sup> PPC Act 1999, §1(3): “harm” includes harm to the health of humans and living organisms and harm to the quality of the environment (calculated as a whole; calculated individually with respect to air, water, or land; other impairments of, or interference with, ecological systems of which any living organisms form a part); an offense to the sense of human beings; damage to property; impairment or interference with amenities or legitimate uses of the environment referencing IPPC Directive.

<sup>96</sup> PPC Act 1999, §1(3).

<sup>97</sup> Another consequence of the single overarching statute is that there are not separate and inconsistent lists of regulated substances for different media (as is the case under US media-based statutes). One study has argued that these statutory differences are largely arbitrary and due to lack of legislative coordination rather than objective differences in environmental concerns between media. See Dernbach, J. “The Unfocused Regulation of Toxic and Hazardous Pollutants,” *Harvard Envtl. Law Review*, Vol. 21 (1997): p. 1.

<sup>98</sup> See PPC Regulations 2000 at <http://www.opsi.gov.uk/si/si2000/20001973.htm>.

<sup>99</sup> For an unofficial, consolidated version of the PPC Regulations, see <http://www.defra.gov.uk/environment/ppc/regs/pdf/ppcregs-consolidated.pdf>.

<sup>100</sup> In 2007, the PPC Regulations were amended by and incorporated into the Environmental Permitting Regulations, which come into force April 2008. See [http://www.opsi.gov.uk/si/si2007/uksi\\_20073538\\_en\\_1](http://www.opsi.gov.uk/si/si2007/uksi_20073538_en_1).

<sup>101</sup> Regulations created pursuant to the PPC Act must be “exercised by statutory instrument.” The PPC Act establishes that if such a regulatory instrument is made without a draft of the instrument having been approved by each House of Parliament, then that instrument may be subject to invalidation by a resolution of either House. Further, where a regulatory instrument is the first under the PPC Act to apply to England or Wales, or is one which “create[s] an offence or increase[s] a penalty for an existing offence,” or “amend[s] or repeal[s] any provision of an Act,” the instrument is without authority unless a draft of the instrument has been approved by each House of Parliament. PPC Act 1999, §2(6)-(9).

<sup>102</sup> PPC Act 1999, §1(1).

The PPC Regulations (based on principles established in the IPPC Directive), set out a unified overarching framework, summarized as the following:

- Controlling pollution to the level attainable by BAT;
- Increasing controls further where necessary to reduce/avoid “significant” pollution;
- Adopting the pollution prevention hierarchy of prevention followed by reuse followed by safe disposal;
- Using energy efficiently;
- Preventing accidents; and
- Returning sites to a “satisfactory” condition upon closure.

The threshold procedural provision of the regulations is that “[n]o person shall operate an installation...except under and to the extent authorized by a permit granted by the regulator.”<sup>103</sup> The regulatory substantive provisions are remarkably brief by US standards. Key provisions of the IPPC Directive are restated as general principles that the regulator is to “take account of” in determining permit conditions:

- “All the appropriate preventative measures are taken against pollution, in particular through application of the [BAT]; and
- No significant pollution is caused.”<sup>104</sup>

For “major” (Part A) facilities (described below in *Threshold Permit Applicability Criteria*), the following additional principles apply:

- “Waste production is avoided in accordance with [the relevant EU directive on waste]; and where waste is produced, it is recovered or, where that is technically and economically impossible, it is disposed of while avoiding or reducing an impact on the environment;
- Energy is used efficiently;
- The necessary measures are taken to prevent accidents and limit their consequences, and that, upon the definitive cessation of activities, the necessary measures should be taken to avoid any pollution risk and to return the site...to a satisfactory state.”<sup>105</sup>

<sup>103</sup> PPC Regulations 2000, §9. There are slightly different provisions for “mobile plant;” the discussion here addresses only requirements for stationary installations.

<sup>104</sup> PPC Regulations 2000, §2(11)(1)-(2).

<sup>105</sup> PPC Regulations 2000, §2(11)(3).

The PPC Regulations contain some prescriptive detail regarding permit conditions, although even these are brief and relatively general by US standards (approximately four pages of text). To a great extent they track the elements of the IPPC Directive. Some of the key required conditions include the following:<sup>106</sup>

- Emission limit values (ELVs) must be included for pollutants “likely to be emitted...in significant quantities, having regard to their nature and...potential to transfer pollution from one environmental medium to another;”
- ELVs are to be based on BAT, “but shall take account of the technical characteristics of the particular installation...and...its geographical location and the local environmental conditions;”
- Where necessary to comply with EQSs issued by the EU, stricter ELVs must be imposed;
- Conditions shall also be imposed “ensuring...appropriate protection of the soil and groundwater, and appropriate management of waste;”
- Additional conditions must address “periods when the installation...is not operating normally,” and periods prior to operation and after cessation of operations; and
- Monitoring, measurement and evaluation, and reporting requirements.

Embellishing further the conditions above, the PPC Regulations go on to state that “implied in every permit [is] a condition that...the operator shall use the [BAT] for preventing, or where that is not practicable, reducing emissions from the installation...” Furthermore, the regulator shall impose such other conditions “as appear to be appropriate, when taken with the [implied condition of BAT], for the purpose of ensuring a high level of protection for the environment as a whole,” taking into account the general principles described earlier.<sup>107</sup> Together, these provisions create a very broad “catch-all” requirement for the permit to address matters not otherwise listed.

Beyond the required conditions, regulators may add conditions imposing limits on the “amount or composition of any substance, produced or utilized during the operation of the installation,” and any other conditions “supplemental or incidental” to the permit. Terms such as “pollution” and “harm” are defined broadly in the PPC Act and such definitions are repeated in the regulations. The PPC Regulations add the broad definition of “substance” as “any chemical element and its compounds and any biological entity or micro-organism, with the exception of radioactive substances...and genetically modified organisms,” which are covered by other EU directives. Taken as a whole, the PPC Regulations, like the underlying PPC Act, carve out a comprehensive range of potential regulatory authority.

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<sup>106</sup> All the listed conditions are contained in PPC Regulations 2000, §2(12).

<sup>107</sup> PPC Regulations 2000, §2(12)(1)(b)(ii).

## Threshold Permit Applicability Criteria

The IPPC system does not apply to all facilities. Certain qualitative and quantitative criteria are used to determine whether a UK facility need apply for an IPPC permit.<sup>108</sup> (See Appendix I for industry activities categorized for Part A and B permits.)

**Qualitative Threshold.** The integrated permitting scheme as determined by the EU applies to certain categories of industrial activities prescribed initially in the IPPC Directive.<sup>109</sup> Having some operational discretion implementing the IPPC Directive, the UK has prioritized and ranked the applicable sectors, for instance, setting forth a regulatory sector schedule for transitioning existing Part A facilities to IPPC permits.<sup>110</sup> (See Table 4.1 in Chapter 4.)

**Quantitative Threshold.** Based on the IPPC Directive, the PPC Regulations establish quantitative thresholds triggering the application of integrated permitting by dividing industry into three categories based on the activities undertaken at the facility level.<sup>111</sup> The PPC categories, Part A (1), Part A (2), and Part B,<sup>112</sup> are roughly similar to the designations of “major” and “minor” sources under US statutes.<sup>113</sup> Part A facilities are those with the most polluting and complex

### Integrated Permits for Defined Class of Facilities Only

To a practical extent, Part A facilities must consider multi-media emissions, while Part B facilities focus only on air. Part A facilities’ integrated permits “shall...achiev[e] a high level of protection of the environment taken as a whole by...preventing or, where that is not practicable, reducing emission into the air, water and land.”<sup>1</sup> Part B facilities “shall...prevent...or, where that is not practicable, reduce[e] emissions into the air,” but not other media.<sup>2</sup> Thus, although the PPC is the legal delivery mechanism for Part B permits, such permits are not considered integrated for purposes of the EU IPPC Directive.

<sup>1</sup> PPC Regulations 2000, §2(12)(1)(b)(ii)

<sup>2</sup> PPC Regulations 2000, §2(12)(2)

<sup>108</sup> Industry-specific examples of Part A facilities include pulp and paper mills with a production capacity over 20 tons/day, which includes 60 facilities in the UK, and any pharmaceutical facility that produces “pharmaceutical products using a chemical or biological process or formulating such products [that] ... result in the release into water of any substance listed ... in a quantity which, in any period of 12 months, is greater than the background quantity by more than the amount specified...,” which includes 38 facilities in the UK. (PPC Regulations 2000, Sch I, Part 2: Interpretation of Part 1, 13.) Substances include compounds and amounts (in grams) such as mercury and its compounds in amounts greater than background, 200; cadmium and its compounds, 1,000; isomers of hexachlorocyclohexane, 20; isomers of DDT, 5; pentachlorophenol and its compounds, 350 PCP; hexachlorobenzene, 5; etc.

<sup>109</sup> The IPPC Directive, Article I, Annex 1 lists the following categories of industry: energy production and processing of metals; minerals; chemicals; waste management; and “other.” The “other” category includes pulp and paper production, textile treatment, tanning, food production, and the intensive rearing of poultry and pigs.

<sup>110</sup> PPC Regulations 2000, Sch 3, Ch 1, para2(2).

<sup>111</sup> The PPC Regulations state that “[n]o person shall operate an installation or mobile plant...except under and to the extent authorized by a permit granted by [the appropriate] regulator.” PPC Regulations 2000, §2(9)(1). Different types of installations and mobile plants must come into accord with this dictate at different times set out in Schedule 3 of the PPC Regulations. PPC Regulations 2000, §2(9)(2).

<sup>112</sup> A(1) facilities appear to include a much larger area of activities than A(2). In some cases it seems that facilities that might otherwise have an A(2) designation are swallowed up by an A(1) designation. An overview of the three categories and breakdown of the specific activities covered is detailed in Schedule 1 of the PPC Regulations. See Appendix I.



industrial activities, while Part B are comparatively smaller and have less polluting potential than Part A facilities.<sup>114</sup> The PPC Regulations set forth a detailed set of criteria, originating from the IPPC Directive, that vary from sector to sector<sup>115</sup> for designating facilities covered by IPPC, including the type of facility operation, the production level, the kind and nature of the pollutant emitted, and the amount of the pollutant emitted.<sup>116</sup>

### **Setting Permit Limits: Emissions, Pollution Prevention, and Sustainability**

As introduced earlier, a key component of an IPPC permit is its ELVs, which are determined by the application of BAT (and where necessary, ensure attainment of EU-imposed EQSs). The regulatory definition of BAT, which restates the definition in the IPPC Directive, is as follows.

- “Best” means the techniques most effective in achieving a high general level of protection to the environment as a whole.
- “Available techniques” mean those developed on a scale allowing implementation in the relevant sector, under economically and technically viable conditions, taking into account both cost and advantages. The techniques need not be used or produced inside the UK must be reasonably accessible to the permitted.
- “Techniques” include both the technology used as well as the way the facility is designed, built, maintained, operated and decommissioned.

The PPC Regulations also list 12 specific criteria to be taken into consideration in determining BAT for Part A facilities.<sup>117</sup> BAT provides in “principle the basis for emission limit values designed to prevent, and where that is not practicable, generally to reduce emissions and the impact on the environment as a whole.”<sup>118</sup> Where relevant, the aim of BAT is to control pollution through the imposition of ELVs.<sup>119</sup> Factors to be considered in determining ELVs include the potential to transfer pollution from one environmental medium to another; limits may apply to groups of pollutants as well as to individual ones. “In other words, in striving to reduce emissions to one environmental medium, emissions to others should not increase as a result, leading to a worsened environmental impact overall; rather, the release of emissions from a

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<sup>113</sup> See, for example, section 104 of the CAA for Title V (distinguishing between major and minor sources); section of 3001(d) of the Resource Conservation and Recovery Act (RCRA – distinguishing between “large quantity generators” and “small quantity generators”).

<sup>114</sup> The statutory authority for Part A covers the potentially most polluting and complex industrial activities conducted in England, Wales and Scotland. It controls releases made to all three media to minimize pollution to the environment as a whole. Some industrial processes, known as Part B, were excerpted from IPPC permitting regulation on the ground that possible releases to air water or land were considered trivial or insignificant. These Part B processes tend to be smaller and less polluting than Part A sites and mainly have potential air pollution impacts. Farthing et al., p. 20.

<sup>115</sup> Examples of criteria for certain sectors are provided in footnote 108.

<sup>116</sup> PPC Regulations 2000, Sch 1, Ch 1, para 2.

<sup>117</sup> PPC Regulations 2000, Sch 2, Ch 1.

<sup>118</sup> PPC Regulations 2000, §1(3)(1).

<sup>119</sup> Farthing et al., p. 74.

process should be optimi[z]ed across all environmental media.”<sup>120</sup> It is important to understand that in applying BAT, the UK permitting system allows for flexibility for and input by industry on a facility-specific basis. In essence, the BAT/ELV concept is complex and site-specific – the standard establishes an expectation for high-level protection by sector and then applies it to an individual facility’s operations in a reasonable fashion. Addressing problems on a case-by-case basis, BAT/ELV makes room for consideration of the surrounding environment (e.g., geographic, demographic) as well as sector specific factors (e.g., cost effectiveness of expected controls and performance characteristics of a facility). Chapters 4 and 5 will discuss in some detail this standard-setting process for IPPC permits in the UK.

#### BAT Considerations for Part A Facilities

“[S]pecial consideration shall be given to the following matters, bearing in mind the likely costs and benefits of a measure and the principles of precaution and prevention:

- (1) The use of low-waste technology;
- (2) The use of less hazardous substances;
- (3) The furthering of recovery and recycling of substances generated and used in the process and of waste, where appropriate;
- (4) Comparable processes, facilities or methods of operation which have been tried with success on an industrial scale;
- (5) Technological advances and changes in scientific knowledge and understanding;
- (6) The nature, effects and volume of the emissions concerned;
- (7) The commissioning dates for new or existing installations or mobile plant;
- (8) The length of time needed to introduce the best available technique;
- (9) The consumption and nature of raw materials (including water) used in the process and the energy efficiency of the process;
- (10) The need to prevent or reduce to a minimum the overall impact of the emissions on the environment and the risks to it;
- (11) The need to prevent accidents and to minimise the consequences for the environment;
- (12) The information published by the Commission pursuant to Article 16(2) of the Directive or by international organisations.”

PPC Regulations 2000, Sch 2, Chapter 1

<sup>120</sup> “In addition, BAT cannot usefully be considered in isolation from the provisions in reg 12 which govern the imposition of permit conditions. In particular, reg 12(6) states that ELVs are to be ‘based on BAT for the description of the installation concerned, but also taking account of its technical characteristics, geographical location and the local environmental conditions’. Interestingly, the way this is put and the terms of the regulation 3 definition itself, raise the possibility that BAT itself only operates at a sector level rather than a site-specific level. However, the approaches which have so far been taken to the meaning of BAT, and which are described below, seem generally to presume that it operates on both levels. Finally, it may be noted that the wording ‘designed to prevent and where that is not practicable, generally to reduce’ is less precise and arguably less rigorous than the wording used in the UK EPA which also includes the term ‘minimise’. (DEFRA, 2005b. *IPPC. Practical Guide*, Fourth Edition. [http://www.defra.gov.uk/environment/ppc/envagency/pubs/pdf/ippcguide\\_ed4.pdf](http://www.defra.gov.uk/environment/ppc/envagency/pubs/pdf/ippcguide_ed4.pdf).) does not, however, mention this difference or indicate that standards will be any less rigorous than under IPC/LAPC. Thus, it can perhaps be assumed that this change of wording of itself is not likely to lead to a different approach.” (Farthing et al., pp. 75-76.)

As illustrated above (and mandated by the IPPC Directive and PPC Act), the concept of pollution prevention is central to the permitting process in the UK. In determining permit conditions, the EA should ensure that facilities do the following:<sup>121</sup>

- Operate in such a way that all appropriate preventative measures are taken against pollution through the application of BAT;
- Cause no significant pollution;
- Avoid waste production or, if generated, recover if possible;<sup>122</sup> and
- Use energy efficiently.<sup>123</sup>

Moreover, Part A facility permits must include conditions aimed at minimizing long distance and transboundary pollution.<sup>124</sup> The principles of sustainable development and pollution prevention are mandated by the IPPC Directive<sup>125</sup> and carried throughout the UK implementing authorities.

An environmental management system (EMS) is one tool that assists a facility's operation in such a way to identify problems and employ necessary preventative measures. As will be discussed in chapters 4 and 5, UK facilities use management systems – facilitated by an ongoing, working relationship between the regulator and the facility – to routinely monitor operation and adjust permit conditions, if needed.

### ***Permit Cessation and Site Closure***

The UK permitting system covers the life of a facility's operation<sup>126</sup> from its opening through cessation, somewhat similar to the cradle-to-grave concept provided for in the US, under the Resource Conservation and Recovery Act (RCRA). From pre-permit facility activity (assessing the impacts of the facility in preparation for an IPPC permit) to facility shutdown (responsibility for cleaning up the operational footprint upon closure), the IPPC system guides industry. As part of an IPPC permit application, a facility must include a site plan for use in the event the facility closes.<sup>127</sup>

<sup>121</sup> PPC Regulations 2000, §2(11)(1), (2).

<sup>122</sup> Where the regulator is determining the conditions of a permit for a Part A installation or mobile plant, the regulator shall also take notice that such an installation or mobile plant “should be operated in such a way that (a) waste production is avoided in accordance with [European] Council Directive 75/442/EEC on waste; and where waste is produced, it is recovered or, where that is technically and economically impossible, it is disposed of while avoiding or reducing any impact on the environment.” PPC Regulations 2000, §2(11)(3).

<sup>123</sup> A Part A facility should also be operated in such a way that “energy is used efficiently... [and] the necessary measures are taken to prevent accidents and limit their consequences.” PPC Regulations 2000, §2(11)(3).

<sup>124</sup> PPC Regulations 2000, §2(12)(9).

<sup>125</sup> IPPC Directive, (preamble), paras 8,9; Articles 1,3.

<sup>126</sup> Chapters 4 and 5 will cover the operational stage – permit development and implementation – relying on the example and experience of UK facilities in the Pulp and Paper and Specialty Organic Chemical sectors.

<sup>127</sup> Notification of surrender of a permit shall include certain information:

- Operator's telephone number and any addresses to which correspondence relating to the notification should be sent;
- For partial surrender, a description of the surrender unit and a map or plan identifying the part of the site used for the operation of the surrender unit;
- A site report describing the condition of the site; and

In brief, when closing a Part A facility, an operator must take “necessary measures...to avoid any pollution risk and to return the site ... to a satisfactory state.”<sup>128</sup> The regulator has the responsibility to review the surrender notice, assure that the site plan is acceptable, and if necessary, make variations to existing permit conditions to account for the closure (in the case of a partial surrender).

### **Regulating Authorities and Roles of Government**

As introduced in Chapter 2, the EA and LA<sup>129</sup> have significant roles in the UK permitting process. Depending on specific industrial activities, the PPC Regulations identify either the EA or LA as the responsible regulator.<sup>130</sup> (See Table 3.1 for a summary of the UK permitting scheme.)

The EA is responsible for the larger and more complex Part A(1) facilities, which require IPPC permits (see Appendix I).<sup>131</sup> As described in the *Threshold Permit Applicability Criteria* section above, these facilities are distinguished by a higher potential to pollute and/or production capacities that exceed certain thresholds identified in the IPPC Directive and the PPC Regulations. IPPC permits (the EA has permitted approximately 3500 such permits) for these facilities were required to be issued by October 2007.

The generally smaller and less complex Part A(2) and Part B facilities are under the regulatory authority of LAs.<sup>132</sup> The LAs are also responsible for air quality management under the UK permitting system.<sup>133</sup> Part A(2) facilities represent approximately 15 percent of the IPPC facilities in England and Wales.<sup>134</sup> In addition under the IPPC regime, LAs are responsible for “re-permitting” approximately 10,000 facilities that already had permits under the earlier IPC regime.

-A description of the steps taken to avoid pollution risk.

PPC Regulations 2000, §2(19)(3)(d).

<sup>128</sup> PPC Regulations 2000, §2(11)(3). However, the PPC Regulations do not make clear whether this direction refers to the cessation of pre-permit activities upon which the granting of an IPPC-compliant permit is conditioned, or whether it refers to the conditions to be included in such a permit that address future cessation of activities that are to be permitted. Where a Part B facility “ceases or intends to cease” operating the entirety of the facilities covered by a permit, the operator may notify the regulator that the operator is surrendering the entire permit or undertaking a partial surrender. PPC Regulations 2000, §2(20)(1,2). Part B facilities have a separate provision devoted to their closure. PPC Regulations 2000, §2(20).

<sup>129</sup> The PPC Regulations specifically define “local authority.” PPC Regulations 2000, §1(8)(15). Local authority pertaining to greater London is defined as “a London borough council, the Common Council of the City of London, the Sub-Treasurer of the Inner Temple and the Under Treasurer of the Middle Temple.” PPC Regulations 2000, §1(8)(15)(a). Local authority pertaining to England outside Greater London is defined as “a district council or, in relation to an area for which there is a county council but no district council, the county council, and the Council of the Isles of Scilly.” PPC Regulations 2000, §1(8)(15)(b). Local authority pertaining to Wales is defined as “a county council or county borough council.” PPC Regulations 2000, §8(15)(c).

<sup>130</sup> While a permit issued under the PPC Regulations “is in force[,] it shall be the duty of the regulator to take such action under [the PPC Regulations] as may be necessary for the purpose of ensuring that the conditions of the permit are complied with.” PPC Regulations 2000, §3(23).

<sup>131</sup> PPC Regulations 2000, §1(8)(2).

<sup>132</sup> PPC Regulations 2000, §1(8)(3,4).

<sup>133</sup> Part A(2) permits are integrated like Part A(1) facilities, whereas permits for Part B facilities include just air pollution control.

<sup>134</sup> There are no Part A(2) or Part B covered facilities in the pulp and paper or pharmaceutical sectors.

**Table 3.1 – UK IPPC Permitting Schemes**

Permit System	Regulator	Class of Industrial Process/Activity	Scope	Number of Facilities
IPPC	EA	Part A (1)	All media & in addition odor, energy, accident prevention, noise, vibration	~ 4,000
LA-IPPC	Local authorities	Part A (2)	All media & in addition odor, energy, accident prevention, noise, vibration	~500
LA PPC	Local authorities	Part B	Air	~ 23,000

By regulation, where the EA is responsible for administering the IPPC permit (Part A(1)), LAs are frequently consulted by the EA as permit standards are negotiated and established for Part A (1) facilities. While LAs have a required period of time to make representations about such permits, their role appears to be advisory and consultative. Despite the fact that such advice is non-binding, the EA is required to “consider” representations from the LA (or any other organization or person who submits comments). There is no regulatory provision regarding an oversight role between the UK government (i.e., DEFRA and the EA) and LAs implementing the permitting regime, although the PPC Regulations do allow DEFRA’s Secretary of State to redirect regulatory functions exercised by the LA to the EA<sup>135</sup> and vice versa.<sup>136</sup>

***Relationship between EA and Operators***

Lastly, a transfer of responsibility from the EA to the operator helps to facilitate the UK permitting process. Operators know more about their facilities than do regulators and industry shares available techniques. Furthermore, the EA’s primary objective in the case of a problem is to “put things right” rather than punish.<sup>137</sup> In addition, much emphasis is placed on setting the initial permit conditions; if regulator and operator mutually agree on the terms, it is hoped there will be fewer breaches down the road. Major issues are identified and dealt with early on in the pre-application process, limiting the need for enforcement later on. Since the permit is inherently flexible, variations and adjustments can be made easily. Regulation 17 states “the regulator may at any time vary the conditions of a permit.”<sup>138</sup> Along with a great deal of

<sup>135</sup> PPC Regulations 2000, §1(8)(6).

<sup>136</sup> The Secretary of State may direct a transfer of regulatory functions from a LA to the EA in the form of a “general direction” (affecting any or all facilities by description) or “specific direction” (identifying a specific facility). PPC Regulations 2000,§1(8)(9). Where regulatory function is transferred from LA to the EA (or where such direction is to withdrawn), the Secretary of State must “(a) serve notice...on the Environment Agency and on the local authorities affected... and; (b) cause notice...to be published as soon as practicable in the London Gazette and in at least one newspaper circulating in the area of each authority affected by the direction.” PPC Regulations 2000, §1(8)(11). This notice must provide the date of effect and duration. A transfer of regulatory function from the EA to LA (only a specific direction is allowed) must meet the same provisions above, and additionally, the Secretary of State must serve notice on the “the operator of the installation or mobile plant affected.” PPC Regulations 2000,§8(12). Notice may be foregone where the Secretary of State decides that such publication would be “contrary to the interests of national security.” PPC Regulations 2000, §1(8)(13).

<sup>137</sup> Mitchell, D., EA Solicitor. Personal communication. 17 July 2007.

<sup>138</sup> PPC Regulations 2000, Regulation 17.

discretion, this variation provision provides leverage during negotiation; for instance, the regulator may threaten more stringent conditions if the operator does not comply with current levels. On the other hand, if the resulting permit does not “fit” the operation as planned, a variation notice can serve to alleviate the need for enforcement measures later on. In this way, an IPPC permit is inherently flexible – a living, breathing entity.

## Enforcement and Compliance

While the PPC Regulations contain enforcement mechanisms, it appears that UK regulators use such mechanisms less frequently than their US counterparts. This approach is consistent with the “culture of cooperation” described in Chapter 2. One UK commentator described the relationship as follows:

The cooperative approach is typically characterized in environmental enforcement by the development of a continuing relationship between enforcement agency and ‘polluter.’ At one extreme this might involve a patient, persuasive, educative role for the enforcer almost acting as an external advisor. In this case, mutual respect and trust can develop which can be used to ensure compliance with laws or standards. At the other extreme, the relationship might be more detached with the regulator seeking compliance within strict time limits (e.g., installing pollution abatement equipment or applying for a requisite license).<sup>139</sup>

Discussions with UK EA solicitors conducted as part of this study confirmed that permit issuance and compliance are accomplished via a continual dialogue between the EA and the regulated facility.<sup>140</sup> These cultural differences help to explain how somewhat “softer” enforcement mechanisms are relied upon in the UK than in the US.<sup>141</sup> From an American perspective, the UK “collaborative” approach may be difficult to envision: it is not overstating the point to say that the principle of “command and control” has been viewed in the US as critical for assuring compliance with environmental protection requirements for over 30 years. In 2006, for instance, 278 defendants were charged under the US EPA criminal program with 154 sentences resulting.<sup>142</sup> These figures do not include EPA civil enforcement cases, or any of the enforcement cases brought by states. The UK statistics differ markedly: of 25,000 breaches in 2002 (under IPC), only 36 enforcement actions were taken – three of which resulted in prosecutions.<sup>143</sup> This does not mean that the UK lacks the means or will to see that permit terms are adhered to. However, the general focus of enforcement efforts in the UK is to see that any breaches are “put right,” with less emphasis on obtaining penalties. In fact, the EA does not currently have authority to assess administrative penalties; it can obtain penalties only through criminal prosecution (although it appears that such prosecution does not require a showing of *mens rea* or criminal intent as would be required in the US). The UK system does include

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<sup>139</sup> Bell and McGillivray, p. 296.

<sup>140</sup> Mitchell, D., EA Solicitor. Personal communication. 17 July 2007.

<sup>141</sup> It is also important to note that in managing federally delegated environmental programs, practice among US states can vary, and some may employ cooperative compliance methods similar to those used in the UK.

<sup>142</sup> EPA, 2006. *Compliance and Enforcement Annual Results: FY2006 Numbers at a Glance*.

<http://epa.gov/compliance/resources/reports/endofyear/eoy2006/2006numbers.html>.

<sup>143</sup> Bell and McGillivray, p. 295 (reporting on numbers of enforcement actions under IPC).

important deterrents, which include the EA unilateral power of permit variation and revocation and the ultimate threat of prosecution.

The scope of enforcement authority in the UK may be changing; the government appears to have accepted<sup>144</sup> several recommendations regarding the adoption of administrative penalties (along with other enforcement and compliance reforms) as part of the “Better Regulation Agenda” described in Chapter 2. These reforms recommend principles more akin to practices that appear in US civil penalty protocol. Based on a 2006 report entitled *Regulatory Justice: Making Sanctions Effective* (the “Macrory review”),<sup>145</sup> legislation<sup>146</sup> was introduced in 2007 adding administrative penalties to the UK regulatory and compliance toolbox. Along with instituting risk-based administrative penalties, the Macrory review also advised strengthening statutory notices to enhance the current criminal law scheme.<sup>147</sup> Even if these changes are adopted, however, there is no apparent reason to expect a significant change in the EA general approach to enforcement. Interviews with EA staff did not indicate that they foresaw the proposed legislation effecting a fundamental change in their enforcement culture.

### ***The Enforcement Pyramid and Principles***

A central concept in the UK enforcement approach is “responsive regulation” or “modern regulation.”<sup>148</sup> Responsive regulation can be viewed in terms of an enforcement pyramid. (See Figure 3.1 below.)<sup>149</sup>

“The essence of responsive regulation is that an enforcement officer will use the minimum amount of formal regulation as possible in order to achieve compliance.”<sup>150</sup> For most operators in the UK, education and persuasion are useful tools to achieve compliance. However, when minimal approaches fail, an approach higher up on the pyramid is utilized. Indeed, the UK EA confirms that “businesses do not want regulation to impinge on their ability to innovate and grow” and thus views “modern regulation...[as] find[ing] the right balance – a proportionate, risk-based response, that will drive environmental improvements, reward good performance, but still provide the ultimate reassurance that tough action will be taken on those who fail to meet acceptable standards.”<sup>151</sup>

<sup>144</sup> The UK government has accepted four of the nine recommendations from Macrory, R., 2006. *Regulatory Justice: Making Sanctions Effective*. <http://www.berr.gov.uk/files/file44593.pdf>.

<sup>145</sup> The final Macrory report can be found at [http://bre.berr.gov.uk/regulation/documents/pdf/macrory\\_penalties.pdf](http://bre.berr.gov.uk/regulation/documents/pdf/macrory_penalties.pdf).

<sup>146</sup> The Regulatory Enforcement and Sanctions Bill, introduced in the House of Lords on November 8, 2007, will give UK regulators the ability to make a case for access to administrative penalties, including the following: (1) fixed monetary penalties; (2) discretionary requirements (including variable monetary penalties, compliance notices, restoration notices); (3) cessation notices; and (4) enforcement undertakings. [http://bre.berr.gov.uk/regulation/reviewing\\_regulation/penalties/index.asp](http://bre.berr.gov.uk/regulation/reviewing_regulation/penalties/index.asp).

<sup>147</sup> Macrory suggests that “reliance on criminal prosecution failed to give regulators adequate means to effectively deal with many cases in a proportionate and risk based way.” [http://bre.berr.gov.uk/regulation/documents/pdf/macrory\\_penalties.pdf](http://bre.berr.gov.uk/regulation/documents/pdf/macrory_penalties.pdf).

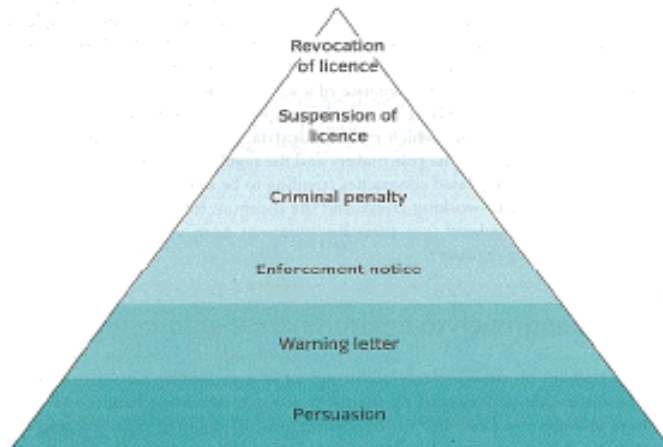
<sup>148</sup> As described in Chapter 2, “modern regulation” is the EA’s response to the “Better Regulation Agenda.”

<sup>149</sup> Bell and McGillivray, p. 297.

<sup>150</sup> Bell and McGillivray, p. 297.

<sup>151</sup> EA, 2005a. *Delivering for the Environment: A 21<sup>st</sup> Century Approach to Regulation*. [http://www.environment-agency.gov.uk/commondata/acrobat/dftfinal\\_1906007.pdf](http://www.environment-agency.gov.uk/commondata/acrobat/dftfinal_1906007.pdf).

**Figure 3.1 – The Enforcement Pyramid**



**Principles of Enforcement.** The EA *Enforcement and Prosecution Policy*<sup>152</sup> (Enforcement Policy) describes four principles used to ensure firm and fair regulation: proportionality, consistency, transparency, and targeting.

- **Proportionality:** The enforcement action taken by the agency will be proportionate to the risks posed to the environment and to the seriousness of any breach of the law.
- **Consistency:** Similar approaches will be taken in similar circumstances to achieve similar ends. While variables such as scale of environmental impact and attitude and actions of management are taken into account, the agency aspires to give consistent advice and responses.
- **Transparency:** Expectations of the agency and expectations of the regulated must be clear. This includes giving opportunities for discussion before formal enforcement action is taken, thoroughly explaining remedial actions, and including written explanations after any urgent action.<sup>153</sup>

<sup>152</sup> EA, 1998. *Enforcement and Prosecution Policy*. <http://www.environment-agency.gov.uk/commondata/acrobat/enfpolicy.pdf>.

<sup>153</sup> The policy ensures “transparency” procedures be developed to address the following:

- Where remedial action is required, a clear explanation (in writing, if requested) is provided as to why the action is necessary and when it must be carried out, distinguishing between best practice advice and legal requirements
- Opportunity is provided to discuss what is required to comply with the law before formal enforcement action is taken, unless urgent action is required, for example, to protect the environment or to prevent evidence being destroyed
- Where urgent action is required, a written explanation of the reasons is provided as soon as practicable after the event
- Written explanation is given of any rights of appeal against formal enforcement action at the time the action is taken. (See the section in this chapter entitled The Appellate Process.)



- **Targeting:** Regulatory efforts should be directed primarily towards those activities giving rise to serious environmental damage. The agency will give deliberate and organized crimes higher priority, in addition to other poorly controlled risks.

**Prosecution.** While regulators use prosecution minimally, certain instances call for more drastic enforcement measures. The Enforcement Policy “is worded in such a way to leave considerable discretion” to the EA whether or not to prosecute.<sup>154</sup> Situations that may call for prosecution include but are not limited to operating without a relevant license, excessive or persistent breaches, failure to comply with remedial requirements, reckless disregard for management or quality standards, failure to supply information without reasonable excuse or knowingly or recklessly supplying false or misleading information, obstructing agency staff, and/or impersonating agency staff.<sup>155</sup> Evidence used in prosecutorial proceedings must meet the “beyond a reasonable doubt” standard:<sup>156</sup> this evidential test is used to ensure that only meritorious claims move forward. As mentioned earlier, there appears to be no *mens rea* (criminal intent) as required in US criminal cases: arguably this could make it easier to pursue and prosecute criminal cases in the UK.

### ***Preventive/Remedial Actions***

The duty for enforcing IPPC permitting in the UK falls to the regulator<sup>157</sup> “to take such action...as...necessary for...ensuring that the conditions of the permit are complied with.”<sup>158</sup> After a permit breach is discovered, a regulator may issue a notice to the operator. These notices do not follow in succession but rather stand independently.<sup>159</sup> The following is a list of the types of notices:

- **Enforcement Notice:** The regulator may file this type of notice when an operator has contravened, is contravening, or is likely to contravene any permit condition. Such a notice describes the exact contravention, specifies the remedial steps, and sets up the remedial time frame. This type of notice can be revoked at any time.<sup>160</sup>
- **Suspension Notice:** This type of notice is served if the regulator is of the opinion that the operation involves a serious risk of imminent pollution. Even if permit conditions are not contravened, the regulator can serve such a notice. A suspension notice can also be given

<sup>154</sup> Bell and McGillivray, pp. 302-303, citing *R v Metropolitan Police Commissioner, ex parte Blackburn* (No 3) [1973] 1 QB 241.

<sup>155</sup> Jewell, T., J. Lowther, N. Parpworth, and D. Hughes. *Environmental Law*, Fourth Edition. (London: LexisNexis UK, 2002) p. 510.

<sup>156</sup> Mitchell, D., EA Solicitor. Personal communication. 17 July 2007.

<sup>157</sup> This report focuses only on the EA and the relevant local authorities in England and Wales. The IPPC system is implemented in the UK (England and Wales) by a number of different authorities. Depending on the type of facility (e.g., Part A(1), Part A(2), or Part B), the relevant permitting authority may be the EA or a local authority.

<sup>158</sup> PPC Regulations 2000, §23.

<sup>159</sup> If an operation involves a serious risk of imminent pollution, the regulator has the authority to take steps to remove such a risk. The regulator must give the operator notification within seven days before taking any remedial measures. The operator can expect to pay for the cleanup costs, unless he or she can prove that no imminent risk of serious pollution existed. PPC Regulations 2000, Regulation 26.

<sup>160</sup> PPC Regulations 2000, Regulation 24.

to one who has ceased being technically competent. As with the enforcement notice, the regulator has the power to withdraw a suspension notice at any time.<sup>161</sup>

- **Revocation Notice:** The regulator may at any time revoke a permit, in whole or in part, by serving a revocation notice on the operator. This type of notice is served when a permit authorizes the carrying out of a specified waste management activity and it appears to the regulator that the operator has ceased to be a fit and proper person to carry out that activity. In addition, if the holder of the permit has ceased to be the operator of the installation, the regulator may also serve a revocation notice.<sup>162</sup>
- **Variation Notice:** The regulator may at any time vary the conditions of a permit and shall do so if it appears to the regulator at that time, whether as a result of a review under regulation 15, a notification under regulation 13 or 16 or otherwise, that regulations 11 and 12 require conditions to be included which are different from the subsisting conditions.<sup>163</sup> (In practice, it has been suggested that variation notices are used quite frequently.<sup>164</sup>)

This notice protocol is critical to UK enforcement since injunctive relief<sup>165</sup> is rarely granted, unless it can be shown that no other alternative will restrain the defendant's activity. A "balance of convenience" test is used to determine whether relief is appropriate, weighing whether the claimant can obtain an ultimately satisfactory remedy (absent injunctive measures) against the loss to the defendant if an injunction is granted.<sup>166</sup> This apparently limited use of injunctive relief in the UK is markedly different than the US enforcement practice, where federal law allows for, and regulatory authorities (at both the federal and state level) often rely on, the use of injunctive relief granted by courts, such as temporary restraining orders and other measures, to require operators to cease and desist harmful behavior and activity.

#### Balance of Convenience Test Inquiries

- ❖ Nature of the harm created by defendant
- ❖ Number of persons affected
- ❖ Economic and employment consequences
- ❖ Alternative criminal remedies
- ❖ Other powers that might remedy the situation

Should an operator receive notice of an enforcement action, there are several grounds for appeal. For example, an operator may appeal based on efficiency concerns, such as, where the appellant considers the actions required under an enforcement notice to be "excessive" and believes that "lesser" steps could adequately address the problem.<sup>167</sup> Other objections relate to timing and factual issues. (A few of the objections on appeal are referenced in the box below.) For

<sup>161</sup> PPC Regulations 2000, Regulation 25.

<sup>162</sup> PPC Regulations 2000, Regulation 21.

<sup>163</sup> PPC Regulations 2000, Regulation 17.

<sup>164</sup> Mitchell, D., EA Solicitor. Personal communication. 17 July 2007.

<sup>165</sup> *Black's Law Dictionary*, 8<sup>th</sup> ed., defines injunctive relief as "a court order commanding or preventing an action."

<sup>166</sup> Jewell et al., p. 510.

<sup>167</sup> The Planning Inspectorate, 2004. *Making Your Enforcement Appeal*. [http://www.planning-inspectorate.gov.uk/pins/appeals/enforcement\\_appeals/guide\\_making\\_enfo\\_appeal\\_RL10.pdf](http://www.planning-inspectorate.gov.uk/pins/appeals/enforcement_appeals/guide_making_enfo_appeal_RL10.pdf), p.15.

additional information regarding enforcement actions, including penalties, consult the Enforcement Policy.<sup>168</sup>

## The Appellate Process

An unsatisfied operator may appeal a regulating authority's (EA or relevant LA implementing IPPC) decision regarding a permit. The Town and Country Planning Act of 1990 provides the framework for the appeals process.<sup>169</sup> The accompanying Town and Country Planning Rules and Regulations 2002<sup>170</sup> govern the written appellate procedure as well as hearing and inquiry proceedings.<sup>171</sup> Specifically, the following persons can appeal to the Secretary of State of DEFRA:<sup>172</sup>

- A person who has been refused a permit.
- A person who has been refused a variation of the conditions of a permit on an application.
- A person who is aggrieved by the conditions attached to his or her permit following an application.
- A person whose application for a regulator to transfer a permit has been refused.
- A person whose application to surrender a permit has been refused, or who is aggrieved by the conditions attached to his permit to take account of the surrender.

<sup>168</sup> EA, 1998.

<sup>169</sup> The Town and Country Planning Act, 1990. [http://www.opsi.gov.uk/acts/acts1990/Ukpga\\_19900008\\_en\\_1.htm](http://www.opsi.gov.uk/acts/acts1990/Ukpga_19900008_en_1.htm).

Anyone with an interest in the land, such as an owner, tenant, lender, or leaseholder may appeal, as long as the enforcement appeal is received before the date on which the notice takes effect.

<sup>170</sup> The Town and Country Planning (Enforcement Notices and Appeals) (England) Regulations 2002 (SI No 2682) contain additional requirements about the content of enforcement notices and what the parties must do if there is an appeal against the notice (<http://www.opsi.gov.uk/SI/si2002/20022682.htm>). The Town and Country Planning (Enforcement) (Written Representations Procedure) (England) Regulations 2002 (SI No 2683) explain the procedures and time limits for the various stages of the written appeals procedure (<http://www.opsi.gov.uk/SI/si2002/20022683.htm>). The Town and Country Planning (Enforcement) (Hearings Procedure) (England) Rules 2002 (SI No 2684) explain the procedures and time limits for the various stages of enforcement appeals decided by hearings. They explain the rights and responsibilities of everyone involved in an appeal that is dealt with by a hearing (<http://www.opsi.gov.uk/SI/si2002/20022684.htm>). The Town and Country Planning (Enforcement) (Inquiries Procedure) (England) Rules 2002 (SI No 2686) (<http://www.opsi.gov.uk/SI/si2002/20022686.htm>) and the Town and Country Planning Appeals (Determination by Inspectors) (Enforcement) (Inquiries Procedure) (England) Rules 2002 (SI No 2685) (<http://www.opsi.gov.uk/SI/si2002/20022685.htm>) explain the procedures and time limits for the various stages of enforcement appeals decided by an inquiry and the rights and responsibilities of everyone involved in an appeal that is dealt with by an inquiry. All these rules (and additional resources) are listed in The Planning Inspectorate, 2004, pp. 59-60 (Appendix 6). For England, the Planning Inspectorate's *Making Your Enforcement Appeal* booklet describes the appeals process in layman's terms.

<sup>171</sup> Town and Country Planning (Enforcement) (Hearings) Rules, 2002.

<http://www.opsi.gov.uk/SI/si2002/20022684.htm>.

<sup>172</sup> PPC Regulations 2000, Regulation 27.

If a suitable appeal is made, the Planning Inspectorate (part of the Office of the Deputy Prime Minister (ODPM)) is usually responsible for rendering a decision. In the most common form of appeal, decisions are based on written representations<sup>173</sup> from the appellant, the local planning authority, and anyone else who has an opinion on the appeal. The Inspector's written decision focuses on the technical side of issues; only factual issues (not issues of law) are considered.<sup>174</sup>

The Inspector may elicit comments from "interested persons" – such as neighbors and local environmental groups.<sup>175</sup> Any comments from interested parties are provided to the appellant and the local planning authority<sup>176</sup> (LPA) for their review and response, before the Inspector relies upon them in the final decision. The "written procedure" is considered faster and cheaper than either a hearing or inquiry,<sup>177</sup> as described below.

#### Grounds for Appealing an Enforcement Notice, For Example

- ❖ Ground (d): that, at the time the enforcement notice was issued, it was too late to take enforcement action against the matters stated in the notice.
- ❖ Ground (e): the notice was not properly served on everyone with an interest in the land.
- ❖ Ground (f): that steps required to comply with the requirements of the enforcement notice are excessive and lesser steps would overcome the objections.
- ❖ Ground (g): the time given to comply with the notice is too short.

The Planning Inspectorate, *Making Your Enforcement Appeal*, [http://www.planninginspectorate.gov.uk/pins/appeals/enforcement\\_appeals/guide\\_making\\_enfo\\_appeal\\_RL10.pdf](http://www.planninginspectorate.gov.uk/pins/appeals/enforcement_appeals/guide_making_enfo_appeal_RL10.pdf), pp. 13-15.

The Inspector may elicit comments from "interested persons" – such as neighbors and local environmental groups.<sup>175</sup> Any comments from interested parties are provided to the appellant and the local planning authority<sup>176</sup> (LPA) for their review and response, before the Inspector relies upon them in the final decision. The "written procedure" is considered faster and cheaper than either a hearing or inquiry,<sup>177</sup> as described below.

If the written procedure described above fails, a hearing or inquiry may be pursued. Neither the appellant nor the LPA has a right to a hearing or inquiry, but either may request one.<sup>178</sup> A hearing is an informal means for providing evidence and oral submissions to the Inspector.<sup>179</sup> The most formal appellate proceeding is an inquiry, akin to an administrative court proceeding (in the US).<sup>180</sup> An inquiry may occur when the Inspectorate decides one is necessary – in cases where the written procedure or hearing were not adequate.<sup>181</sup> Interested parties may participate in and present their opinions to the Inspector at a hearing or an inquiry.<sup>182</sup> In all cases, the Inspector may make a site visit to confirm or investigate the facts rendered on appeal.<sup>183</sup> Based

<sup>173</sup> The Planning Inspectorate, p. 44-45 (Appendix 1).

<sup>174</sup> The Planning Inspectorate, pp. 15, 20, 27, 37.

<sup>175</sup> The Planning Inspectorate, p. 25.

<sup>176</sup> "[L]ocal planning authority' means in relation to –

(a) an enforcement appeal, the body who issued the relevant enforcement notice;  
 (b) an appeal against the refusal or non-determination of an application for a certificate of lawful use or development, the body to whom that application was made." The Town and Country Planning (Enforcement) (Hearings Procedure) (England) Rules 2002, Section 2 (<http://www.opsi.gov.uk/SI/si2002/20022684.htm>).

<sup>177</sup> The Planning Inspectorate, p. 21.

<sup>178</sup> The Planning Inspectorate, p. 29.

<sup>179</sup> The Planning Inspectorate, pp. 23, 29-30, 46-47 (Appendix 2). The appellant can challenge evidence put forward against his/her appeal, although cross-examination is not commonly allowed. The Planning Inspectorate, p. 21; The Town and Country Planning (Enforcement) (Hearings Procedure) (England) Rules 2002, Section 11, <http://www.opsi.gov.uk/SI/si2002/20022684.htm>. While legal representatives usually do not accompany appellants to a hearing, they may if requested by the appellant. The LPA advertises the hearing in a local newspaper in order to inform interested parties.

<sup>180</sup> The Planning Inspectorate, pp. 48-49 (Appendix 3).

<sup>181</sup> The Planning Inspectorate, p. 31.

<sup>182</sup> The appellant usually has the last word in closing the proceeding in order to address issues raised by others, but he/she cannot introduce new arguments. The Planning Inspectorate, p.34.

on the evidence presented, the Inspector makes a recommendation to the Secretary of State for DEFRA.<sup>184</sup> The Secretary of State may affirm the original decision by the Inspector or render a different one.<sup>185</sup> If necessary, the inquiry may be re-opened, and the appellant will be given an opportunity to comment. A decision letter consummates the process. The very last resort for an appellant is an appeal to the High Court.<sup>186</sup> An Inspector's written decision may be appealed for judicial review; however, only procedural issues and points of law are heard in this court (no technical or factual matters are discussed).<sup>187</sup>

According to an internal EA Memorandum of 20 September 2007, a note of interest on the actual use of appeals related to IPPC permit issuance follows.<sup>188</sup> Since 2004, a total of 179 appeals have been brought against IPPC determinations in the UK. Of the active appeals (as of September 2007), 94 of these appeals were brought by landfill operators (one of the last two sectors to come on line in the UK IPPC implementation scheme). These challenges are based on either the EA's refusal to issue a permit (in 50 cases) or are related to permit condition(s) (44 cases). This is in stark contrast to only 15 appeals from all of the other "process" industries combined (including five appeals from the tallow incineration and one from farming). This disparity between appeals from the landfill sector (versus other sectors) is due in part to some longstanding policy issues and complex technical issues associated with the sector.<sup>189</sup> Prior to IPPC implementation, there existed approximately 1200 landfill sites; after IPPC implementation, there will be approximately 350 permitted sites.<sup>190</sup> These conditions have created a seemingly greater willingness by landfill operators to challenge permits.<sup>191</sup>

### **The Ombudsman**

In addition to filling an appeal, an aggrieved operator may also file a complaint regarding maladministration with the appropriate Ombudsman.<sup>192</sup> The investigating Ombudsman for DEFRA is the Parliamentary Commissioner for Administration, while complaints against a LA are dealt with by the Commissioner for Local Administration.<sup>193</sup> While the Ombudsman is a "quick, cheap, and often effective mechanism for channeling complaints about public authorities," the Ombudsman does not have statutory authority to impose a damage award or to alter the legal outcome of a case.<sup>194</sup> However, the Ombudsman does have significant

<sup>183</sup> The appellant and LPA may be present to answer questions of the Inspector and point areas of importance to the appeal (except in the case of the written procedure). The Planning Inspectorate, pp. 28, 30, 34.

<sup>184</sup> The Inspector's decision is sent to the Secretary, the LPA, and all others entitled to a copy.

<sup>185</sup> The Planning Inspectorate, p. 37. The Secretary may grant refused authorizations, grant a varied authorization, quash any or all conditions in an authorization, quash a revocation, and quash or affirm any variation, enforcement, and prohibition notices. Jewell et al., p. 510.

<sup>186</sup> The Planning Inspectorate, p. 38.

<sup>187</sup> The Planning Inspectorate, p. 38.

<sup>188</sup> Leinster, P., EA, Director of Operations, 2007. *Drilldown on PPC Permitting* Board Paper EA(07)55.

[http://www.environment-agency.gov.uk/commondata/acrobat/item07bdrilldownonppc\\_1859606.pdf](http://www.environment-agency.gov.uk/commondata/acrobat/item07bdrilldownonppc_1859606.pdf), p. 3.

<sup>189</sup> See Leinster, p. 3, noting specific issues, such as "continuing good performance in ...[PPC] permitting activities," the progress for meeting the EU IPPC 2007 deadline, and several unresolved issues.

<sup>190</sup> Mitchell, D., EA Solicitor. Personal communication. 17 July 2007.

<sup>191</sup> Mitchell, D., EA Solicitor. Personal communication. 17 July 2007.

<sup>192</sup> The Planning Inspectorate, pp. 39-40.

<sup>193</sup> Bell and McGillivray, p. 349.

<sup>194</sup> Bell and McGillivray, p. 349.

investigatory powers and will make a recommendation for compensation, which is accepted in 95 percent of cases.<sup>195</sup>

## Public Information and Participation

Views in the UK regarding public participation have changed dramatically in recent years.<sup>196</sup> Consider the following 1980 sentiment:<sup>197</sup>

British environmental managers tend to feel that the public is passive and will accept what is thought good for it...Most policymakers...see themselves as custodians of the public interest...Regulatory policy making...[is] executed by selective consultation with particular interests but with no requirement to inform the general public.

Over the years, international initiatives in addition to European legislation have begun to transform this position, elevating and recognizing the importance of the public role.<sup>198</sup> For instance, Principle 10 of the Rio Declaration states the following:<sup>199</sup>

Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have...access to information concerning the environment that is held by public authorities...and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy shall be provided.

In 2003, the EU updated the Directive on Freedom of Access to Information on the Environment, hoping to address previous defects.<sup>200</sup> The objectives of this directive are as follows.<sup>201</sup>

<sup>195</sup> Bell and McGillivray, p. 349.

<sup>196</sup> We offer here a brief description of the UK public participation requirements in order to provide the reader with a context for the UK regime, not as a point of departure for comparing the UK system to the US or for suggesting that UK public participation provisions necessarily be tested in the US.

<sup>197</sup> Vogel, 1986, p. 92 (quoting O'Riordan, T. *Environmentalism*. (London: Pion, 1980) pp. 232-33).

<sup>198</sup> Bell and McGillivray, p. 317.

<sup>199</sup> United Nations Environment Programme, 1992. *The Rio Declaration on Environment and Development*, <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=78&ArticleID=1163>. The Rio Declaration on Environment and Development is the product of the United Nations Conference on Environment and Development conference in Rio de Janeiro from 3 to 14 June 1992. The Declaration purports to "reaffirm...the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972, and...build upon it, [w]ith the goal of establishing a new and equitable global partnership through the creation of new levels of cooperation among States, key sectors of societies and people, [w]orking towards international agreements which respect the interests of all and protect the integrity of the global environmental and developmental system, [r]ecognizing the integral and interdependent nature of the Earth, our home."

<sup>200</sup> Bell and McGillivray, p. 326.

<sup>201</sup> Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC. [http://www.ico.gov.uk/upload/documents/library/environmental\\_info\\_reg/detailed\\_specialist\\_guides/european\\_directive\\_\(eur-lex\).pdf](http://www.ico.gov.uk/upload/documents/library/environmental_info_reg/detailed_specialist_guides/european_directive_(eur-lex).pdf).

- To guarantee the right of access to environmental information held by or for public authorities and to set out the basic terms and conditions of, and practical arrangements for, its exercise; and
- To ensure that, as a matter of course, environmental information is progressively made available and disseminated to the public in order to achieve the widest possible systematic availability and dissemination to the public of environmental information. To this end, the use, in particular of computer telecommunication and/or electronic technology, where available, shall be promoted.

#### Benefits of Public Participation

- ❖ Improves the Quality of Decisions
- ❖ Allows for Environmental Problem Solving from the “Bottom-Up”
- ❖ Promotes Environmental Citizenship and Responsibility
- ❖ Improves Procedural Legitimacy

In 2005, the EU and UK signed the Aarhus Convention, further confirming a commitment to public input. The three pillars of the Convention aim to promote (1) access to environmental information, (2) public participation in environmental decision-making, and (3) access to justice in environmental matters.<sup>202</sup>

#### **Specific UK Requirements**

The PPC Act and regulations govern the information available to the public in the IPPC process. In 2005, the UK adopted the PPC (Public Participation) (England and Wales) Regulations 2005, amending the procedures for public participation in the 2000 PPC Regulations.<sup>203,204</sup> These provisions allow persons regardless of whether or not they are permit holders<sup>205</sup> “to compile” any information related to emissions (“within the meaning of the regulation”), energy consumption and efficiency, and waste and to comment at specified stages in the permit development process.

Regulators are given the power to serve notice on any person for purposes of acquiring information under the law, including information regarding emissions.<sup>206</sup> For instance, during

<sup>202</sup> Bell and McGillivray, p. 317.

<sup>203</sup> The Pollution Prevention and Control (Public Participation) (England and Wales) Regulations, 2005. <http://www.opsi.gov.uk/si/si2005/20051448.htm>, amended regulation 2. Also see Schedules 4 and 7 of the PPC Regulations 2000 and the Explanatory Memorandum of the PPC (Public Participation) Regulations 2005. DEFRA, 2005a. *Explanatory Memorandum to the PPC (Public Participation) (England and Wales) Regulations 2005*. [http://www.opsi.gov.uk/si/em2005/uksiem\\_20051448\\_en.pdf](http://www.opsi.gov.uk/si/em2005/uksiem_20051448_en.pdf).

<sup>204</sup> In 2007, the Public Participation regulations were amended and incorporated into the Environmental Permitting Regulations – which come into force April 2008; see [http://www.opsi.gov.uk/si/si2007/uksi\\_20073538\\_en\\_1](http://www.opsi.gov.uk/si/si2007/uksi_20073538_en_1).

<sup>205</sup> PPC Act 1999, §11.

<sup>206</sup> PPC Regulations 2000, Part V, Regulation 28 (2),(4).

the permit application process, a regulator may serve notice on a permit applicant requesting additional information for purposes of determining the application.

The permit applicant must advertise the permit application and draft determination within a specified time period in newspapers. The advertisement must include the regulator's address such that anyone interested may submit comments in writing.<sup>207</sup> Similar notice and advertisement requirements apply to permit variations and appeals.<sup>208</sup> In addition, within 14 days of receiving a Part A permit application, the responsible regulator (whether it be the EA or LA) must give notice to persons enumerated by regulation (such as LAs, local fisheries commissions, the Food Standards Agency, Health Authority, relevant planning authorities, and others).<sup>209</sup> The regulator must then consider any representations made by the entity receiving notice (i.e., a copy of the permit application), or any other persons,<sup>210</sup> in its determination.<sup>211</sup> These provisions execute the statutory mandate requiring "regulators to carry out consultation in connection with the exercise of any of their functions and...take into account representations made to them on consultation."<sup>212</sup>

The PPC Act also specifically requires regulators to maintain registers<sup>213</sup> open for public inspection. It is the regulator's responsibility to designate which matters require publicity in public registers<sup>214</sup> (excluding confidential commercial information and information affecting national security).<sup>215</sup> Such matters (listed in the box below) include information associated with permit application, issuance, variation,<sup>216</sup> revocation, enforcement, and appeals, to name a few key areas. The regulator may keep the registers in any form. The registers must be available free of charge at reasonable times for public inspection, and copies must be obtainable at reasonable charges.<sup>217</sup>

Although the PPC Act and relevant regulations arguably set the stage for a high level of public-sharing of information regarding permit decisions and enforcement actions, it appears that in

<sup>207</sup> A permit applicant is required to advertise within a period of 28 days (beginning 14 days after the date the application is made to the regulator) in one or more newspapers depending on the location and type of facility. PPC Regulations 2000, Sch 4, Part I, para 5. The contents of an advertisement is also detailed in PPC Regulations 2000, Sch 4, Part I, para 6. In the US, the public generally does not receive notice when a permit is applied for, only when a regulator issues a draft permit.

<sup>208</sup> PPC Regulations 2000, Sch 7, para 4(8) and Sch 8, par 3(1).

<sup>209</sup> PPC Regulations 2000, Sch 4, Part 2, par 9.

<sup>210</sup> As per regulation, "any person may make representations in writing to the regulator within the period of 28 days beginning with the date of the advertisement." PPC Regulations Sch 4, Part I, para 6(f).

<sup>211</sup> PPC Regulations 2000, Sch 4, Part 2, para 12(2)(a) and (b). In addition, pursuant to the DEFRA *IPPC Practical Guide* (DEFRA, 2005b, p. 37) public consultation is required on draft determinations of permits for new and substantially changed installations but not for existing installations.

<sup>212</sup> PPC Act 1999, §13.

<sup>213</sup> PPC Regulations 2000, Part V, Section 29(6).

<sup>214</sup> PPC Act 1999, §12.

<sup>215</sup> Where a permit has been issued under the PPC Regulations 2000, "it shall be the duty of each regulator, as respects installations or mobile plants for which it is the regulator, to maintain a register containing the particulars described..." PPC Regulations 2000, Part V, Section 29(1). The PPC Regulations identify matters to be excluded from such registers – those affecting national security and those containing certain confidential information. PPC Regulations 2000, Part V, Regulations 30 and 31.

<sup>216</sup> PPC Regulations 2000, Sch 7, Part I, para 3; Part 2.

<sup>217</sup> PPC Act 1999, §12 (a) - (c); PPC Regulation 29 *Public Registers of Information*.



practice such opportunities are not utilized as extensively by the public in the UK as they are in the US.

Moreover, there is no provision in the PPC Act specifically authorizing persons other than the operator to appeal a permit decision, although there appears to be a general administrative law doctrine allowing any person with a direct interest an a governmental decision to seek judicial review.<sup>218</sup> In addition, a citizen wishing to challenge a permit may seek recourse from the Ombudsman, discussed above. The 2005 amendments to the PPC Regulations 2000 hoped to achieve “a more open approach to taking decisions which may be of considerable significance to local communities and wider environmental interests...and were made [in an attempt to] reduce the overall time between [permit] application and determination.”<sup>219</sup> Yet, despite the potential ability to engage, it appears that UK public pressure groups are not as likely to directly challenge a permit determination or enforcement decision or file amicus (“friend of the court”) briefs, whereas in the US these practices are frequently employed.

**Required Information for Public Registers**  
**2000 PPC Regulations, Schedule 9, paragraph 1**

1. All particulars of permit applications;
2. All particulars of advertisements placed by applicants as part of the application process;
3. All particulars of permits granted;
4. All particulars of applications for the transfer, variation or surrender of a permit;
5. All particulars of permits which have been transferred, varied, or surrendered;
6. All particulars of any permit which has been revoked;
7. All particulars of any enforcement or suspension notice which has been issued;
8. All particulars of any notice issued by the regulator withdrawing an enforcement or suspension notice;
9. All particulars of any notice of appeal;
10. Details of any conviction or formal caution for an offence committed under the 2000 Regulations, reg 32 relating to the operation of an installation/mobile plant;
11. All particulars of any monitoring information obtained by the regulator as a result of its own monitoring or supplied by the operator in accordance with a condition of a permit;
12. All particulars of any report published by a regulator of an assessment of the environmental consequences of the operation of an installation in the locality of premises where the installation is operated under a permit granted by the regulator;
13. All particulars of any direction given by the Secretary of State;
14. All particulars of any representations made by any person in response to an advertisement (added 2005).

<sup>218</sup> Bell and McGillivray, pp. 340-349.

<sup>219</sup> DEFRA, 2005a.



## 4. OPERATIONAL FRAMEWORK FOR INTEGRATED PERMITTING

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The broad contours of the EU and UK framework for facility permitting under the IPPC Directive and UK national law have been described in the preceding chapters. The goal of this chapter is to provide a bridge from that overview to the permit-specific discussion and analysis found in Chapter 5. Specifically, this chapter describes how the general requirements of the IPPC Directive and the implementing statute and regulations in the UK are translated into facility-level permits by the EA, what those permits typically include, and the process through which permits are issued.

Among the questions that will be addressed in this chapter are practical matters: What strategy did the UK adopt to permit approximately 3500 IPPC facilities by October 2007? How does the UK EA manage its continuing workload? What considerations are involved in setting permit terms under the IPPC system in the UK? What does an IPPC permit look like? Who is involved in issuing an IPPC permit? What are the steps a facility operator must take to secure an IPPC permit? What tools and guidance are available?

### Implementing IPPC in the UK – Setting Permitting Priorities and Targeting Resources

#### *Sector Approach and Priorities*

The IPPC Directive mandated that certain industrial sectors have IPPC permits by the end of October 2007. In order to make such a large permitting effort manageable, and at the same time be strategic, the UK (pursuant to the PPC Regulations) established a phased, sector-based approach and schedule,<sup>220</sup> beginning with the submission of permit applications for paper, pulp and board manufacturing activities by June 2001, and ending with applications in the waste disposal and intensive farming sectors by the end of January 2007.<sup>221</sup> Under the schedule established in the PPC Regulations, facilities in each of the 48 defined sectors had a three-month window in which to submit an IPPC permit application.<sup>222</sup> By September 2007 the EA had determined (issued) more than 2,700 IPPC permits.<sup>223</sup> This included 2,233 for process industry and 541 for landfills. The sectors permitted ranged from the very complex (e.g., organic fine chemicals, hazardous waste landfills and pharmaceuticals) to the relatively simple (e.g., food and drink, textile treatment, and intensive pig and poultry farms). The EA is one of the few EU environmental permitting authorities to have substantially met the IPPC deadline of October 30, 2007. The details of the IPPC permits issued in each sector appear in Figure 4.1 and Table 4.1. A more specific list of regulated sectors and industrial activity areas can be found in Appendix I.

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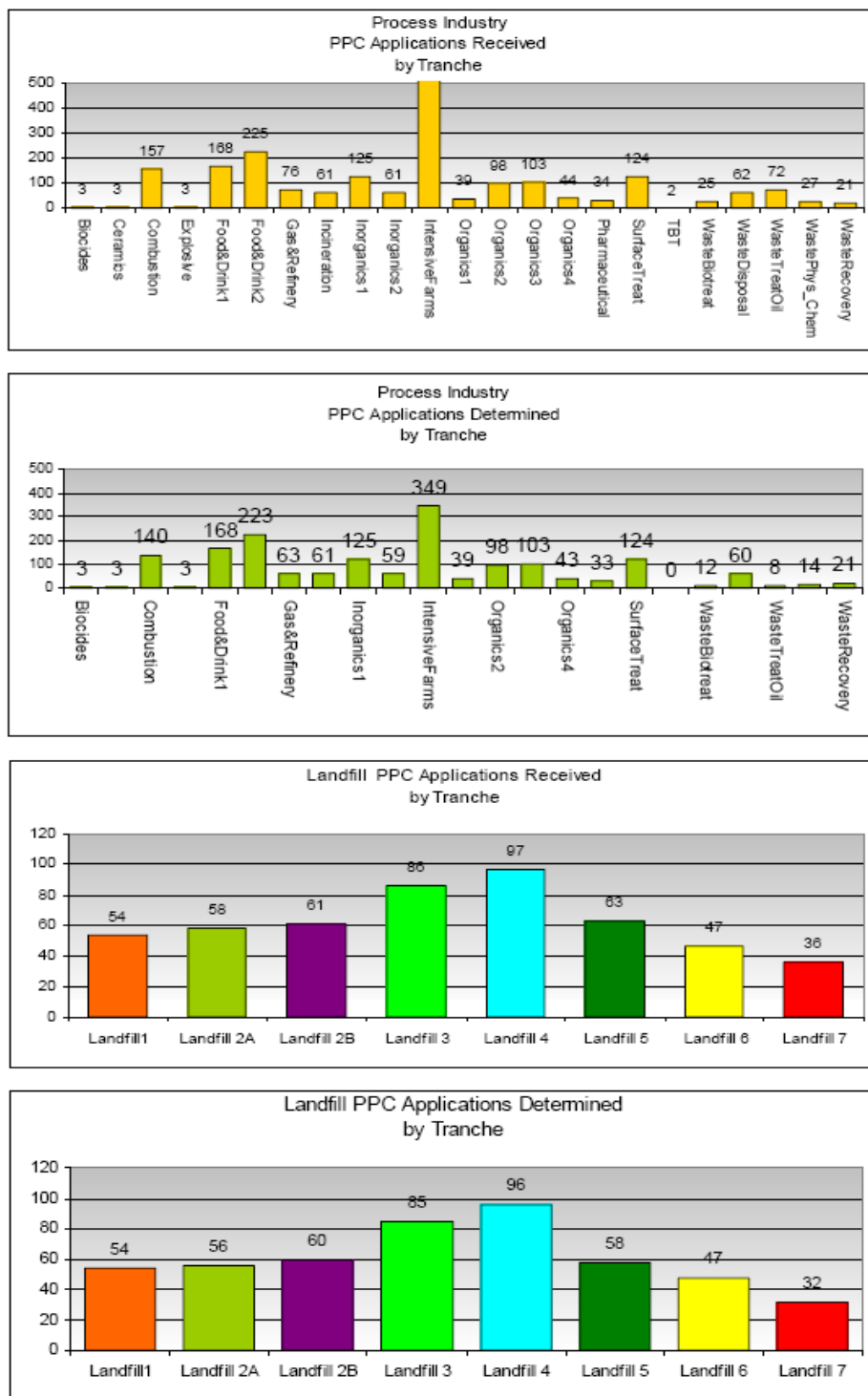
<sup>220</sup> This schedule was agreed to by industry albeit with some resistance and desire on the part of individual sectors to put off applications as long as possible. (Derwent, H., DEFRA. "Industrial Environmental Regulation in the UK." Presentation at the conference Prevention and Control of Industrial Pollution: International Conference on Policy Approaches. Seville, Spain. 25-26 April 2002. <http://eippcb.jrc.es/pages/doc/PCIPsevilla/mainpage.htm>.)

<sup>221</sup> PPC Regulations 2000, Sch 3, Regulations 9 and 10(14).

<sup>222</sup> The EA refers to the group of applications within each of these three-month windows as a tranche.

<sup>223</sup> Leinster, p. 3.

Figure 4.1 – Distribution of IPPC Applications and Permits by Sector<sup>224</sup>



<sup>224</sup> Figure taken from Leinster, p. 8. Tranche is the term the EA uses to refer to the group of applications within each of the three-month windows designated for submitting IPPC permit applications.

**Table 4.1 – IPPC Extant Permits, Applications as of October 31, 2007<sup>225</sup>**

Industrial Sector	End of Application Window	Extant Permits	Applications Pending	Total Expected
Paper, pulp, and board manufacturing	28 February 2001	54	0	54
Production of cement and lime	31 August 2001	25	0	25
Ferrous metals	31 August 2001 31 July 2002	31	0	31
Gasification, liquefaction, and refining	31 August 2001 31 August 2006	74	8	82
Non-ferrous metals	31 December 2001	73	0	73
Tar & bitumen activities	31 December 2001 31 March 2004	4	0	4
Other mineral activity	30 April 2002	3	0	3
Manufacturing glass and glass fibres	31 July 2002	15	0	15
Production of other mineral fibres	31 July 2002	3	0	3
Coating activities, printing, and textile treatments	31 July 2002 31 March 2007	55	0	55
Treatment of animal and vegetable matter and food industries	31 July 2002 31 August 2004 31 March 2005	370	4	374
Organic chemicals	Various 31 March & August 2003 31 March & August 2006	325	15	340
Disposal of waste by landfill	2003-2006	449	28	477
Production of fuel from waste	31 March 2004	1	0	1
Carbon activities	31 March 2004	2	0	2
Ceramic production including bricks and tiles	31 March 2004	2	0	2
Surface treating metals and plastic materials	31 July 2004	130	0	130
Manufacturing activities involving carbon disulphide or ammonia	31 December 2004	8	0	8
Inorganic chemicals	Various 31 December 2004 31 August 2005	183	4	187
Recovery of waste	31 March 2005	27	5	32
Disposal of waste by incineration	31 March 2005 31 August 2005	87	8	95
Chemical fertilizer production	31 August 2005	7	0	7
Disposal of waste other than by incineration or landfill including hazardous, oil, biological, and physiochemical	31 August 2005 30 June 2006 30 November 2006 31 January 2007	207	12	219
Combustion	31 March 2006	260	11	271
Plant health products and biocides	31 March 2006	11	0	11
Pharmaceutical production	31 March 2006	36	0	36
Explosives production	31 March 2006	3	0	3
Timber	31 August 2006	0	0	0
Activities involving asbestos	31 August 2006	4	0	4
Intensive farming	31 January 2007	829	176	1015
Associated processes		16	0	16
<b>Totals</b>		<b>3294</b>	<b>271</b>	<b>~3575</b>
* Dates indicated in the table correspond to the end of the three-month application window for the sector. Multiple dates within a sector correspond to application due dates for Part A(1), Part A(2) facilities as well as various other sub-categorizations of facility within a sector.				

<sup>225</sup> Data provided by EA, 2007a. *Breakdown of Extant Permits and Duly Made Applications – by Sector (as at 31 October 2007).*

The UK, based in part on previous experience under IPC, chose a phased approach to implement the IPPC Directive, “to spread the load on regulators and to enable experience of IPPC permitting to be built up gradually, thus avoiding the considerable pressure – both on regulators and consequently also on operators – which would result from leaving everything to the last notionally possible moment.”<sup>226</sup> Implementation of the IPPC Directive in the UK required integrated permits for several business sectors that were not already covered under the previous IPC permitting (or process “authorization”) scheme. These include intensive farming, food and drink manufacture, and waste management facilities. Management of the application process for these sectors required more than usual support from the EA.

### **Sector Plans**

At a strategic level the EA begins the process of IPPC permitting with creation of a sector plan.<sup>227</sup> These sector plans, also described as environmental improvement plans, are developed in partnership with industry and aim for the following:

- Focus on the most significant risks and impacts the sector poses to the environment;
- Deliver continuous improvement in the sector’s environmental management and performance;
- Prioritize and target the EA’s effort within and across sectors;
- Achieve, in partnership with industry, benefits that go beyond what can be achieved by regulation; and
- Monitor progress in environmental improvement within and between sectors.<sup>228</sup>

Development of a sector plan is preceded by a strategic review of a sector’s environmental issues – environmental pressures and environmental, social and health impacts – documented in a sector report.<sup>229</sup> The sector plan addresses the issues identified in the sector report and in turn identifies priorities, objectives, and progress measures and reporting for the next five to fifteen years. In the case of the chemicals industry, the sector plan outlines ten broad sector-wide objectives.<sup>230</sup> Coupled with each of these objectives are a set of performance indicators – current and proposed. In the case of the chemicals industry, some of the reporting using the identified

<sup>226</sup> DEFRA, 2006. *Implementation to 31 December 2005 in the United Kingdom and Gibraltar of Directive 96/61/EC Concerning Integrated Pollution Prevention and Control: Report Required by the European Commission Under the Terms of Article 16(3) of Directive 96/61/EC*. <http://www.defra.gov.uk/environment/ppc/regs/pdf/ippc-implementation06.pdf>.

<sup>227</sup> Ideally there is a logical sequence to planning from the development of (and updates to) sector-based technical guidance on BAT, to sector plans, to PPC sector permitting plans (SPPs) and finally to individual applications and permits within a sector. Although reality has deviated from the ideal, the EA continues to work towards creating this sequential framework for PPC permitting.

<sup>228</sup> EA, 2005c. *Improving Environmental Performance, Sector Plan for the Chemical Industry*, Version 1. <http://www.environment-agency.gov.uk/business/444251/1215866/>.

<sup>229</sup> See for example the sector report for the chemicals industry, EA, 2005c.

<sup>230</sup> These objectives include tasks such as, develop a sustainable chemical industry, reduce the consumption of resources in chemical manufacturing, reduce air and water emissions, and promote product stewardship as well as wider supply chain benefits.

indicators was to be done in conjunction with reporting against similar targets set by members of the UK trade association, the Chemical Industries Association (CIA). The sector plan concludes with a set of general program tasks to be completed by the EA and sector operators within a certain timeframe.<sup>231</sup> The EA invited interested stakeholders to comment on the first sector plan and envisaged a process where sector plans would be “substantially” reviewed once every five years.

### **PPC Sector Permitting Plans**

The next step in the sector planning process is creation and publication of a PPC sector permitting plan (SPP).<sup>232</sup> The audience for SPPs is facility operators and, as the EA states, the intent of an SPP is to identify “key sectoral environmental issues” and “to give operators a steer on the priority that we [the EA] give to the various aspects of PPC and so will be of value in the preparation of PPC applications.”<sup>233</sup> The current generation of SPPs addresses the transition from IPC to IPPC permits (in instances where a sector was regulated under IPC) and note where improvements may be needed to demonstrate BAT under the IPPC permitting regime.

The majority of an SPP consists of “considerations for PPC applications and determinations.” As such, the SPP includes a sector-wide analysis of emissions to air, water, sewer, land, and groundwater as well as the other major components of an IPPC permit (see IPPC permit contents discussion below). The SPP notes sector-wide patterns and trends for facility management (including the range of EP OPRA scores (discussed below) for the sector), use of raw materials, waste minimization, energy efficiency, accident prevention and control, noise and vibration, monitoring, and decommissioning as well as overall impact on habitat and human health. Attached to each one of these discussions and analyses is the EA ranking – a high, medium or low priority – often with specific guidance as to what the EA will be looking for and what they will focus on in the IPPC permit application. The SPP concludes with the EA’s assessment of future developments in both the UK and EU that might affect the sector and its facility permits.

### **Targeting the Greatest Potential for Environmental Harm**

In addition to managing environmental permitting on a sector basis, permitting operations within each sector are driven by a systematic approach to direct agency resources to where they matter most, thus implementing one of the central tenets of “modern regulation” described in Chapter 2. Integral to this approach and to managing and optimizing use of EA resources is the EP OPRA tool.

While the EA is a governmental entity, its funding is only partially provided by the Government. The EA must also rely on income from fees and other agency-generated funds. In particular, IPPC permitting is required to be fully self-supporting through generation of application and

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<sup>231</sup> Examples of program tasks include: complete suite of performance indicators, record definitions of each performance indicator, and publish annual report of sector performance as measured by each of the indicators.

<sup>232</sup> The idea of a SPP was developed several years into IPPC permitting; therefore, some of the first sectors to be permitted under the IPPC permitting regime, such as the pulp and paper sector, do not have a SPP. However, a SPP has been published for the chemical sector, which provided the basis for the discussion in this report. See, EA, 2005c.

<sup>233</sup> EA, 2005c.

permit subsistence fees. This obligation imposes the responsibility to match permit fee revenues with the actual cost of the IPPC system, including permit issuance, inspections and audits, and permit management. While there are several ways that agencies can attempt to establish fee structures to accomplish this objective, the EA uses the EP OPRA tool to establish facility-specific fees and to determine workload elements such as the priority and frequency of facility inspections and audits. Key to this system is that it is facility-specific and dynamic. Both fees and workload can vary on an annual basis depending upon the facility's EP OPRA score.

### **EP OPRA – A Brief Introduction**

EP OPRA is a facility-based scoring system that provides a measure of the potential of a facility and its operations to cause environmental harm, or in other words, a measure of *approximate* facility risk. It is important to note for the US reader, in using the term risk, the EA is not referring to a “risk assessment” as that term is used in the US. As will be evident in the full description later in this chapter, EP OPRA does not make use of the highly structured and quantitative risk assessment paradigm followed in programs such as the US EPA Superfund program.<sup>234</sup> In other words, EP OPRA is hazard-based rather than exposure-based.

The EP OPRA profile and score result from a series of objective questions answered by facility operators that address five attributes: facility complexity, location, emissions, operator performance, and compliance. The EA uses the EP OPRA score as an indicator and predictor of the regulatory effort and resources that will be required of the agency. Operators are required to submit an EP OPRA profile (contained in an Excel spreadsheet) to the EA with the permit application. Because EP OPRA is an intriguing and unique tool that may hold some promise for use in the US, a more detailed discussion of it appears in the discussion of the permit application process and in Appendix J.

### **IPPC Permits: EU and UK Standard Setting**

Setting the terms of individual facility permits begins with the standard-setting process at the EU level. As noted earlier, the EU legislates to set requirements that apply to each of the member states. In the case of the IPPC Directive, the key mandates that affect individual facility permits revolve around what it means to prevent, control, and reduce pollutant emissions in order to protect the environment as a whole, and how this is to be accomplished.<sup>235</sup> The primary

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<sup>234</sup> Superfund risk assessment includes risk characterization, identification of acute hazards, toxicity (hazard identification and dose-response), exposure assessment, etc. to determine risk on a probabilistic basis. As will be described later in Chapter 4, the approach used by EP OPRA is entirely different from that used by US EPA. For more detail, see EPA's guidance for risk assessments conducted under the Superfund Program at [http://www.epa.gov/oswer/riskassessment/risk\\_superfund.htm](http://www.epa.gov/oswer/riskassessment/risk_superfund.htm).

<sup>235</sup> “The [IPPC] directive incorporates a high level of demands. Permits are intended to contribute to the avoidance of pollution, the integrated reduction of emissions in air and water, the minimization of flows of waste, the efficient utilization of energy and precautions in case of an incident. The directive is however in its core only a procedural directive that refrains from implementing its general objectives in harmonized limits or to define other instruments of environmental policy.” (Hey, C. “Balancing Participation in Technical Working Groups: The Case of the Information Exchange of the IPPC Directive.” Presentation at the conference The Sevilla Process: A Driver for Environmental Performance in Industry.” Stuttgart, Germany. 6-7 April 2000. <http://www.umweltdaten.de/publikationen/fpdf-l/1823.pdf>)



mechanism used to achieve these goals is the all-important requirement for the application of BAT.

## **BAT**

The legal framework for BAT has been described in Chapter 3. As a reminder, by regulation, BAT is “the most effective and advanced stage of the development of activities and their methods of operation which indicates the practical suitability of particular techniques for providing the basis for ELVs designed to prevent and, where that is not practicable, generally to reduce emissions and impact on the environment as a whole.”<sup>236</sup> In thinking about BAT, it is important to remember that “BAT is a means to an end, not an end in itself. The [IPPC] Directive’s purpose [the end] is ‘to achieve a high level of protection for the environment taken as a whole.’”<sup>237</sup> Consistent with this characterization, BAT is also not a system based on “fixed” national emission limits, nor is it designed with the primary purpose of meeting ambient environmental quality standards.<sup>238</sup> This mindset contrasts some with the US approach to regulatory standards, where meeting a regulatory standard is more often than not the end.

### **Best Available Techniques**

**Best:** Prevent, and where that is not practicable reduce, emissions in order to achieve a high level of protection of the environment as a whole.

**Available:** Developed on a scale that allows implementation in the relevant industrial sector under economically and technologically viable conditions.

**Techniques:** Both the technology used and the way in which the facility is designed, built, maintained, operated, and decommissioned.

For US readers, it is also essential to understand that BAT is mandated for all aspects of facility operations (engineering as well as behavioral aspects) that have an environmental consequence, and that BAT extends not only to controls on pollution sources but to various methods of mitigating and preventing adverse environmental effects, including substitution of raw materials, use of more benign processes, and efficiency improvements. It also should be noted that BAT consists of *techniques*. Techniques encompass technology as well as facility design, operation, maintenance, and closure. For example, IPPC permits address BAT for facility management, which often includes implementation of a comprehensive management system (usually an EMS), thus creating the expectation that a facility operator will continually strive for environmental performance improvements. Thus, BAT as it is applied in the EU and UK is a far more inclusive approach than the somewhat similarly-named requirements that form the basis of US environmental protection programs. US performance and technology-based standards and emission and discharge limits (such as *Reasonably Available Control Technology* (RACT), *Best Available Control Technology* (BACT), *Lowest Achievable Emission Rate* (LAER), and *Maximum Achievable Control Technology* (MACT) under the CAA, and *Best Practicable Control Technology* (BPT) and *Best Conventional Control Technology* (BCT), and *Best*

<sup>236</sup> PPC Regulations 2000, §3(1).

<sup>237</sup> Derwent, H., DEFRA. “Industrial Environmental Regulation in the UK.” Presentation at the conference Prevention and Control of Industrial Pollution: International Conference on Policy Approaches. Seville, Spain. 25-26 April 2002. <http://eippcb.jrc.es/pages/doc/PCIPsevilla/mainpage.htm>.

<sup>238</sup> EA, 2000. *IPPC Technical Guidance for the Pulp and Paper Sector*, Version 2. <http://www.environment-agency.gov.uk/business/444304/444635/1778182/107293/?version=1&lang=e>.

*Available Technology* economically achievable under the CWA) have by comparison a relatively narrow scope.

### ***BAT Determination and Permit Requirements***

In the UK, the assessment of what constitutes BAT takes place at several levels – on a sector basis at the EU and UK national level, and then at the local or facility level. Ultimately, BAT is determined on a site-specific basis, taking into account EU and UK guidance, but also reflecting local conditions and “the technical characteristics of the installation concerned.”<sup>239</sup> BAT thus addresses local environmental quality issues and because the determination of BAT takes into account technical characteristics of the installation, the process weighs cost to the facility operator with benefit to the environment.<sup>240</sup> This flexibility, specified in the IPPC Directive, allows the EA to impose reasonable costs on the operator, but to avoid costs that would be wholly out of proportion to the environmental benefit provided.<sup>241,242</sup> BAT must also be available to the facility operator, i.e., developed and proven, but not necessarily in widespread use. Expanding on the later two points, if a facility operator has a choice in selecting BAT from more than one technique, the operator may choose to reject options where the cost of employing a particular technique is disproportionately high and not balanced by environmental benefit.<sup>243</sup> In addition, a “technique” does not have to be in general use or subject to a competitive market in order for it to be “available.” As long as a technique is proven, even on a small scale, it is considered available. This last aspect of BAT is particularly

#### **EU BAT - The Common Standard for Environmental Protection**

When one thinks of BAT and compares it to its multiple and diverse counterparts in the US, one is reminded of the contrast between the “English” system of weights and measures and the Metric system. An apt analogy might be EU BAT is to a variety of terms used under US statutes such as RACT, BACT, LAER, MACT, BPT, and BCT, as the meter is to inch, foot, yard, and mile. Instead of a common unit of measure (using the appropriate prefix milli-, centi- deci-, kilo-, giga-, etc.), the US is committed to a system of unique units each with a very particular meaning. US environmental protection standards are characterized by this same idiosyncratic approach -- each environmental statute defines its own unique set of standards.

<sup>239</sup> IPPC Directive, Article 9(4).

<sup>240</sup> It is important to note that there is a distinction between cost and individual facility/company profitability. Profitability is not a factor in determining BAT. Also, cost is a factor, primarily on the sector level rather than on an individual facility basis.

<sup>241</sup> This analysis and determination is aided by the use of the EA’s Horizontal Guidance 1, or H1 tool, discussed later in this chapter.

<sup>242</sup> “...it must be further pointed out that the directive definition of BAT also incorporates consideration of the economic viability of implementing a technique, taking into account the ‘costs and advantages’ of implementation ...” and “it is vitally important that we develop...a clear understanding of the benefits of reducing pollutant levels...no-one will underestimate the difficulty of doing that...Nevertheless, and with full regard for the ‘precautionary principle,’ we must be prepared at some point to say that, on the available evidence, the costs of further tightening ELVs or of imposing some other form of control upon any or every installation in any or every industrial sector cannot be justified by the benefits.” Derwent, H., DEFRA. “Industrial Environmental Regulation in the UK.” Presentation at the conference Prevention and Control of Industrial Pollution: International Conference on Policy Approaches. Seville, Spain. 25-26 April 2002. <http://eippcb.jrc.es/pages/doc/PCIPsevilla/mainpage.htm>.

<sup>243</sup> The *IPPC Practical Guide* describes economic assessment in the following way: “An objective approach needs to be taken to balancing costs and advantages when assessing what are BAT. The lack of profitability of a particular business should not affect their determination...there may be some cases where the regulator should set different standards (i.e., ELVs that correspond to BAT different from that determined on a sector-wide basis), for example, because the balance of costs and benefits is different in the particular local environmental and/or technical circumstances of a particular installation. But it would not be right to authorize lower standards, or delay the implementation of BAT solely because an operator argued for this narrowly on the basis of its own financial position.” DEFRA, 2005b, p. 49.

important in driving innovation and in creating new markets for emerging techniques and technologies considered BAT in the EU.<sup>244</sup>

Operationally, IPPC permit terms are what conclusively define BAT for a facility. BAT is determined for each emission generating activity and operation that has an impact on the environment. Permit conditions then set forth the requirements that achieve BAT *for that particular aspect of a facility's operation* (aspects such as management techniques and materials inputs in addition to emissions to air, water and land). It is the responsibility of the facility operator to propose BAT for each aspect of its operations in the IPPC permit application. Once the EA determines the application, i.e., issues the permit, BAT outlined in the permit (in some cases with references to the application) and any corresponding ELVs set by the EA become BAT for that facility.<sup>245</sup>

Generally, new facilities or “new builds” are expected to apply “the most effective and advanced stage” of BAT as soon as operations begin.<sup>246</sup> However, to the extent that certain activities and operations (for an existing facility at the time of permit application) do not constitute “the most effective and advanced” techniques, a facility may be subject to conditions in an improvement program. In short, PPC improvement programs require the operator to upgrade techniques to those indicated in the BREF or UK technical guidance,<sup>247</sup> or if that is not feasible within the time period prescribed in the improvement program, to move in that direction.<sup>248, 249</sup> Technical characteristics and conditions at a facility

#### In Comparison – US Requirements for Air Pollution Control

Typically, several different regulations and standards apply to air emissions for a typical complex facility in the US. Each US state must have a federally approved State Implementation Plan (SIP) containing requirements for criteria pollutant emission sources that will lead to state attainment of *National Ambient Air Quality Standards* for the criteria pollutants (e.g., nitrogen and sulfur oxides), or where the state has already attained compliance, that will demonstrate continued attainment.<sup>1</sup> For instance pulp and paper facilities usually emit criteria air pollutants (and may emit all of them) from pulping, papermaking, and/or combustion sources. Thus, pulp and paper facilities typically are subject to SIP requirements.

Additionally, under section 111 of the CAA, EPA has set standards of performance for new (or modified) facilities of certain types that emit one or more criteria air pollutants. *New Source Performance Standards* that have been promulgated for certain types and sizes of combustion sources (such as boilers firing various fuels) may apply at pulp and paper facilities. Finally for criteria pollutant emissions, new facilities or facilities that modify existing processes may become subject to BACT or LAER requirements under the CAA new source review program. Finally, under section 112 of the CAA, facilities are subject to several MACT standards and other requirements for emissions of hazardous air pollutants.

<sup>1</sup> Under the CAA, ambient air quality standards have been set for six criteria air pollutants: nitrogen oxides, sulfur oxides, volatile organic compounds (precursors to ozone formation), particulate matter, carbon monoxide, and lead.

<sup>244</sup> James, T., EA Policy Manager. Personal communication. 2 May 2007.

<sup>245</sup> For the role and importance of the permit application, see discussion that follows later in this chapter on the permitting process and tools.

<sup>246</sup> Still subject to site-specific factors allowed by IPPC Directive Article 9(4) so that BAT will vary between facilities within a sector. In other words, “New installations will normally be expected to comply with or go beyond indicative BAT [BAT indicated in the BREF or UK technical guidance]. However, site-specific factors may justify a different conclusion from the normal understanding of what technique is BAT in particular cases.” DEFRA, 2005b, p. 51.

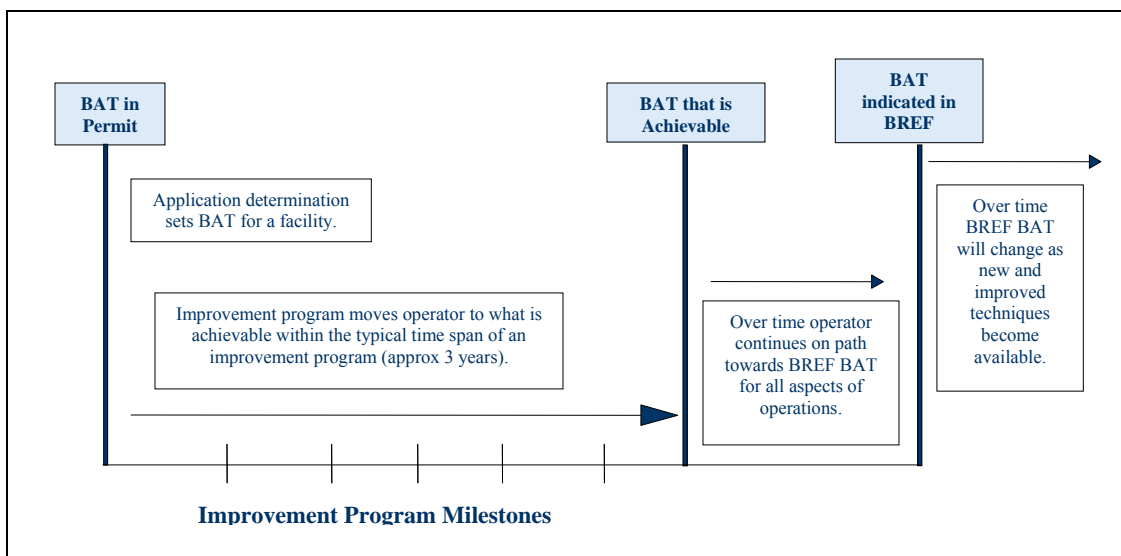
<sup>247</sup> The UK sometimes refers to BAT indicated in the BREF or UK technical guidance as “new plant” BAT and in connection with improvement programs, directs regulators to be “concerned with establishing timescales for upgrading existing installations to new standards, or as near to new standards as possible. How far the new plant standards apply will depend on local and plant specific circumstances.” DEFRA, 2005b, p. 51.

(e.g., limitations imposed by the physical plant that short of a complete tear-down, prohibitive or disproportionate expense, cannot be overcome) can prevent an individual operator from reaching BAT indicated in the BREF or UK technical guidance. Over the longer term, however, the facility still remains subject to the BAT indicated in the BREF or UK technical guidance. In addition, as physical and operational changes occur at a facility, including those that are a result of internally-driven capital improvement cycles, and/or as permits are reviewed and revised, the EA may impose additional conditions that narrow the gap between BAT that is achievable and BAT as indicated in the BREF or UK technical guidance. It is also important to note that BAT itself is a dynamic rather than a static target. Over time BREFs and UK technical guidance incorporate new and better techniques that become available on the EU and national levels. This process is illustrated in the schematic found in Figure 4.2.

**BAT Determination the Same for New and Existing Sources**

All sources in the UK – both new and existing – must work toward BAT that constitutes “the most effective and advanced stage of... techniques...for protecting the environment as a whole.” While practically speaking, final standards and limits may differ for new and existing sources, the fact that all sources must consider the same set of BAT techniques may mean that it is very rare, or unheard of, to find a source in the UK untouched by regulatory controls. This is not the case in the US where “grandfathered” sources remain exempt from control for many years.

**Figure 4.2 – UK Interpretation of BAT**



<sup>248</sup> As stated in UK sector guidance notes: “For an existing installation, it may not be reasonable to expect compliance with indicative BAT standards immediately if the cost of doing so is disproportionate to the environmental benefit to be achieved. In such circumstances, operating techniques that are not at the relevant indicative BAT standard may be acceptable, provided that they represent what is considered BAT for that installation and otherwise comply with the requirements of the Regulations.” Nonetheless, “where there is a significant difference between relevant indicative BAT and BAT for the installation, the Permit may require further improvements on a reasonable short timescale” (i.e., through an improvement program). EA, 2003. *Guidance for the Specialty Organic Chemicals Sector*, Version 6. <http://publications.environment-agency.gov.uk/pdf/GEHO1205BJZB-e-e.pdf>, p.4.

<sup>249</sup> Improvement programs and their implementation will be discussed further at the conclusion of this chapter and in Chapter 5.

At the other end of the spectrum, an operator may be required to go beyond the BAT indicated in the BREF so as not to violate an EU-established EQS or ELV. The IPPC Directive requires regulated facilities to meet EU EQSs that specify the maximum concentration of certain pollutants in water.<sup>250,251</sup> However, attainment of an applicable EQS or ambient environmental standard does not reduce the stringency of permit terms; under BAT requirements, if emissions can be reduced or prevented altogether, then this should be done irrespective of compliance with any applicable EQS. As UK regulators state, “[the BAT approach] requires us not to consider the environment as a recipient of pollutants and waste which can be filled up to a given level, but to do all that is practicable to minimize the impact of industrial activities.”<sup>252</sup> Implementation of BAT works in concert with ambient standards to accomplish environmental protection goals.

### **Establishing BAT in the EU**

Sector-based BAT determination is done initially at the EU level. The IPPC Directive mandates that the EC organize an exchange of information between member states and industry on BAT and publish the results.<sup>253</sup> In practice, this information exchange involves the production of *non-binding* BAT Reference Documents (BREFs) for each of the thirty industrial sectors regulated under IPPC. The purpose of the BREF is to summarize available information on BAT and to serve as a reference for permitting authorities across the EU as well as address whatever technological differences or imbalances there may be among the various member states. The content of the BREF provides the basis for input in determining BAT at the national level and then, in turn, at the facility level.<sup>254</sup> In essence, BAT as

#### **A Closer Look at the BREF and BAT for the Pulp and Paper Sector<sup>1</sup>**

By the threshold criteria set in the IPPC Directive the BREF for the pulp and paper sector applies to approximately 98 percent of Europe’s pulp and paper mills. Manufacturing at these mills involves a large variety of raw materials, products, and processes. Determination of BAT at the EU level must address this diversity, and in many cases involves a combination of what the Europeans refer to as process-integrated techniques (pollution prevention) and external measures (end-of-pipe controls). Water effluent discharge is one example of this. The long-term solution is a drive towards effluent-free mills, but short of reaching this goal, current BAT is designed to tighten both the use and discharge of water from pulp and paper mills. BAT for a certain class of mill – bleached kraft pulp mills – involves a combination of 11 possible internal process measures and a 12th external, end-of-pipe control, biological wastewater treatment, that may be necessary to meet the BAT performance standard of 8 - 23 kg COD per ton of pulp produced.

The above range of emissions for BAT is quite wide. This reflects the interplay of both technological and economic factors in the negotiation of BAT. A more narrow range might have reflected the best of the best, but would not have been within reach economically for a good segment of the sector. The result may not be the very best environmental performance, but still “a high level of protection for the environment as a whole.”

<sup>1</sup> Michael Suhr. 2000. *Federal Environmental Agency, Germany, The BREF in the Pulp and Paper Industry in The Sevilla Process -- A Driver for Environmental Performance in Industry*, pp. 111-122.

<sup>250</sup> The EA has commented that the use of EU EQS is largely an academic exercise at this point and that ELVs are amply protective of water quality. James, T. “Integrated Regulation in the UK.” Presentation at the workshop Lessons from the United Kingdom’s Integrated Permitting Experience: Exploring New Directions for Environmental Permitting in the US. Washington, DC. 25 October 2007.

<sup>251</sup> In the UK, corresponding environmental air quality standards are termed Environmental Assessment Levels, or EALs. These will be discussed later in the chapter in conjunction with the H1 tool.

<sup>252</sup> EA, 2000, p. 1.

<sup>253</sup> IPPC Directive, Article 16.

<sup>254</sup> The information exchange process and the resulting information base mandated by the IPPC Directive have been described as a remnant of harmonized emissions control advocated by Germany. The combination of this BREF information exchange and the provisions of Article 9(4) of the directive aligned most closely with the UK permitting system thus represent a compromise between German and UK approaches. (Hey, C. “Balancing Participation in

it is articulated in the BREF represents techniques “that are considered to be appropriate to [a] sector as a whole and in many cases reflect the current performance of some installations within the sector.”<sup>255</sup> BREFs address each environmental consequence of industrial operations within a sector.

The BREF process is one of negotiation and consensus (as discussed below) and considers the economic position of sectors in each of the member states. In part because this is so, BAT in the BREF does not represent the absolute best performance that could be achieved by an industrial source.<sup>256,257,258</sup> Standard boilerplate text that appears in each BREF states, “In some cases it may be technically possible to achieve better emission or consumption levels but due to the costs involved or cross-media considerations, they are not considered to be appropriate as BAT for the sector as a whole.”<sup>259,260</sup> Consistent with the UK interpretation of BAT implementation, BREF boilerplate language goes on to state, “It is intended that the general BAT ... are a reference point against which to judge a proposal for a new installation. In this way, they will assist in the determination of appropriate ‘BAT-based’ conditions for the [individual] installation.... It is foreseen that new installations can be designed to perform at or even better than general BAT levels ... It is also considered that existing installations could move towards the general BAT

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Technical Working Groups: The Case of the Information Exchange of the IPPC Directive.” Presentation at the conference The Sevilla Process: A Driver for Environmental Performance in Industry.” Stuttgart, Germany. 6-7 April 2000. <http://www.umweltdaten.de/publikationen/fpdf-l/1823.pdf>)

<sup>255</sup> Reference Document on Best Available Techniques for the Manufacture of Organic Fine Chemicals (BREF). European Commission. August 2006, p. 371.

<sup>256</sup> “The process of [BREF] information exchange was overshadowed for several years by the conflict on the content of the IPPC Directive. Only in 1999 was a compromise formulation reached that makes it clear that the result of the information exchange process does neither lie in a large range of techniques nor in a particularly ambitious standard. Using this ‘clarification,’ made in 1999, of the level of the environmental policy demands in the direction of *an above average, but not best possible environmental performance of BAT*, a normative framework for further work on the information exchange process has been created.” Hey, C. “Balancing Participation in Technical Working Groups: The Case of the Information Exchange of the IPPC Directive.” Presentation at the conference The Sevilla Process: A Driver for Environmental Performance in Industry.” Stuttgart, Germany. 6-7 April 2000. <http://www.umweltdaten.de/publikationen/fpdf-l/1823.pdf>.

<sup>257</sup> Stated somewhat differently, “The BREF provides a general BAT on the sector level. Which means that the presented BAT is considered to be appropriate for the sector as a whole, but not necessarily appropriate, not even technically possible for immediate implementation at all individual sites. The IPPC Directive does not set a time limit for when BAT should be implemented at the individual plant. Some BATs are easy to implement in the short-term perspective, others, such as change of process, have to be considered in the long term investment planning. It is considered that existing installations could be expected, over time, to move towards general BAT levels.” Hagstrom, P. “BAT Process Selection and Split Views.” Presentation at the conference The Sevilla Process: A Driver for Environmental Performance in Industry.” Stuttgart, Germany. 6-7 April 2000. <http://www.umweltdaten.de/publikationen/fpdf-l/1823.pdf>.

<sup>258</sup> “[W]hat is clear, however, from that definition [of BAT] is that the use of BAT does not require the never ending pursuit of the highest possible level of environmental protection. Rather it requires the best technology to achieve a high – not necessarily the highest possible – level of environmental protection.” Derwent, H., DEFRA. “Industrial Environmental Regulation in the UK.” Presentation at the conference Prevention and Control of Industrial Pollution: International Conference on Policy Approaches. Seville, Spain. 25-26 April 2002. <http://eippcb.jrc.es/pages/doc/PCIPsevilla/mainpage.htm>.

<sup>259</sup> Higher performance, however, may be considered and required on a site-specific basis dictated by individual site and local conditions.

<sup>260</sup> European IPPC Bureau, 2005. *IPPC BREF Outline and Guide*. <http://eippcb.jrc.es/pages/Boutline.htm>.

levels or do better, subject to the technical and economic applicability of the techniques in each case.”<sup>261</sup>

For those familiar with CAA permitting in the US, BREF BAT is roughly equivalent to BACT (a facility-specific adaptation of the “best” technology broadly available and commonly used).<sup>262</sup> For additional perspective, the top end of performance ranges found in BREFs may be on par or still below CAA LAER (a highly demanding, “best in class” standard based on the lowest emission rate achieved in practice and highly unique among US environmental standards, generally without regard to cost).<sup>263,264</sup>

To produce a BREF, the European IPPC Bureau, or EIPPCB, located in Seville, Spain, conducts what is known as the "Sevilla" process. This process amounts to a sector-specific "negotiation" between competent authorities from individual EU member states (i.e., the governmental entities responsible for permit issuance), industry, and non-governmental organizations (NGOs) convened as a Technical Working Group (TWG).<sup>265</sup> Participation by practitioners and other experts is voluntary.<sup>266</sup> The process typically takes two to three years to complete and has been described as a classic example of “technocratic participatory standard-setting” not purely science and technology-based but also based on legal and political considerations.<sup>267</sup> In other words, “For the most part, the discussion in the [BREF] technical forums is a mixture of scientific discourse (argument) and negotiation processes (bargaining) such that both technical and also political qualifications are necessary.”<sup>268</sup> At times where there is disagreement among members of the TWG, between member states or between industry and others, “split views” are represented in the BREF. From the UK perspective, the quality, quantity and timing of the information provided through the BREF process can be somewhat variable.<sup>269</sup>

<sup>261</sup> European IPPC Bureau, 2005.

<sup>262</sup> The US CAA Section 7479(3) officially defines BACT as “an emission limitation based on the maximum degree of [pollutant] reduction ... which the [state] permitting authority, on a case by case basis, taking into account energy, environmental, and economic impacts and costs, determines is achievable for [the] facility.”

<sup>263</sup> The US CAA Section 7501(3) officially defines LAER as “that rate of emissions which reflects the most stringent emission limitation which is ... achieved in practice by such class or category of source, whichever is more stringent.”

<sup>264</sup> These comparisons between UK and US standards are based on a qualitative analysis of information presented in written materials, most notably in the EU BREFS and UK technical guidance along with input that resulted from discussion with EA staff and managers. As such, this analysis represents a best interpretation, rather than a hard number, quantitative assessment.

<sup>265</sup> The “negotiation” character of the Sevilla process stands in contrast to the US system of standard setting through rulemaking, although in some sense US public notice and comment procedures may involve “negotiating” among the views (in the form of comments) of industry, NGOs, and the public.

<sup>266</sup> The European Environmental Bureau has only a limited budget to compensate experts.

<sup>267</sup> Bell and McGillivray, p. 782.

<sup>268</sup> Hey, C. “Balancing Participation in Technical Working Groups: The Case of the Information Exchange of the IPPC Directive.” Presentation at the conference The Sevilla Process: A Driver for Environmental Performance in Industry.” Stuttgart, Germany. 6-7 April 2000, p. 69. <http://www.umweltdaten.de/publikationen/fpdf-l/1823.pdf>.

<sup>269</sup> DEFRA, 2007b. *Views from the UK on the IPPC Review*. <http://www.defra.gov.uk/environment/ppc/envagency/meetings/pdf/070517-views-ippc-review.pdf>, p. 2.

Each sector BREF contains the following:

- General information on the sector;
- A listing of the industrial processes that operate within the sector;
- Current emission and [natural resource] consumption levels within the sector;
- Prevention, emission reduction, resource management, and other techniques relevant for determining BAT and permit conditions based on BAT; and
- Conclusions on BAT in conjunction with the emission and consumption levels expected to result from the implementation of BAT.

In other words, the BREF contains methods, processes, and techniques that should be taken into account when making BAT determinations for an individual facility.<sup>270</sup> The BREF contains a survey of possible BAT that has been demonstrated at facilities within the EU, and because economic conditions vary across the EU, BAT performance targets are presented as a range (benchmarks) for such facilities. The BREF forms the basis for individualized action in each member state; however, member states have the ability to adapt the BREF consistent with sector conditions nationally.

The first generation of BREFs tended to focus more on pollution abatement and end-of-pipe technologies and techniques. Prevention, such as use of “green chemistry” techniques had relatively little traction in the process of drafting the Large Volume Organic Chemical BREF, for example.<sup>271</sup> As the first round of BREFs undergo review (a process currently underway for five industrial sectors – iron and steel, pulp and paper, cement and lime, glass and non-ferrous metals)<sup>272</sup> an increased understanding and availability of data on the environmental footprint of each sector should allow greater use and focus on pollution prevention.<sup>273</sup>

The IPPC Directive requires each member state to report to the EC on its implementation of the directive.<sup>274</sup> In its latest report to the EC, the UK government (DEFRA) offered some commentary on the usefulness of BREFs.<sup>275</sup> While the general tone of the comments was positive, DEFRA noted some potential for improvement that provides insight into the translation of the standard-setting process from the EU to the UK. Overall, the BREFs serve as a useful

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<sup>270</sup> Actually, multiple BREFs may apply at a single facility, depending on the types of operations employed. As will be discussed in Chapter 5, at the time of permitting the St. Regis pulp and paper mill, BREFs/technical guidance for combustion plants and incineration plants were pertinent as well. Since then, additional generic BREFs have become applicable including those encompassing energy considerations, cost/economic impacts, and cross-media effects.

<sup>271</sup> Radway, A. EA, Policy Adviser. Personal communication. 17 July 2007. Based on experience with Large Volume Organic Chemical BREF.

<sup>272</sup> The development of BAT described in the BREF is an ongoing process and thus is subject to periodic review by the TWG.

<sup>273</sup> Radway, A. EA, Policy Adviser. Personal communication. 17 July 2007.

<sup>274</sup> IPPC Directive, Article 16(3).

<sup>275</sup> DEFRA, 2006.



basis to create the more user-friendly domestic sector-based guidance notes. Because they are a valuable resource for the UK regulator, timeliness in BREF publication is of key importance. However, for member state regulators, challenges arise in sectors (and BREFs) where the variety of techniques is very wide. This reduces the impact of the BREFs and makes it difficult for member states to set emission limits within a meaningful (narrow) range. In instances where industrial sites and processes have evolved and matured over a long period of time, or where there is wide variation in raw material use, BREFs have proved to be less useful. Case-by-case assessments are often more appropriate in these instances.

In addition to sector-specific BREFs, the EIPPCB also produces horizontal BREFs, which address issues that cut across sectors, such as BREFs that address monitoring systems, economic and cross-media issues, and energy efficiency.

### ***Translating EU BAT in the UK: Technical Guidance Notes***

BREFs apply across the EU and so are not tailored to sector conditions in each of the member states. However, each member state, at its discretion, can choose to take what is issued in the BREF and translate it into national guidance. This translation creates flexibility, but at the same time maintains consistency across the EU (i.e., national guidance is still BREF-based). In the UK, the EA issues *non-binding*, sector-specific as well as horizontal (or cross-cutting) technical guidance notes that cross-reference and complement the BREF, but also establish standards and expectations for industry in the UK. In the UK technical guidance notes techniques considered sector-wide BAT represent an appropriate balance of costs and benefits for a typical, well-performing facility in the UK, and are intended to be generally affordable without making the domestic sector uncompetitive within the EU and globally.

There are various goals stated for use of the technical guidance notes:

- Ensure that operators address all requirements under the PPC Regulations;
- Facilitate and ease the burden of operators and regulators by providing clear indicative standards;
- Provide consistency in regulating across the sector; and
- Provide a common structure across permit applications that will enhance transparency.

### ***Indicative BAT Standards***

BAT standards and industry sector benchmark levels that are indicated by a BREF and in turn by UK technical guidance notes without taking into account local or site-specific conditions at a facility constitute indicative BAT.<sup>276</sup> Local and site-specific conditions can include environmental as well as the physical and engineering aspects of the facility itself. The latter can influence the economics and thus the timing of BAT application through conditions in an

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<sup>276</sup> *Implied* BAT is an *additional* concept stating that a facility operator has an implied obligation to use BAT to prevent or reduce emissions even when a specific permit condition does not require them to do so. In this way even the most detailed, smallest scale aspect of facility operation is subject to BAT (see DEFRA, 2005b, p. 46).

improvement program. In instances where a facility operator proposes not to implement indicative BAT standards, the operator must provide a strong justification for an alternative course of action. The greater the deviation from indicative BAT, the more detailed a rationale the facility operator must provide that the alternative constitutes BAT for that facility.

### ***Emission Limit Values and Environmental Quality Standards***

The IPPC Directive differs from other, previous EU pollution control directives in that it does not contain specific numeric limits for environmental emissions.<sup>277</sup> The numeric limits that are set in facility permits, ELVs, are based on national sector level (and ultimately on facility-level) BAT determinations.<sup>278</sup> ELVs imposed in a permit also factor in EQSs.

The essence of IPPC is that operators should choose the best option available to achieve a high level of protection of the environment taken as a whole. IPPC achieves this by requiring operators to use the best available techniques (BAT). This, together with a consideration of local circumstances, provides the main basis for setting ELVs.

-- *IPPC Practical Guide, Edition 4*

Specifically, ELVs are numeric limits placed on emissions produced by different industrial processes. The limit itself is derived from what a well-performing UK facility implementing the indicated BAT standards would be expected to emit. However, in specifying an ELV in a permit, BAT-based ELVs may be adjusted to reflect local and site-specific conditions. Modifying an ELV based on local conditions may result in a permit ELV that differs from the indicated BAT-based ELV. As is the case in deviations from indicative BAT, a detailed rationale is required in order for an operator to propose and for the EA to accept a deviation from a BAT-based ELV. However, using this approach, IPPC permitting is able to mesh local and facility-specific conditions with sector-wide considerations.

In addition to the site-specific aspects of BAT-based ELVs, there are requirements prescribed at the EU level that take precedence over any domestic or locally-derived ELV. EU-imposed ELVs must be incorporated into IPPC permits in the UK. ELVs are set at the EC level in instances where there is an agreed-upon need for EU-wide consistency to limit certain emissions. These EU ELVs most often originate from EU media-specific directives. Corresponding media-specific legislation in the UK may also contain (non-BAT based) ELVs that get incorporated into IPPC permits.

The EU also sets EQSs (also referred to as “target” or “ambient” environmental standards) based on the effect on, or the condition of, the receiving environment or public health end point. Water quality standards and the National Ambient Air Quality Standards are equivalent standards in the US. In the UK, EQSs are established through EU legislation in some cases,<sup>279</sup> and in others, through UK laws and regulations.<sup>280</sup> EQSs specify the maximum concentration of a pollutant

<sup>277</sup> Bell and McGillivray, p. 771.

<sup>278</sup> In *Views from the UK on the IPPC Review*, the UK reiterates, “The general principle remains that what needs to be harmonized throughout the EU is the approach to setting BAT-based ELVs for each installation, not the ELVs themselves” (DEFRA, 2007b, p.4).

<sup>279</sup> For instance, in some cases EQS are established through media-specific EU directives.

<sup>280</sup> For example, the UK Air Quality Regulations 2000 (<http://www.opsi.gov.uk/si/si2000/20000928.htm>) set mandatory standards for SO<sub>2</sub>, NO<sub>2</sub>, lead, CO, benzene, 1,3-butadiene and PM<sub>10</sub>; and the UK Water Quality

that can be released to air or water. In addition to numeric EQSs, *qualitative* EQSs also exist. Where a BAT-based permit (i.e., a BAT-based ELV) violates an applicable EQS set by European legislation, a more stringent ELV must be imposed in the permit to meet the applicable EU EQS. In other words, an ELV based on BAT alone is not sufficient in instances where conformance with an EU EQS is jeopardized. Violation of an EU EQS could be the basis for permit refusal if the operator cannot meet the more stringent ELV.

In cases where UK-specific EQSs are established and apply, they do not carry the same weight as those set by the EU. The PPC Regulations do not require a more stringent ELV *solely* on the basis of a national EQS or objective. However, in instances where a UK EQS is applicable, adherence to it may be an important determinant of local environmental quality, and in that respect, form the basis for ELVs set in the permit. In other words, in most cases where an IPPC facility is a significant contributor to violation of a domestic EQS, more stringent ELVs are required.

## IPPC Permits: Conditions

The permit is the legal instrument that specifies BAT for an individual facility. An IPPC permit appears to be a very powerful tool. As previously discussed, an IPPC permit is a dynamic document that reflects the current performance of a facility and over time, is also a forcing mechanism for continuous improvement.

### Overview

The BAT determination process culminates in the facility-specific assessment of BAT that proceeds from the application determination, or permit issuance process (described below). Because the concept of BAT applies broadly, an IPPC permit addresses a wide range of considerations – more than an individual permit in the US, and in some respects more than the collective body of requirements applicable to facilities in the US under federal, state, and local law.<sup>281</sup> The discussion below is a high level description of a typical IPPC permit in the UK. Chapter 5 explores IPPC permits in more detail based on observations gleaned from review of IPPC permits in the pulp and paper and specialty organic chemical sectors.

### Typical Permit Contents

IPPC permits contain a variety of specific terms and conditions some of which are similar to what typically appears in a US CAA Title V or CWA National Pollutant Discharge Elimination System (NPDES) permit, but many of which do not have analogues in US permits. The following list (derived from the UK *IPPC Technical Guidance for the Pulp and Paper Sector*<sup>282</sup>) illustrates the scope of environmental concerns which must be addressed in an IPPC permit.<sup>283</sup>

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Regulations 2000 (<http://www.opsi.gov.uk/SI/si2000/20003184.htm>) set quality parameters for water used for drinking, washing, cooking, and food preparation.

<sup>281</sup> To some UK regulators, IPPC possesses a “soul” referring to the belief that its overall effect is greater than the sum of its parts. James, T. EA, Policy Manager. Personal communication. 2 May 2007.

<sup>282</sup> EA, 2000.

<sup>283</sup> The general contents of a permit may vary to some extent by sector, but more than likely, permits for all sectors will include conditions that address the concerns listed here.

- **Emission Benchmarks and Emissions to Air, Water, and Land.** Delineates EQSs that must be met and presumptive benchmarks for air, water, and waste emissions from well-run facilities employing BAT. Operators are required to determine emission levels that will result from application of BAT at their facilities and compare them with applicable EQSs/benchmarks. ELVs are set in this portion of the permit.
- **Impact.** Requires the operator to assess facility environmental impacts to demonstrate that facility operations (under proposed BAT implementation) will provide a high level of protection for the environment as a whole.<sup>284</sup>
- **Management Techniques.** Requires facility operators to implement a management system, often an EMS, to ensure compliance with BAT requirements and to promote continuous improvement.
- **Materials Inputs.** Covers BAT for raw materials and water, including raw materials selection and minimizing their use and environmental impact subject to demonstration by the operator that steps have been taken to reduce the use of chemicals, substitute less harmful materials, and understand the fate of by-products and contaminants.
- **Main Activities and Abatement.** Requires operators to describe facility activities and proposed techniques to prevent/reduce emissions (including odor) and waste and demonstrate how such techniques represent BAT. This section includes a requirement to have and implement an odor management plan.
- **Emissions to Groundwater.** Prohibits direct or indirect discharge of certain listed substances to groundwater.
- **Waste Handling.** Describes requirements for characterizing and quantifying waste streams and for waste storage and handling.
- **Waste Recovery and Disposal.** Requires measures for avoiding/reducing waste generation and, where wastes cannot be eliminated, for treating and/or disposing wastes.
- **Energy.** Requires operators to provide energy-related information and propose measures for energy efficiency improvement.
- **Accidents and their Consequences.** Requires a documented system to identify, assess, and minimize environmental risks and hazards of accidents and their consequences.
- **Noise and Vibration.** Requires facility operators to identify main sources of noise and vibration, assess their impact on nearest noise-sensitive areas, and describe techniques undertaken and/or proposed to mitigate any identified adverse impacts.

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<sup>284</sup> This analysis is facilitated by horizontal guidance (H1), which will be described later in this chapter.

- **Monitoring.** Prescribes monitoring requirements for air, water, and waste emissions and for monitoring groundwater and noise.
- **De-commissioning.** Requires facility operators to have an approved plan for avoiding any pollution risk and returning the site to a satisfactory state upon ceasing operation of the facility.

### ***IPPC Focus on Pollution Prevention, Resource Use, Sensory Effects, Non-Substance Emissions, and Continuous Improvement***

In reviewing the above environmental issues and concerns, it may be apparent to many readers, especially those familiar with the US permitting system, that a number of areas are not under the purview of the US permit writer. These include a facility's management techniques, materials inputs, energy and water use, accident risks and hazards, sources of odor, noise, heat, and vibration, as well as advance planning in the event of facility closure. Because these issues are not common in the context of US permitting, the discussion below introduces some of these unique features of UK IPPC permits and links them to the central theme of the IPPC Directive. Chapter 5 will expand this discussion and discuss the specifics of the individual permits examined as part of this study.

**Pollution Prevention.** In the hierarchy of the IPPC Directive, the mandate is first to prevent pollution and, only if that is not possible, do control and reduction measures become the focus of IPPC permitting. IPPC permits do not include a discrete set of requirements specifically labeled as "pollution prevention." Rather, prevention underlies a number of areas addressed in an IPPC permit – namely materials inputs, main activities and abatement, waste recovery, and energy. For example, under consideration of materials inputs, the operator (in the permit application) and regulator (in determining the application) scrutinize the choice and use of raw materials in order to prevent pollution in the first place, and thus determine BAT for materials inputs that offers the best protection at reasonable cost. A similar process takes place for main activities and abatement which in effect shifts the emphasis away from end-of-pipe to process controls and use of clean technologies.<sup>285</sup> Once described in the permit application and approved by the EA, these aspects of the permit can be changed subject to the permit variation criteria and process described in Chapter 6.

**Resource Use.** As a key component of the sustainability focus of the IPPC Directive, consumption of natural resources, specifically water and energy use and efficiency, are scrutinized through the IPPC permitting process. As will be discussed further in Chapter 5, BAT for energy requires an operator to inventory energy consumption and generation as well as to propose measures "for the improvement of energy efficiency."<sup>286</sup> Techniques to minimize water use are examined in the course of demonstrating BAT for materials inputs.

**Sensory Effects, Non-substance Emissions and Accident Prevention.** Protection of both the natural and human environment "as a whole" is a central tenet of the IPPC Directive. In turn the

<sup>285</sup> Bell and McGillivray, p. 792.

<sup>286</sup> EA, 2000, p. 61. In the IPPC permit application, the guidance requires an operator to provide a breakdown of the energy consumption and generation by source and the associated environmental releases, and to describe proposed measures for improvement of energy efficiency. BAT for energy is outlined for each set of operator responses.

definition of “pollution,” as was mentioned in Chapter 3, includes emissions that “cause offense to human senses or impair or interfere with amenities and other legitimate uses of the environment.” Thus, emissions of odor, noise, vibration, and heat all fall under the rubric of IPPC permits. Operators are required to demonstrate BAT for these emissions, which in some cases may include techniques not too dissimilar to measures that might be required under traditional statutory nuisance legislation which in the UK requires application of the “best practicable means” to prevent or minimize the nuisance. As will be discussed further in Chapter 5, this is not the case for environmental permits at the federal, and in most cases, state level in the US. Local jurisdictions in the US may address nuisances such as odor through local laws or town ordinances.

**Continuous Improvement.** The IPPC permitting system includes elements that drive continuous improvement on several levels.<sup>287</sup> To begin with BAT is a dynamic, technology-forcing standard. It is not set and then left static on an indefinite basis. EU BREFs are subject to review and update on a periodic basis. Among the considerations for BAT for IPPC facilities (referenced in Chapter 3) is “technological advances and changes in scientific knowledge and understanding.”<sup>288</sup> Consistent with Article 11 of the IPPC Directive, UK operators and regulators alike are expected to stay current on developments in BAT. In addition, despite the fact that there is only a general requirement under the PPC Regulations for periodic review of permits, there is a hard (regulatory) trigger for permit review in the event that BAT changes and the “new” BAT can be implemented without incurring excessive cost.<sup>289</sup>

In addition to environmental performance improvements driven by developments in BAT, certain portions of IPPC permits require the operator to monitor opportunities for improvement on an ongoing basis. One such requirement is BAT for management techniques. This often takes the form of an EMS or other management system that is required to include regular assessment of environmental performance and a commitment to set and improve performance targets over time. BAT for materials inputs and selection of raw materials also require procedures to stay abreast and act on new developments and further opportunities to reduce facility impacts.

The EA also engages industry at the sector level in creating the expectation for continuous improvement. As mentioned earlier, the EA has created a series of sector plans for a half dozen industries in the UK<sup>290</sup> that look out over the next five to 15 years and lay out priorities, objectives and performance indicators for the sector. Coupled with upstream events – periodic

<sup>287</sup> While not specifically a part of the cycle of *continuous* improvement, IPPC permits for existing facilities from the start include an improvement program that moves the facility to BAT standards for new facilities.

<sup>288</sup> IPPC Directive, Annex IV(5).

<sup>289</sup> Setting the specific schedule for the required periodic review (in regulation 15(1)) is left to the discretion of the EA. The current review period is at least every eight years with a four to five year review period the norm. James, T., EA, Policy Manager. Personal communication. 2 May 2007.

<sup>290</sup> The full title is *Improving Environmental Performance, Sector Plan for the Chemical Industry* (EA, 2005c). At the time this report was written, the EA had published sector plans for the cement, chemical, dairy farming, nuclear, and waste management industries. Sector plans for the power generation, food and drink manufacturing and water companies were next in line for publication. See <http://www.environment-agency.gov.uk/business/444251/1215866/> for sector plans.

updates to the BREFs and UK technical guidance notes – and downstream revisions to PPC SPPs and permit review, sector plans are a tool to drive overall sector-wide improvement.

## UK Permitting Process and Tools

### Overview

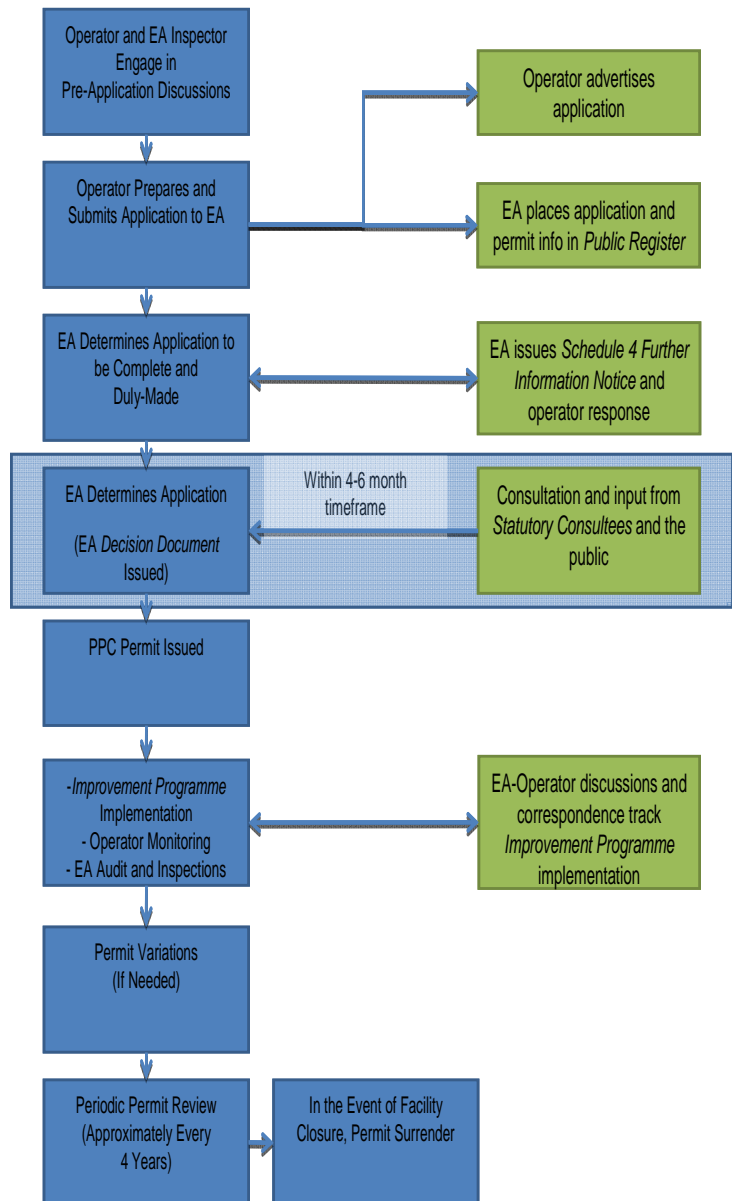
To obtain a permit, facility operators in the

UK must demonstrate that they have systematically developed proposals to apply BAT to all activities with environmental consequences and to meet certain other requirements such as complying with EU established EQSs. Thus in the UK IPPC permit process, it is the operator that proposes BAT in a permit application. Final permit terms are fashioned by the permitting agency (the EA) subsequent to further information exchange and negotiation with the operator (if necessary), and review and comment by other agencies and the public. Permits issued for existing facilities may include an improvement program if the EA determines that there is a significant gap between BAT in the current permit and that indicated in the UK technical guidance note (or in the BREF). The overall process is represented in Figure 4.3. The sections following explore the permitting process in more detail.

### IPPC/PPC Process: Pre-Application Discussions

The IPPC permitting process often begins with the somewhat unofficial step of the operator conferring with the regulator prior to the official submission of the permit application. These discussions involve the local EA area office inspector who ends up playing a significant role at multiple stages of the permitting process. Consultation at this stage is an opportunity for the inspector to advise and educate the operator on both the “how” and “what” of the permit application. In addition to making the operator aware of available EA tools and guidance, the

**Figure 4.3 – Overview of the UK Permitting Process**



inspector can often help in the technical evaluation of BAT.<sup>291</sup> Identification of technical issues early in the process can smooth and accelerate the permitting process later on. As one DEFRA official stated, “Whether or not an installation [was] already regulated, it was apparent from the beginning of IPPC implementation that there would be considerable benefit in pre-application discussions between the operator and the regulator. Experience to date has confirmed this. Such discussions enable the operator to establish what is required in the application and what guidance is available. The regulator can gain insights into the nature of the installation. Both parties can build up a mutual understanding and respect so that they can as far as possible work together to deliver the benefits of IPPC.”<sup>292</sup>

Pre-application discussions can also help to identify issues that may be of concern to the surrounding community. In many cases, the public is not likely to have concerns, but in instances where activities at the facility do give rise to community concern, it is best for the operator to address that concern early on. Unresolved issues that surface in formal communication from the public during the application determination process can significantly lengthen that period.<sup>293</sup>

**IPPC/PPC Process: Application**

As noted earlier in the discussion of the phased, sector-by-sector implementation of the IPPC Directive in the UK, facility operators in each of the sectors covered by the directive have a three-month window in which they are required (by the PPC Regulations) to submit an IPPC permit application to the EA.

**Operating Permits Only  
(pre-construction permits not required)**

For a new greenfield source in the UK, an IPPC permit is not required until the source begins operation (like US NPDES permits). There is no permit or review required prior to beginning construction. As a practical matter, most new sources apply for their IPPC permit well before operation is scheduled to begin, and often well before construction actually begins. Under the PPC Regulations it is clear that any construction is undertaken at the source’s risk, and case law has upheld that “equity in the ground” is not an argument for not meeting BAT. A new facility that can’t meet BAT at the commencement of operation can be (and has been) required to dismantle portions or all of a facility and reconstruct it such that it can meet BAT. As a legal and practical matter, most IPPC permits for new greenfield sources do not contain an improvement program since new sources are “normally expected to comply with or go beyond indicative BAT.”<sup>1</sup>

<sup>1</sup> DEFRA, 2005b, p.51.

**Importance of the Application.** IPPC permits themselves are relatively short documents. The entire permits for the pulp and paper mill and the specialty batch chemical production facility examined in detail later in this report are 40 and 28 pages long, respectively.<sup>294</sup> However, the content (and length) of the permit document does not represent all of what is prescribed.

<sup>291</sup> “Neither does the existence of published guidance lessen the need for well qualified and highly motivated inspectors with the resources necessary to carry out detailed technical inspections both on and off site. Those inspections are vital both to setting permit conditions and also to checking compliance with them. They also provide a great deal of the raw material which must be fed into the process of preparing...the BREFs.” Derwent, H., DEFRA. “Industrial Environmental Regulation in the UK.” Presentation at the conference Prevention and Control of Industrial Pollution: International Conference on Policy Approaches. Seville, Spain. 25-26 April 2002. <http://eippcb.jrc.es/pages/doc/PCIPsevilla/mainpage.htm>.

<sup>292</sup> Derwent, H., DEFRA. “Industrial Environmental Regulation in the UK.” Presentation at the conference Prevention and Control of Industrial Pollution: International Conference on Policy Approaches. Seville, Spain. 25-26 April 2002. <http://eippcb.jrc.es/pages/doc/PCIPsevilla/mainpage.htm>.

<sup>293</sup> DEFRA, 2005b, p. 25.

<sup>294</sup> By comparison, US CAA Title V permits alone can exceed 100 pages.



Operators are bound by the operational details spelled out in the permit application.<sup>295</sup> Through the guidance that dictates the content of the permit application, IPPC places the onus on the operator “to assess the effects of their operations, to explore ways of improving them and to make proposals for the regulator’s consideration.”<sup>296</sup> In other words, an operator must propose and justify BAT for all aspects of its operations, and demonstrate that its activities do not result in significant environmental harm.

Often entire sections of the permit application (anywhere from two to fifteen pages) submitted by the operator are incorporated by reference in the IPPC permit. Typically, these are sections of the application that describe management and operating techniques, use and flow of raw materials, energy efficiency, accident prevention and control as well as sensory effects and non-substance emissions of odor, noise, heat, vibration, and light. In contrast, other permit conditions, for instance emissions to air and water, appear in full in the permit document.

To the extent that IPPC permit conditions consist of sections of the application (incorporated by reference), these permit conditions are indicative of current facility operations. In effect, this means that the operator has proposed that current operations and activities constitute BAT, and that the EA has accepted the operator’s proposal through the application determination process. This same determination process can also result in improvement program conditions that move the operator towards the more advanced techniques. How the EA evaluates (and enforces against) what is outlined and described in the operator’s application will be further explored in the permit-specific discussion in Chapter 5 and in the compliance assessment and enforcement discussions in Chapter 6.

**Application Guidance.** The EA has developed a substantial number of guidance documents, electronic templates and tools to support the facility operator in developing the IPPC permit application. In addition to the sector-specific UK technical guidance notes derived from EU BREFs, the EA issues a number of horizontal or cross-sector guidance documents (Horizontal Guidance, H1, H2, H3, H4, H7, and H8) that address cross-cutting issues such as emission impacts, energy, noise, odor, site reporting, protection, monitoring and surrender. Among all the EA tools and guidance, EP OPRA and H1 are of particular interest to EPA. In the context of the permit application the EP OPRA spreadsheets help a facility identify specific activities that influence its EP OPRA profiles, and the associated financial consequences relating to application, subsistence and other fees. This information can serve to help a facility target its own environmental management activities to reduce both environmental risks and regulatory costs. Both EP OPRA and the H1 tool are highlighted in a detailed discussion below.

On a more practical level, the EA supplies electronic spreadsheets, application templates, and other guides to facilitate the application process from the operator point of view. The EA *Read Me First* guidance is a concise seven-page document that provides practical advice to the permit applicant seeking to assemble a permit application that is well supported and complete.<sup>297</sup>

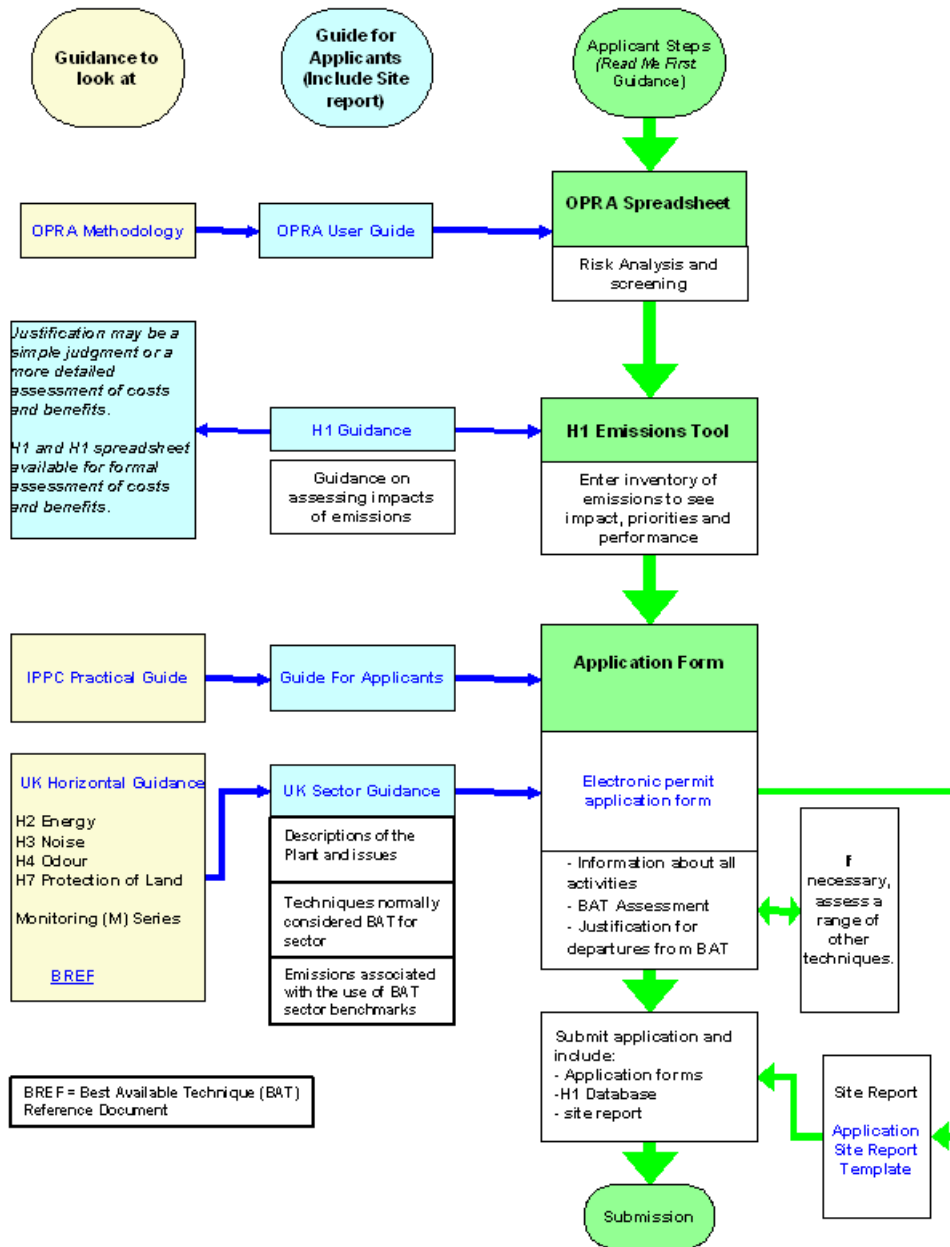
<sup>295</sup> Operators can deviate from what is outlined in the permit application subject to the criteria described in the discussion of the variation process in chapters 5 and 6.

<sup>296</sup> DEFRA, 2005b, p. 24.

<sup>297</sup> The full title of this EA document is: *Read Me First: General Guidance on Producing a Good IPPC Application*. Please note that with the release of the EP Regulations in April 2008, many PPC documents and guidance have been replaced with revised documentation for the new EP permitting regime. For EP-related

Starting with the general principles of IPPC permitting and ending with practical considerations on electronic submission, the *Read Me First* guidance provides a roadmap for the application process, explains the purpose of the various application tools, and offers useful tips on such things as when to communicate with the local EA inspector. Figure 4.4 illustrates the application process.

**Figure 4.4 – IPPC Permit Application Steps<sup>298</sup>**



guidance, see <http://www.environment-agency.gov.uk/business/1745440/1745496/1906135/1986067/?version=1&lang=e>. For EP guidance similar to *Read Me First*, see *Getting the Basics Right* ([http://www.environment-agency.gov.uk/commondata/acrobat/basics\\_2002267.pdf](http://www.environment-agency.gov.uk/commondata/acrobat/basics_2002267.pdf)).

<sup>298</sup> Modified from figure provided by James, T., EA, Policy Manager.

## EP OPRA

As noted earlier, each operator is required to complete and submit an EP OPRA profile to the EA in the application process. In addition to being an important source of feedback to the facility, this initial profile and its subsequent updates are used by the EA at several stages of the regulatory process.

As a screening tool, EP OPRA is designed to gauge the potential for individual facilities to cause environmental harm by providing approximate risk information that can be used to help plan the agency's overall inspection and monitoring activities and target effort towards specific processes and operators according to their risk levels. The facility profile that results from the use of EP OPRA also determines the application and annual subsistence fees an operator pays to the EA. This last aspect of EP OPRA is essential to the EA in meeting the requirement to recover its permitting and compliance assessment costs.<sup>299,300</sup> Overall, use of EP OPRA is intended to improve the efficiency of the agency and provide incentives for operators to improve their pollution risk management by linking regulatory effort directly to environmental risk.

EP OPRA does not assess risk directly, but consists of a set of indicators of environmental risk based on a series of input factors that determine risk from a process, such as management systems, substances handled, emission rates, pollution control systems, and location. The EA has developed a detailed spreadsheet for use in compiling information about these indicators and calculating screening values.<sup>301</sup>

As mentioned, EP OPRA has five attributes: the first three attributes reflect the environmental hazard of the facility, the fourth is a retrospective measure of operator performance, and the fifth reflects the compliance rating of a facility. The first four attributes are completed by the facility at the time of permit application. The fifth attribute is completed and updated by the agency after a permit has been issued.

The output of EP OPRA is a banded profile consisting of a series of letters (A-E) – one for each attribute, where A represents the lowest risk and least need for regulatory oversight, and E the highest risk and most need for regulatory oversight. The banded profile is determined by the answers to objective questions in the worksheets and then is converted to an overall points score. The EP OPRA banded profile is the primary factor in determining EA priorities for compliance assessment at the local level and an important factor in determining priorities at the national

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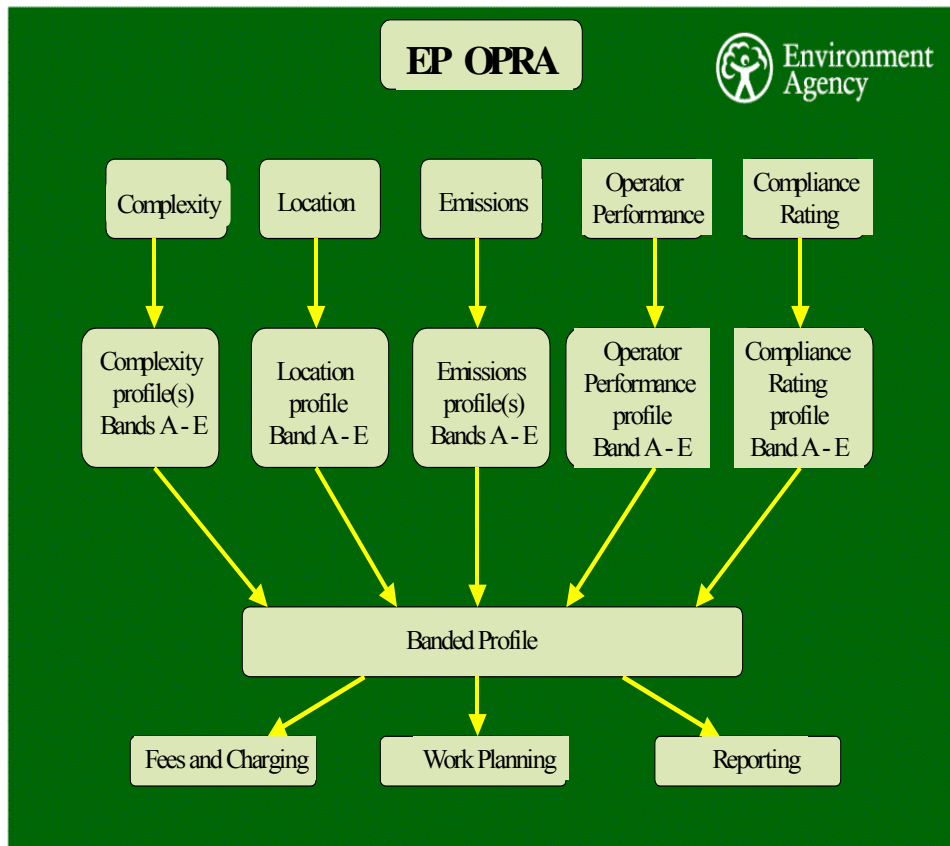
<sup>299</sup> Consistent with the “polluter pays” concept, DEFRA requires the EA to fund its permitting operations with the income generated from operators (i.e., from application and subsistence fees).

<sup>300</sup> The EA must recover costs of IPPC permitting, but is not allowed to provide additional financial incentive for regulatory compliance. The UK Government and UK law views financial incentive as a “backdoor” tax on industrial operators. James, T. “Integrated Regulation in the UK.” Presentation at the workshop Lessons from the United Kingdom’s Integrated Permitting Experience: Exploring New Directions for Environmental Permitting in the US. Washington, DC. 25 October 2007.

<sup>301</sup> In April of 2005, the EA published an updated version of EP OPRA to be used across a range of regulatory regimes, including industrial facilities and waste management facilities. This version, called EP OPRA - Version 3, is similar to the original version, but extends the risk screening methodology to Waste Management Licensing and links it to the Compliance Classification Scheme (CCS).

(strategic) level. Each numeric EP OPRA score corresponds to an amount in pounds and in this way is used to calculate application, subsistence and other fees. This then provides the mechanism by which the EA can match income to resource expenditure, i.e., cover its costs in permitting and assessing compliance of each facility. EP OPRA is summarized in Figure 4.5.

**Figure 4.5 – EP OPRA**<sup>302</sup>



Each of the five EP OPRA attributes is described briefly below:

- **Complexity.** Type of activities covered by permit or license; potential for significant releases to one or more media; use of one or several processes; potential for accidental emissions; inventory of potentially hazardous materials; size relative to sector; whether significant regulatory effort is required to assess and maintain compliance and public confidence.<sup>303</sup>
- **Emissions.** Type and quantity of substances released – generally based on maximum potential impact or permitted levels, rather than on actual emissions; media into

<sup>302</sup> Figure provided by James, T., EA, Policy Manger, 30 June 2005.

<sup>303</sup> This attribute is based directly on a lookup table that assigns complexity ratings for individual processes. All other attributes are based on calculations that incorporate information from individual facilities.

which the release takes place (air, water, land, waste, sewer, off-site waste); relative impact of a substance on that media.

- **Location.** Status of the environment around a facility; proximity of human habitation; proximity to wildlife habitat; presence in a sensitive groundwater zone; sensitivity of receiving waters; potential for direct release to waters; potential for flooding and consequences of flooding; inclusion within an Air Quality Management Zone.
- **Operator Performance.** Presence/absence of management systems or recognized procedures covering operations and maintenance, competence and training, emergency planning, auditing, monitoring, reporting and evaluation; enforcement history.
- **Compliance Rating.** Non-compliance with permit/license requirements; potential impact on the environment as a result of non-compliance; additional compliance assessment effort required to resolve permit/license breaches. This attribute is completed by EA after a permit has been issued, using information from the Compliance Classification Scheme (CCS) and a weighting scheme that reflects the potential environmental effects of events. This attribute allows EA to more accurately adjust regulatory oversight according to an assessment of compliance. Poor performers will have higher EP OPRA scores and excellent performers will benefit from a reduced EP OPRA score.

Facility profiles generated by EP OPRA are also made available to the public – individual EP OPRA profiles are published annually and are available on the EA website through the tool entitled *What's in your backyard?*<sup>304</sup>

### **UK Horizontal Guidance**

In addition to the technical guidance notes for individual sectors (the vertical guidance), the EA has developed a series of horizontal cross-cutting or issue-based technical guidance notes that aid in the development and determination of the permit application.<sup>305</sup> For example, the *H2 Energy Efficiency Guidance* supplements the information found in sector guidance notes and “assists applicants in responding to energy efficiency requirements...”<sup>306</sup> The same is true for *H3 Horizontal Noise* and *H4 Horizontal Odour Guidance* that address the permitting of noise, vibration, and odor effects under the PPC Regulations.

Use of the horizontal guidance in conjunction with sector guidance notes assists both the EA and the applicant in the determination of BAT. In instances where an operator deviates from or must

<sup>304</sup> See the EP OPRA website on pollution hazards (<http://www.environment-agency.gov.uk/maps/info/epopra/?lang=e>).

<sup>305</sup> See <http://www.environment-agency.gov.uk/business/1745440/444663/298441/horizontal/> for horizontal guidance notes.

<sup>306</sup> EA, Environment and Heritage Service and SEPA, 2002. *Horizontal Guidance Note H2: Integrated Pollution Prevention and Control (IPPC) Energy Efficiency*. <http://www.environment-agency.gov.uk/commondata/acrobat/interimenergy.pdf>, p. iii.

go beyond the sector-specific indicative BAT (e.g., due to geographic location or local environmental or other site-specific conditions) in order to achieve an acceptable (the best practicable) environmental outcome,<sup>307</sup> the H1 guidance and software tool provide the basis for selection of BAT.<sup>308</sup>

### **H1: Environmental Assessment and Appraisal of BAT**

To facilitate preparation and determination of the IPPC permit application, the EA, in collaboration with Scottish and Irish environmental agencies, has developed an electronic environmental assessment and appraisal tool – H1. An applicant is not required to use H1 in the preparation of the IPPC permit application – the applicant may present the same information using other formats or methodologies. However, in the *Read Me First* guidance, the EA states that it will use H1 to validate the information the applicant provides if the operator does not submit H1 results with the permit application. When used by the operator, H1 results (supplemented by an operator’s interpretation) become a significant part of the justification and demonstration of BAT in the permit application. Because H1 is a cross-cutting, cross-media tool of interest (and potential use) to the US permit practitioner, we provide a more detailed explanation and description of it below.

The H1 software application provides sources and regulators with a scoping and options analysis of the environmental impacts and costs associated with available environmental protection techniques. The aim of the tool is to assemble information from a source regarding the activities at issue; quantify environmental impacts; apply required environmental standards; consider provisional environmental benchmarks; compare the environmental impacts of available options; evaluate the costs when conducting an appraisal of BAT for more than one option; and select BAT.

#### **H1 Tool**

The H1 tool helps the operator and the regulator in justifying the choice of BAT and determining environmental impacts. The H1 modules:

- ❖ Define objectives and options to be considered
- ❖ Quantify emissions from each option
- ❖ Quantify environmental impacts
- ❖ Compare and rank order options
- ❖ Evaluate costs of each option
- ❖ Identify BAT, balancing cost/benefits

The IPPC H1 methodology provides a simplified process to conduct an options appraisal of environmental protection techniques to determine BAT in cases where (1) the source proposes to deviate from the BAT proposed in the applicable sector technical guidance note; (2) several options exist for BAT; or (3) no BAT exists in the technical guidance. In addition, the tool may be used to conduct an environmental assessment of the overall impact of emissions to confirm that the emissions are at acceptable levels for permitting purposes and to identify priority emissions or environmental risks that merit further attention.

As discussed earlier, BAT for a particular sector or activity that results in emissions, or discharges to the environment is determined in the context of statutory requirements or standards that must be met. In addition, environmental benchmarks such as Environmental Assessment

<sup>307</sup> BPEO is a concept introduced in Chapter 2. It predates the IPPC/PPC permitting regime, but its importance persists as one of the fundamental tenets of environmental policy in the UK.

<sup>308</sup> EA, Environment and Heritage Service and SEPA, 2003. *Horizontal Guidance Note H1: Integrated Pollution Prevention and Control (IPPC) Environmental Assessment and Appraisal of BAT*. <http://www.environment-agency.gov.uk/business/1745440/444663/298441/horizontal/545377/?version=1&lang=e>, p. iii.

Levels (EALs) guide BAT selection, but do not have the same legal authority as the required standards (such as EU-designated EQSs).<sup>309</sup> These provisional EAL benchmarks are revised over time as additional scientific information becomes available and in response to any new legislation.

The H1-guided BAT determination process using the software application and written guidance is comprised of six modules that are considered sequentially. Module 1 contains a scoping exercise and an initial determination of options. Module 2 requires that the source inventory all emissions, which are then quantified in Module 3. Module 4 compares the impacts of the BAT options under consideration, and Module 5, if necessary, is used to evaluate the costs of all options. Finally, Module 6 facilitates selection of BAT from candidate options by balancing environmental benefits against costs. More detail on the elements of each H1 module can be found in Appendix K.

An important aspect of the H1 tool is its capability to facilitate a comparative analysis of regulatory options available to a facility based on environmental and economic parameters. Environmental options are considered first with the objective of identifying the outcome with the least environmental impact. If the outcome with the least environmental impact is BAT, then the analysis stops. If there is no BAT or there is an option that provides better environmental results than BAT, the next step is to take costs into account. The cost analysis follows methodologies for cost accounting and comprehensively considers factors such as capital, operation and maintenance costs, discount rates, present values, and the costs of making process changes. Equipped with environmental and cost information, the operator and the EA are then prepared to balance the environmental benefits of options against the costs of achieving them.

In conclusion, the H1 tool generates a comprehensive picture of a facility's environmental footprint, and among other things might be useful in the context of the US permitting system in pointing to areas where further environmental improvements might be achieved.

### ***Determination of the Application***

The substantive features of determining the IPPC application (i.e., BAT determination) have largely been described. From a procedural point of view, determination of the application involves a series of actions and interactions on the part of the EA, the operator, statutory consultees, and the public. The EA should normally determine a permit application within four months of its submission.<sup>310</sup>

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<sup>309</sup> EALs are used in the H1 methodology as an indicator of a degree of environmental impact considered acceptable for a particular substance to a receptor or environmental medium and as such, serve a role similar to that of an EQS (which defines the highest concentration of a substance considered tolerable for the environment). Because EQS exist for only a limited number of substances, the EA has developed EALs as provisional benchmarks for other additional substances released into the environment. The H1 guidance contains both the methodology used to derive EALs (from the World Health Organization (WHO) and other guidance on human health and aquatic life protection) and a comprehensive listing of EALs (concentration-based) for release of several hundred individual substances to air, water, and land.

<sup>310</sup> DEFRA, 2005b, p. 32.

The determination of an IPPC permit application is primarily a technical evaluation with relatively little in the way of policy considerations. As a result it may be difficult to challenge.<sup>311</sup> The EA must either grant the permit subject to conditions or refuse it. No permit may be granted unconditionally. The EA may refuse a permit based on any one of several circumstances including a failure on the part of the applicant to provide adequate information, a determination that (1) the facility would pose an unacceptable threat or endangerment to a particularly sensitive local environment; or (2) the techniques proposed by the applicant were not sufficient to meet the BAT standard.

The EA documents the determination process in a decision document. The decision document includes a summary of any comments received from statutory consultees as well as from the public. Statutory consultees typically consist of local health authorities, countryside councils, county councils, and others as described earlier. The EA's responses are also noted in the decision document.

In the process of determining the application, the EA may go back to the facility operator to request additional information. This request is documented in a *Schedule 4 Further Information Notice*. The Schedule 4 Notice is shared with statutory consultees, along with the operator's response(s).

The remainder of the decision document consists of the technical evaluation and determination of each of the permit conditions. Also included with this document is the assessment of what will be included in the improvement program that will bring or move an existing facility's operations closer to BAT indicated in the BREF or UK technical guidance.

### ***Improvement Programs***

An important piece of the EA determination of an IPPC/PPC application is the establishment of an improvement program. Improvement programs can include a dozen to several dozen conditions that specify the actions and timeframe<sup>312</sup> of the improvements necessary to achieve or move in the direction of BAT that is indicated in the BREF or UK technical guidance.<sup>313</sup> As discussed earlier, each IPPC permit contains BAT for all aspects of a facility's operations. However, the EA recognizes that existing sources may not be able to achieve the indicated BAT for each aspect of its operations right away.<sup>314,315</sup> The improvement program conditions in the permit are designed to address this gap and to assign steps and milestones that will move the plant toward indicative BAT standards. The shortfall between BAT determined in the permit (at the time of permit issuance) and the indicated BAT is typically due to facility-specific physical (i.e., limitations imposed by the physical plant) and economic constraints that for instance, may

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<sup>311</sup> Bell and McGillivray, p. 778.

<sup>312</sup> Typically, improvement program conditions must be completed within three years.

<sup>313</sup> The *rough* equivalent to the improvement program in the US is the compliance date set in US regulations, which typically allows several years for compliance following final promulgation of new environmental standards.

<sup>314</sup> The improvement program follows from the PPC Regulations, consideration of the length of time needed to introduce BAT (Number 8 in the list of BAT Considerations for Part A Facilities referenced in Chapter 3). The government acknowledges that "new techniques cannot be brought into effect overnight."

<sup>315</sup> On the other hand, some facilities will be able to achieve, or even surpass, BAT for some aspects of facility operation.



not exist in designing and constructing a new facility. Depending on the significance of the shortfall between BAT in the permit and the indicated BAT, the EA permit writer will impose improvement program conditions for those aspects of the facility's operations where the environmental impact of the gap is the greatest. Additionally, the EA acknowledges that in some instances, it may only be feasible to install or upgrade BAT if it is timed to coincide with a facility's capital investment cycle.<sup>316</sup>

Like all conditions in the permit, provisions in the improvement program are legally binding. There may however, be room for negotiation as to the appropriate and reasonable schedule for introducing upgrades to BAT subject to sector-wide considerations as well as individual facility circumstances. Through the improvement program, facilities may also be subject to additional environmental assessments and report backs to the regulator. Implementation of improvement programs is explored further in the context of the permit-specific analysis in Chapter 5.

### ***The Public's Role***

As referenced in Chapter 3, soon after the applicant submits the application, UK regulators – the EA and LAs – are required to place permit information in a public register to be available to the public at a specific location and at times via a website. Information placed in the public register includes the permit application and the record documenting agency determination of the application.

Permit applications must also be advertised by the applicant locally, and as appropriate for the whole of the UK, in the *London, Edinburgh, or Belfast Gazette*. Notice includes information as to where, how, and when permit documents can be viewed. This provides the opportunity for any member of the public to express their views on the permit to the regulator who is required to consider these views in determining the permit.<sup>317</sup> The public has 28 days to comment when the permit application is first submitted to the agency and 20 additional days when the draft decision is issued.

The EA generally responds to those who submit permit comments.<sup>318</sup> The comments themselves and the EA's assessment and response are noted in the permit decision document.<sup>319</sup> Comments and responses are also maintained in the public register.

The EA also provides guidance on when to use targeted approaches to disseminate information to the public concerning IPPC permits. In some instances it may be appropriate to provide specific outreach to particular members of the public, community groups, community locations or run a public information campaign that would involve activities such as a leaflet drop to the

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<sup>316</sup> The improvement program has also been described as an *investment plan* for a facility (comment by an IP ICE stakeholder at EPA's workshop Lessons from the United Kingdom's Integrated Permitting Experience: Exploring New Directions for Environmental Permitting in the US. Washington, DC. 25 October 2007.) 25 October 2007).

<sup>317</sup> DEFRA, 2006.

<sup>318</sup> DEFRA, 2006, p. 21.

<sup>319</sup> See for instance, Decision Document, Determination of an Application for a Permit under Regulation 10(2) of the Pollution Prevention and Control (England and Wales) Regulations 2000 for St. Regis Paper Company, Ltd, Sudbrook Paper Mill, Caldicot, Monmouthshire, NP265XT. Permit No. BK1163. 15 March 2002.

community surrounding the facility. The selection of specific approaches is determined on a site-specific basis.<sup>320</sup> For those IPPC facilities that are subject to the Public Participation Directive (PPD), the Internet is used to post draft permits.<sup>321</sup>

As a backdrop to discussion of the public's participation in the permitting process and despite the procedural requirements that have been noted, some commentators describe the EA as a "creature of statute with no direct public accountability."<sup>322,323,324</sup> Thus, the fact that the regulatory (permitting) functions of the EA have become increasingly centralized (geographically), coupled with the EA's discretion in setting individual permit terms that reflect local and economic conditions, can make it difficult for the public to access information, as well as to challenge individual decisions. Perhaps to counter this somewhat, the EA has established an Environmental Protection Advisory Committee (EPAC) for each of the eight EA regions. These committees have a mandate to include people with a "significant interest" in the agency's functions and the EA has an obligation to consult and consider the input of the relevant EPAC.<sup>325</sup>

In addition to public notification within the UK, notification to the other member states is required when the regulator or the EA determines that UK facility operations are likely to have a significant effect on the environment of another member state. In such cases, the UK cannot issue a permit until the potentially affected member state(s) has been consulted. Any comment back from another member state or its public must be taken into account in the determination of the permit application.

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<sup>320</sup> DEFRA, 2006, p. 21.

<sup>321</sup> DEFRA, 2006, p. 21.

<sup>322</sup> Bell and Gillivray, p. 122.

<sup>323</sup> In the UK, the influential RCEP has been a particularly strong supporter of increased public participation in environmental decision-making and widening access to environmental information. (Bell and McGillivray, pp. 118)

<sup>324</sup> By contrast, the US EPA was created not by statute, but by executive order.

<sup>325</sup> Bell and McGillivray, p. 125.

## 5. COMPARATIVE ANALYSIS OF UK AND US PERMITS IN THE PULP AND PAPER AND SPECIALTY ORGANIC CHEMICALS SECTORS

Having investigated the general nature of IPPC permitting in the UK, the next discussion examines in detail the permits of two particular facilities in the UK and compares them to the permits for similar facilities in the US. The UK facilities chosen were the St. Regis Paper Company's Sudbrook Mill in Monmouthshire, England,<sup>326</sup> and the Eastman Company's Llangefni Chemical Works, Peboe Division, in Anglesey, Wales. Their US counterparts were a Georgia-Pacific paper mill in Big Island, Virginia,<sup>327</sup> and Lonza's specialty chemical manufacturing facility in Conshohocken, Pennsylvania.

The St. Regis mill produced corrugated medium for corrugated containers using pulp produced from recycled fiber (about one-third of total pulp) and from the neutral sulfite semi-chemical (NSSC) pulping of wood chips. The Georgia-Pacific paper facility analyzed in the comparison study produces corrugated medium and linerboard in roughly equal amounts from recycled fiber pulp and from pulp produced through semi-chemical pulping of hardwood chips (using a mixture of sodium carbonate and sodium hydroxide as the pulping solution). Production at the St. Regis mill was about 160,000 metric tons/year, while the Georgia-Pacific mill produces several times more, about 580,000 metric tons/year. The facilities did not employ any bleaching processes to produce their final products.

**St. Regis Paper Company  
Sudbrook Mill, Wales**

*Products:*

Corrugated medium/containers

*Processes:*

NSSC pulping and mechanical pulping of recycled fiber

*Production:*

160,000 metric tons/year

**Georgia-Pacific, LLC  
Big Island Mill, Virginia**

*Products:*

Corrugated medium/liner-board

*Processes:*

Sodium carbonate/sodium hydroxide semi-chemical pulping and mechanical pulping of recycled fiber

*Production:*

580,000 metric tons/year

<sup>326</sup> The St. Regis Sudbrook Mill closed in May 2006. This was after the project team had invested considerable time in looking at the permit record for this facility. Because of this investment and other factors, the team decided to continue the analysis with this mill's permit as a basis of comparison.

<sup>327</sup> Georgia-Pacific is an indirect wholly owned subsidiary of Koch Industries, Inc.

The Eastman facility is a multi-product site and manufactures intermediates and active ingredients for the pharmaceutical industry and other specialty organic chemicals. Such products are synthesized in batch reactions rather than continuous reactions. The Eastman facility responds to customer needs and offers a range of services from research and development introductions and process investigations to custom synthesis and validation of bulk actives. The site's manufacturing equipment is multi-purpose, allowing manufacture of multiple products at any one time, and capable of carrying out a wide variety of reactions on many different types of compounds. Production varies according to schedule and customer needs but currently averages around 100-300 metric tons/year. The US facility used for comparison with Eastman the Lonza facility in Conshohocken, Pennsylvania. Lonza is a fine organic chemical manufacturing facility and primarily supplies active ingredients for pharmaceutical products. As in the case of the Eastman facility, the Lonza site is a multi-purpose, batch chemical processing plant that operates different chemical processes during the year on a campaign basis. Production at the Lonza facility is higher than at the Eastman site at about 600-750 metric tons/year.

**Eastman Co. Peboc Division  
Llangefni Chemical Works, Wales**

*Products:*

Intermediate active ingredients for the pharmaceutical industry

*Processes:*

Multi-purpose batch chemical synthesis

*Production:*

100-300 metric tons/year

**Lonza, Inc. Riverside,  
Conshohocken, Pennsylvania**

*Products:*

Intermediate active ingredients for the pharmaceutical industry

*Processes:*

Multi-purpose batch chemical synthesis

*Production:*

600-750 metric tons/year

## Methodology

To directly compare environmental requirements for each pair of similar facilities, the project team decided a side-by-side listing of detailed requirements under each system would form a basis from which to draw conclusions. Thus, the team constructed a comprehensive permit matrix for each pair of facilities, which is available as a companion document to this report.<sup>328</sup> The matrices contain a row for each requirement under the UK system, since the UK system is more comprehensive (the list of requirements, Management Techniques through Impacts, is outlined in the discussion in Chapter 4). The first column of the table lists each requirement category under a UK IPPC permit. The second and third columns present indicative BAT from the UK technical guidance notes<sup>329</sup> and the actual permit conditions that resulted from application of the UK technical guidance notes (using the St. Regis mill permit in the pulp and paper comparison matrix and the Eastman permit in the specialty organic chemical matrix). The fourth column indicates which, if any, improvement program items are associated with the row's requirement and provides the status of each item.

<sup>328</sup> The permit matrix is available at [www.epa.gov/permits](http://www.epa.gov/permits).

<sup>329</sup> A column distilling information from applicable BREF(s) could have been added to each analysis matrix, thus giving insight into the way in which EU guidance is translated into specific country guidance. However, this was judged not an important project objective and the project team chose not to spend time and effort on that task.

The fifth column in each matrix contains general US requirements (either for a pulp and paper facility or a specialty chemical manufacturing facility), and the sixth contains the permit terms extracted from active permits (separate permits for each media) for the Georgia-Pacific facility in the pulp and paper matrix and for the Lonza facility in the specialty chemical matrix. Thus, for each requirement in the UK IPPC permitting system, there is a space in the matrix row for any corresponding requirements from the US system. Of course, not all rows in the US requirements or US facility permit columns contain requirements since the UK permitting system is more comprehensive than the US system. The seventh column contains information about voluntary programs in the US, many of which provide incentives to go beyond regulatory requirements and undertake pollution prevention activities. The final column of each analysis matrix was reserved for comments and conclusions from team members participating in the analysis.

## Overview of Requirements in the UK and US

### *UK Permit Requirements*

As noted earlier in this report, considerable differences exist between permitting systems in the UK (and in general among the EU countries under IPPC) and the US. UK permits reflect an integrated approach to prevention and remediation of all environmental impacts from selected industrial facilities. Although the UK's earlier IPC regime integrated regulation of emissions to land, water, and air, the EU-wide IPPC brings in additional requirements, such as for management systems, raw material selection/use, waste avoidance or minimization, energy efficiency, accident avoidance, and minimization of noise, heat, and vibration. The intent is to protect the environment as a whole, promote clean technology to prevent/minimize pollution, encourage innovation by placing significant responsibility for satisfactory solutions in the hands of facility operators, and provide a one-stop shop for administering IPPC.

### *US Permit Requirements*

In contrast, the US permits are media-specific and primarily incorporate national requirements and standards promulgated under media-specific statutes. In general, such requirements and standards are intended to protect health and welfare or reflect application of best technology to prevent deterioration of existing air, water, and land resources. Federal standards and requirements generally are not "presumptive" but absolute and not subject to adjustment due to local conditions or individual facility characteristics.<sup>330</sup> Thus, the job of the permit is to faithfully reflect all requirements applicable to a facility. Separate permits are issued for each media. There are no federal expectations or requirements that a facility operator examine and act to reduce the environmental footprint of a facility on a continuing basis.<sup>331</sup> In general, the focus is on compliance with applicable standards/requirements for each medium separately.

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<sup>330</sup> There are some exceptions, including case-by-case BACT determinations under the US CAA New Source Review (NSR) program and State Implementation Plan (SIP) requirements. The determination of BACT is subject to a number of factors, such as individual facility characteristics and cost of applying candidate BACT. SIP provisions are state-specific and tailored to provide attainment and maintenance of national ambient standards. In addition, there is some site-specific flexibility under the US CWA NPDES program in applying technology-based standards and meeting water quality standards.

<sup>331</sup> One exception is that NPDES permits issued under the CWA often contain requirements to develop best management practices (BMP) plans that evaluate pollution prevention and waste minimization alternatives. Although the NPDES BMP plan requirements are media-specific (i.e., they must be linked to the "purposes and

## Cross-Walk and Analysis of UK Integrated and US Media-Specific Requirements and Permits

### *Scope of UK and US Permits and Requirements*

As already indicated, UK IPPC permits encompass a more comprehensive set of requirements compared to their US counterparts. The types of permit terms common to both systems include requirements for the traditional air, water, and waste media (e.g., numerical emission and effluent limitations and other emission limiting or control requirements for air and water pollutants and requirements governing the generation, storage, and handling of wastes and reclamation of waste impaired sites) along with associated monitoring, records, and reporting requirements. Most of the additional areas addressed in integrated permitting in the EU/UK (e.g., management techniques, materials inputs, energy, noise and vibration, accident prevention, de-commissioning, impact assessment) are not federally regulated in the US. The remainder of this section focuses on comparing in greater detail these additional integrated permitting requirements with the largely non-regulatory related actions in the US. Additional comparative information on the common air, water, and waste requirements for each permitting system can be found in later sections of this chapter.

**Facility Environmental Management.** Facility operators in the UK are required to implement management systems sufficient to ensure compliance with BAT requirements and to promote continuous improvement. Each management system must have, among other things, objectives and measurable goals for environmental performance at the facility, a program of continuous improvements to achieve goals and targets, a commitment to regularly improve the targets (where appropriate), and periodic audits and reports. Each management system also must specifically address selection of raw materials, water efficiency, waste minimization, energy use, and accident prevention. Typically, EMSs certified under International Organization for Standardization (ISO) 14001 *and* covering all areas prescribed under BAT for management techniques satisfy this mandate.<sup>332</sup> In the US, it is not uncommon for facilities to employ EMSs, especially larger companies, as a matter of company policy, to aid compliance with environmental requirements, to buoy business prospects domestically and internationally (such as through obtaining ISO 14001 certification), or as a result of participating in various federal, state, or local environmental partnership or voluntary programs that promote or require EMSs (EPA's Performance Track is one example). Although the EPA supports and encourages use of EMSs, it has stated firmly that it does not intend to require them.<sup>333</sup>

The St. Regis IPPC permit required that the facility “be managed and controlled” according to and consistent with (1) the site EMS (as described in the permit application) and (2) additional

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intent of the Clean Water Act”) and frequently focus on storm water management, they also encourage facilities to develop more comprehensive facility-wide environmental management systems and to continually reassess the adequacy of the plans up until the point that BMP performance is optimized.

<sup>332</sup> ISO 14001 certification or any other third-party certification is not necessarily required to obtain permit approval – the objective is an effective management system whether it has external certification or not. James, T., EA, Policy Manager. Personal communication. 27 July 2007.

<sup>333</sup> Information and resources related to US EPA's EMS activities can be found at <http://www.epa.gov/ems/>. EPA's strategy for assessing the role of EMS in permitting and regulation states that “EPA has no intention of mandating the use of EMS” (see <http://www.epa.gov/permits/ems/strategy.htm>).

related information submitted by the company in response to EA requests for more information on the company's EMS.<sup>334</sup> The EMS for the Sudbrook site was certified under ISO 14001. The Eastman facility has an EMS that was set up to align with ISO 14001, but is not ISO 14001 certified. The Eastman permit contained an improvement program item requiring the facility EMS to be certified at certain levels of the Green Dragon Environmental Standard (a national standard within Wales and roughly equivalent to ISO certification). The facility reached Green Dragon Level 4 at the completion of the improvement program.

It is noted that the EMS for the St. Regis facility did not appear directly in the permit. Nonetheless, since the permit required the site to be operated according to information in the application, and the application cited the EMS, the EMS is indirectly incorporated into the permit.<sup>335</sup> Changes over time to written management systems or EMSs would be unlikely to require variation of the permit.

**Materials Inputs.** In the UK, BAT encompasses use of raw materials and water, including raw materials selection and waste minimization. Facility operators are required to demonstrate measures taken to reduce use of raw materials (including water) and to substitute less harmful chemicals where appropriate. Additionally, operators must have procedures for regular review of new developments in raw materials and for incorporation of suitable new materials with improved environmental profiles. For example, under section 2.2 of the UK *IPPC Technical Guidance for the Pulp and Paper Sector*,<sup>336</sup> BAT for selection of raw materials requires the operator to have procedures by which the awareness of new developments in raw materials and their implications will be achieved. Similar language is in the *Guidance for the Specialty Organic Chemicals Sector*.<sup>337</sup>

Regarding waste minimization, at least every four years operators must conduct a waste audit to analyze the use and fate of raw materials, by-products, solvents, and other support materials, and institute a plan for acting on identified opportunities for improved efficiency and other changes that reduce waste.<sup>338</sup> In the US, EPA does not require facility operators to examine their raw material use to determine whether better (i.e., more environmentally benign) alternatives are available or to reduce waste products. Media-specific standards in the US may in effect cause some raw material substitution or more efficient use of raw materials as part of a company strategy to comply with those standards. Generally, however, companies are not compelled to do this if they can otherwise meet the standards. An exception is the rare banning of certain

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<sup>334</sup> EMS provisions appear in Section 2.1.1 of the permit. The EMS description is actually found on pages 4-6 of the St. Regis permit application rather than in the permit document itself. Additional information supplied by the company was in response to an EA Schedule 4 request.

<sup>335</sup> In addition, the St. Regis and the Eastman permit include the following standard permit condition: "Where the Operator has a formal environmental management system applying to the Permitted Installation which encompasses annual improvement targets the Operator shall, not later than 31 January in each year, provide a summary report of the previous year's progress against such targets."

<sup>336</sup> EA, 2000.

<sup>337</sup> EA, 2003.

<sup>338</sup> Although EPA's research did not examine this aspect of the BAT determination process in detail, our expectation is that BAT determination and subsequent compliance assessment for materials inputs (e.g., ongoing EA review to ensure that opportunities for substitution of more benign materials are identified and implemented) would be no different from the BAT process for areas subject to more traditional regulation and control, such as limitations on air and water emissions.

chemicals, such as EPA production/use prohibitions on certain ozone depleting chemicals under the Montreal Protocol

**Nuisance Factors – Odor.** Under the Main Activities and Abatement section of a UK IPPC permit application, operators must describe facility activities and proposed techniques to prevent and/or reduce emissions and waste and demonstrate how such techniques represent BAT. It is here that IPPC permits for pulp and paper facilities require facilities to develop and implement an odor management plan, as odor is a frequent problem in this sector. Facility operators must describe and categorize odorous releases, demonstrate that there will not be odor problems from such releases or take action to ensure that this is so, and identify actions to prevent odor problems from arising during abnormal events. For the most part, US federal environmental regulations do not address odor directly, rather odor problems typically are addressed under state or local nuisance regulations. For instance, most state water quality standards under the CWA, for example, prohibit discharges that result in “objectionable odors.” US federal environmental regulations do, however, in some instances address odor-causing compounds such as hydrogen sulfide (H<sub>2</sub>S) and total reduced sulfur (TRS) compounds for some source categories like kraft pulp mills. These standards (for H<sub>2</sub>S and TRS) do not apply to semi-chemical pulp mills, such as the Georgia-Pacific facility, where H<sub>2</sub>S and TRS emissions are not problematic.

**Energy Use.** Regarding energy, the BREFs for the pulp and paper and specialty organics sectors require facility operators to provide information on energy consumption and generation; emissions of pollutants, including carbon dioxide (CO<sub>2</sub>), associated with energy use; and compliance with basic energy efficiency measures, including a plan to comply with applicable energy related requirements from the UK technical guidance note. Operators are required to consider sector benchmarks for energy use and certain energy efficiency improvement techniques in proposing measures to enhance energy efficiency. In addition, IPPC permits often require operators to recover and use any excess or byproduct energy produced (e.g., heat or excess steam).

No counterpart to these requirements exists in the US. However, as was the case with US facility implementation of EMSs described above, US companies have other incentives to increase energy efficiency or otherwise reduce energy related emissions, including high energy generation/use costs; the potential to meet or partially meet some standards through energy efficiency measures or alternatives in energy generation; and participation in federal, state, or local agency voluntary programs or partnerships that promote energy efficiency and/or reduction in emissions from energy generation.

**Accidents.** IPPC permits are required to contain measures to prevent accidents that may have environmental consequences (to any media). Facility operators are required to identify hazards to the environment posed by the facility, assess the risks due to identified hazards, describe and employ measures to prevent accidents and minimize their environmental effects, and maintain a structured accident management plan. The Eastman facility is also a lower tier Control of Major Accident Hazards (COMAH) site and thus subject to COMAH regulations that “apply mainly to the chemical industry, but also to some storage activities, explosives and nuclear sites, and other



industries where threshold quantities of dangerous substances... are kept or used.”<sup>339</sup> COMAH is administered jointly by the EA and the Health and Safety Executive (HSE), so in addition to compliance with conditions of the IPPC permit, as a COMAH facility, the Eastman site is also visited by HSE.

In the US, CAA Section 112(r) requires facility operators producing, processing, storing, or handling certain regulated substances (a list of substances known to cause or that may reasonably be anticipated to cause death, injury, or serious adverse effects to human health or the environment) to identify hazards from release of the substances, take steps to prevent their release, and minimize consequences of any releases. Stormwater regulations under the CWA NPDES program require best management practices (BMPs) to minimize contact of stormwater with raw materials and spills. In the solid waste program, disposal requirements are mandated by each state. Industrial solid waste landfills standards in Virginia (where Georgia-Pacific’s Big Island mill is located) require that safety hazards to operating personnel must be prevented through an active safety program.

No RCRA hazardous waste statutory requirements specifically mention safety. However, the statute does require that EPA promulgate standards, applicable to owners and operators of facilities for the treatment, storage, or disposal of hazardous waste as may be necessary to protect human health and the environment. The RCRA regulations have specific standards requiring facilities to be designed and operated (and have a contingency plan) to minimize the possibility of fire, explosion, or any unplanned release to air, soil, or surface water that could threaten human health and the environment. Additionally, the Emergency Planning and Community Right-to-Know Act obligates facility owners and operators to report to state and local authorities regarding potential hazards, such as stored hazardous substances.

**Noise and Vibrations.** Integrated pollution prevention includes consideration of noise and vibration effects.<sup>340</sup> Facility operators must provide information on the sources of noise, noise levels, nearest receptors, and the impact of noise sources on these receptors. Subsequently, operators must implement basic good practice measures for the control of noise (e.g., equipment maintenance and noise attenuation devices) and implement other measures to ensure noise from the facility does not cause annoyance. Justification is required where noise remains above background levels or above specified decibel levels.

US facilities are generally not subject to federal noise requirements or standards, at least not from an environmental perspective. Federal regulation of noise primarily stems from worker health and safety issues under the Occupational Health and Safety Administration purview. Noise issues for neighbors of US facilities usually are handled by local jurisdictions under nuisance regulations, if at all.

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<sup>339</sup> See the Health and Safety Executive website on the Control of Major Accident Hazards (<http://www.hse.gov.uk/comah/>).

<sup>340</sup> The PPC definition of “pollution” includes “emissions which may be harmful to human health or the quality of the environment, cause offence to human senses or impair or interfere with amenities and other legitimate uses of the environment.” PPC Act, 1999, §1(3)(e).

**Facility De-commissioning.** IPPC permits contain requirements relating to the evaluation of sites and activities to determine potential environmental effects from facility shut down and de-commissioning. Furthermore, operators must upgrade identified problem areas through execution of an improvement plan, prepare a site report as a point of reference for future determinations of deterioration at the site, and prepare and maintain a site closure plan to ensure proper closure procedures will be followed.

In the US more limited scope requirements apply. For example, RCRA has closure criteria for municipal solid waste landfills and regulatory standards for closure of hazardous waste treatment, storage and disposal facilities, but they don't appear to apply as broadly as EU/UK requirements. For solid waste industrial landfills in Virginia, such as at Georgia-Pacific, each landfill unit must have a closure plan. Such units must be closed in a manner that minimizes need for further maintenance and that controls post closure escape of uncontrolled leachate, surface water runoff, or waste decomposition products to any media. Since the Georgia-Pacific mill is a small quantity generator of hazardous waste and not required to be permitted, closure and post closure standards for hazardous waste are not applicable.

**Environmental and Public Health Impacts.** Finally, EU/UK facility operators must provide an assessment of the environmental impacts associated with facility operation. Included in such assessments are a description of the receiving environment; identification of important receptors (e.g., human, flora, fauna, and sensitive habitat areas); pathways by which receptors will be exposed; the impacts of facility releases on the receptors, including modeling releases to calculate exposure levels; and comparison with statutory obligations and any applicable environmental standards.<sup>341</sup> Where potential problems are uncovered (e.g., the assessment indicates the facility may violate an environmental standard or EAL), the operator must make facility improvements to be able to demonstrate "a high level of protection of the environment as a whole."

Such comprehensive and integrated impact assessments are not required of individual US facilities.<sup>342</sup> Rather, the US system relies primarily on the combined effect of compliance with separate media regulations, which are designed to protect public health/welfare and the environment. For example, under the CAA, ambient air standards for selected ubiquitous air pollutants are designed to protect public health and welfare and hazardous air pollutant (HAP) standards have been established for nearly two hundred toxic pollutants. RCRA requires EPA to promulgate standards applicable to owners and operators of facilities for the treatment, storage, or disposal of hazardous waste as necessary to protect human health and the environment.<sup>343</sup>

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<sup>341</sup> The UK H1 guidance document, or *Environmental Assessment and Appraisal of BAT*, provides step-by-step procedures for assessing environmental impacts (see <http://www.environment-agency.gov.uk/business/1745440/444663/298441/horizontal/545377/>). This guidance document was not available at the time the St. Regis operator submitted the facility application. However, Eastman provided an impact assessment, based on H1 guidance, in their permit application.

<sup>342</sup> Although, a National Environmental Policy Act (NEPA) site-specific environmental impact statement (EIS) or environmental assessment (EA) must be prepared and assessed for any US EPA-issued NPDES permit for new sources. Both the EIS and EA assess all impacts of facility operations on the environment.

<sup>343</sup> RCRA also contains an "omnibus" requirement to protect human health and the environment. For example, under Section 3005 of RCRA, and the Part 270 RCRA permit regulations, regional or state permit writers for hazardous waste combustors determine on a site-specific basis what, if any, additional permit conditions are

Under the CWA NPDES program, most large facilities are required to conduct Whole Effluent Toxicity (WET) testing to assess the impact of the discharge on sensitive test organisms. This WET testing is conducted to account for the possible additive or synergistic effects of the multiple pollutants present in wastewaters. Further, most states assess ecological impacts to receiving waters using “biological criteria.” Once these regulations are established, the permitting process generally does not involve reviewing environmental impacts at the level of the facility; however, some facilities may be required to conduct biological assessments as conditions of their NPDES permit.

It was beyond the scope of this study to determine the comparative efficacy of the two regulatory systems with respect to protecting public health and the environment. Therefore, in this report it is only appropriate to note differences between the two systems that may produce differing results in health or environmental protection. One difference is that a PPC environmental impact analysis will include noise and odor considerations, whereas noise and odor are less formally dealt with in the US, mainly through nuisance regulations at the state or local level (although there are instances of federal standards that address odor problems in an industry sector). A second difference has to do with timing. Under IPPC permitting, UK operators are required to demonstrate that their facilities do not cause any significant pollution as a prerequisite to obtaining a permit to continue operating.<sup>344</sup> In the US and under the CAA, two phases for addressing the effects from HAPs are delineated. Under the first phase, facilities emitting HAPs are required to meet standards based on application of MACT (as defined in sector-based regulations). Such standards are not necessarily protective of human health. The second phase of HAP regulations requires additional standards as necessary to protect public health. Finally, there are differences between the two systems in the pollutants addressed (see the following section on “Relative Stringency”), which can lead to different conclusions as to what constitutes a health or environmental threat. (Note: Additional differences may lie in the methods used to calculate or model environmental/health impacts and in the environmental level of a pollutant that is considered “safe,” although such differences were not studied for this report).

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necessary to assure that these additional risks are not above acceptable levels. Multi-pathway site-specific risk assessments provide the information and logical decision-making process needed in making such determinations. Risk assessments also are performed at uncontrolled or abandoned sites as part of the remedial investigation/feasibility process under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program. However, permitting under RCRA applies to only a small subset of facilities generating or managing hazardous wastes. Therefore, the omnibus authority and closure requirements are not applicable at many facilities. In Virginia, solid waste facilities intended primarily for the disposal of non-hazardous industrial waste are subject to standards “designed to protect the public health, public safety, the environment, and natural resources.” Specific design and operational requirements are dependent on the volume and the physical, chemical, and biological nature of the waste.

<sup>344</sup> Focus in the US is on compliance with applicable standards and other requirements. Generally, if a US facility is in compliance with all applicable environmental requirements, there is no further requirement to demonstrate that the facility does not present health risks or other adverse ecological effects. This is not to say that US requirements do not address potential adverse health or welfare effects. National media-specific standards are designed to do this but not in a comprehensive, integrated, and facility-specific manner. For example, certain US facilities desiring to make changes in their operations that will cause a significant increase in air emissions will be required to show that such increases will not cause significant deterioration of air quality or impede progress to attain national ambient standards and will not adversely affect any nearby sensitive environmental (Class 1) areas. Also, many states regulate ambient air concentrations of certain “toxic” pollutants to assure health risks are low and EPA is in the process of issuing federal “residual risk” standards for certain types of facilities emitting HAPs.

## Relative Stringency

### ***Comprehensiveness***

One factor in determining the relative impact and reach of the two permitting systems is the scope of the embedded environmental requirements. As discussed in the previous section, IPPC permits include a number of requirements not found in US federal permits, a consequence of the US focus on separate regulation of environmental releases to air, water, and land.

All of the following UK permit requirements generally have no counterpart in the US environmental permitting system:<sup>345</sup>

- Implementation of comprehensive management systems;
- Raw material use audits followed by improvement plan and waste minimization;
- Energy efficiency/use audits and implementation of energy efficiency improvement measures;
- Noise and vibration surveys and noise problem remediation; and
- Comprehensive environmental impact audits to demonstrate a high level of environmental protection.

Therefore, IPPC permitting can, in some respects, be considered more “stringent” in scope because it forces UK facility operators to address more environmental concerns and to take actions to minimize the environmental effects of all facility inputs, processes, and outputs rather than simply focus on meeting specific environmental standards, as the US requires.

A key question, however, is what beneficial environmental results do these additional IPPC requirements produce? That is, does the integrated focus on all environmental aspects, raw material use, energy efficiency/use, noise, etc. deliver environmental performance superior to that of US facilities? This question cannot be answered definitively without gathering data from a significant number of US and UK facilities, which is something this study did not attempt to do.

Nonetheless, correspondence associated with implementation of the improvement program (the broad outlines of which were introduced and described in Chapter 4) for the St. Regis permit indicates that the company did undertake a number of actions toward meeting BAT in areas not related to the traditional media controls that are characteristic of US permits.

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<sup>345</sup> One exception is that NPDES permits issued under the CWA often contain requirements to develop BMP plans that evaluate pollution prevention and waste minimization alternatives. Although the NPDES BMP plan requirements are media-specific (i.e., they must be linked to the “purposes and intent of the Clean Water Act”) and frequently focus on storm water management, they also encourage facilities to develop more comprehensive facility-wide environmental management systems and to continually reassess the adequacy of the plans up until the point that BMP performance is optimized.

For example, as part of implementing a noise reduction plan, the company reported that “[t]he barrier built to attenuate the Re-winder trim fans has been extended as planned in our letter dated 15<sup>th</sup> October 2003.”<sup>346</sup> Additionally, with regard to the improvement program for odor management, St. Regis reported (in several letters) progress in determining sources of odors and actions taken to reduce odors, such as submerging a black liquor effluent pipe into the effluent pond and a process change to empty and wash the “dry end pulper” during shutdowns.

US companies might undertake some of the same actions in these “non-traditional” or “additional” areas of concern, but not as a result of regulatory mandate. Potential drivers for such action in the US include company policy, the need to be competitive, compliance with international standards or sector standard practice, local community concerns, and participation in voluntary programs or partnerships with environmental agencies/groups. In any event, US facility actions in environmental areas beyond the traditional media-specific mandates may be sporadic and not as comprehensive as under the UK/EU integrated permitting system. The integrated system may also produce better results because environmental areas beyond the traditional media are required to be addressed, whereas action by US facilities in these areas is mostly voluntary.

Another factor related to comprehensiveness is facility coverage – that is, what fraction of facilities within each system is covered by environmental regulations. In the UK, all facilities that fall within IPPC covered sector definitions must comply with the requirements; there are no exemptions. Thus, BAT must be determined and met in all facilities. What is determined to be BAT may vary somewhat from site to site, based on individual facility characteristics and certain cost or investment cycle considerations, but ultimately the mandate that facilities cause “no significant pollution” must be met. In comparison, US facilities within the same sectors are not always covered. For example, under the CAA, some older facilities constructed before a certain date have been “grandfathered” from certain pollutant regulations. This means that they are not subject to federal air requirements, unless at some point they are modified or rebuilt to such a degree that they become subject to New Source Performance Standards or trigger control requirements under NSR. In the utility sector, there are still many aging coal-fired facilities with minimal environmental controls. Thus, there are instances of little to no air emission control at some facilities.

### ***Numeric Limits***

The project team expected to have an opportunity to make quantifiable comparisons of releases regulated under both the UK and US environmental regimes (e.g., air, water, waste emissions abatement). The team hoped to perform a detailed examination of UK and US permits for similar facilities that would yield hard numbers to help judge relative stringency or environmental effectiveness of requirements under the two systems, but was unable to perform such an examination. For instance and for various reasons, the air provisions in the permits did not yield much in the way of like-to-like match-ups that could be compared on a numeric basis.

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<sup>346</sup> Letter from St. Regis to the UK EA, 12 November 2004. See the permit matrix, published as a companion document to this report, for more detail.

The examination of permit conditions for the UK and US pulp and paper facilities also pointed out the potential limitations of looking at a current snapshot view of environmental performance rather than a longer-term examination. IPPC permits for existing facilities are issued with an improvement program, which mandates specific actions to improve environmental performance at the facility over time. Notable air pollutants targeted in some of the improvement program items for the St. Regis facility were volatile organic compounds (VOC), particulate matter (PM10), and nitrogen oxides (NOx). Rough screening of releases of these pollutants indicated that they may have been of concern, even though some of the releases were below sector benchmarks. The improvement program called for St. Regis to conduct further monitoring and more refined modeling of certain release points before taking any further action. The results of the monitoring and refined modeling presumably would direct a further course of action for the suspect releases. Therefore, the expectation is that performance would improve in the future, perhaps over the period of a few years.<sup>347</sup>

Similarly, although the Georgia-Pacific facility is currently in compliance with existing standards and other requirements, additional requirements are pending. In the near future, the Georgia-Pacific mill will have to comply with a HAP standard for black liquor combustion emissions, and a recently promulgated HAP standard for boilers may apply as well. It is also possible that there will be future requirements on the facility's lightly controlled coal-fired boilers, mainly to reduce sulfur dioxide (SO<sub>2</sub>) and NOx. These examples point out the difficulty in making a stringency determination by comparing applicable permit terms at a single point in time.

Another limitation to the stringency analysis for the control of air releases is that the analyzed sources, although similar, are different in several ways. These differences affect the types of requirements that apply to them. Both pulp and paper facilities use a combination of semi-chemical pulping of raw wood chips and mechanical pulping of recycled fiber to produce products for corrugated cases. However, the St. Regis mill uses sodium sulfite to digest wood chips, whereas the Georgia-Pacific mill employs a sodium carbonate/sodium hydroxide solution. The specialty chemical facilities in the study produce chemicals for use in pharmaceutical products. However, they do not produce the same products and, therefore, do not necessarily use and/or emit the same chemical pollutants.

The Georgia-Pacific mill has several times the production capacity of the St. Regis mill and recovers pulping liquor for recycle, while St. Regis's process produces weak black liquor that is not recycled. Boilers at St. Regis are gas-fired and the mill also has a waste incinerator (burning wood waste). The Georgia-Pacific mill's boilers include one burning coal; one burning coal, wood waste, and other wastes; and one burning primarily natural gas. The mill also burns black liquor wastes in two very old smelters.

In addition, emission limits in the permits are expressed in different units. The St. Regis and Eastman permits contain concentration limits for the most part, whereas limits in the Georgia-Pacific and Lonza permits predominantly are expressed as pounds/hour and metric tons/year. Conversion to a single set of units requires flow rate information, which was not readily available. The substantial effort required to convert to a common set of units was not pursued

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<sup>347</sup> Because the mill closed, the final effect of the improvement program cannot be shown.

since the other problems with direct comparison (noted above) would also continue as limitations on a meaningful analysis.

Finally, no overall comparison was completed between UK and US standards for determining hazardous and solid wastes. A brief look at the Virginia Georgia-Pacific facility revealed that it is listed in the federal database as a small quantity generator of hazardous waste; Toxics Release Inventory (TRI) reporting for the facility lists dioxin and ammonia as RCRA Subtitle C hazardous toxic chemicals generated. On the other hand, the St. Regis mill is not designated in its permit as a hazardous waste generator under UK standards.

The State of Virginia regulates solid waste as any discarded material; in general, materials are solid wastes if they are used, reused, reclaimed, accumulated, stored or treated before such use, reuse, or reclamation. Roughly similar requirements exist in the UK, where waste defined as any substance or object that has been discarded is required to be discarded, or is intended to be discarded, including those materials that are going to be recycled or recovered. Solid waste was not disposed of at the St. Regis facility site, and therefore, a permit was not required.

### **Pollutant Analysis**

Despite the fact that numerical stringency analysis of requirements from the two systems is not possible (or necessarily desirable), some comparisons of a more qualitative nature can be made. In this light, it is useful to look at the pollutants covered in each system, the types of control techniques considered to be BAT in the UK compared to the techniques generally required to meet US standards, and what can be expected from the two systems in the future.

Regarding air emissions, the St. Regis permit includes permit limits for NO<sub>x</sub>, SO<sub>2</sub>, PM<sub>10</sub>, carbon monoxide (CO), H<sub>2</sub>S, and VOCs. These limits no doubt reflect the fact that, at the time the St. Regis permit was issued, the EU had an Air Quality Framework Directive that set ambient air quality standards for SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>10</sub>, lead, CO, ozone, and benzene.<sup>348</sup> Similarly, the US has established ambient air quality standards for so called “criteria” air pollutants, which include NO<sub>x</sub>, SO<sub>2</sub>, PM<sub>10</sub>, lead, and CO. Therefore, the US regulates sources of these emissions, including certain combustion sources at pulp and paper mills. The US also regulates VOC emissions as a precursor to the formation of ozone, another “criteria” air pollutant. As previously mentioned, the US does not regulate emissions of H<sub>2</sub>S at semi-chemical pulp mills; although, H<sub>2</sub>S emissions at kraft and sulfite pulp mills are regulated for health and welfare reasons, including odor. The UK appears to regulate H<sub>2</sub>S to reduce odor.

The US also has established standards for the emissions of HAP emissions at pulp mills. HAPs in the US consist of nearly 190 substances on a list published under section 112 of the CAA (as amended in 1990). The UK counterpart to the US list of regulated air pollutants is the “Indicative List of Pollutants.”<sup>349</sup> The list contains the following pollutants:

- SO<sub>2</sub> and other sulfur compounds;

<sup>348</sup> In December 2004, the EU added ambient standards for arsenic, cadmium, mercury, nickel, and polycyclic aromatic hydrocarbons.

<sup>349</sup> DEFRA, 2005b, Annex V.

- Oxides of nitrogen and other nitrogen compounds;
- CO;
- VOCs;
- Metals and their compounds;
- Dust;
- Asbestos;
- Chlorine and its compounds;
- Fluorine and its compounds;
- Arsenic and its compounds;
- Cyanides;
- Substances and preparations which have been proved to possess carcinogenic or mutagenic properties or properties which may affect reproduction via the air; and
- Polychlorinated dibenzodioxins and polychlorinated dibenzofurans.

This list contains families of compounds, rather than individual compounds, which predominate in the US list, thereby making a side-by-side comparison more difficult. Many pollutants no doubt are on both lists. Moreover, the UK system incorporates additional pollutants in a less direct way, through the requirement to provide an assessment of environmental impacts to all media due to facility operation (using the H1 tool discussed in Chapter 4). The purpose of the assessment is to demonstrate that implementation of BAT at a facility will not result in significant pollution. As part of such an assessment, facility emissions must be evaluated against the EALs for several hundred pollutants. The EALs function as thresholds for acceptable environmental impacts, and in effect, constitute an unofficial set of additional EQSs.

One significant difference in pollutant emphasis is the case of methanol. Methanol is on the US HAP list and, thus, is regulated as a major air pollutant from pulp and paper operations, but in the UK does not seem to elicit any special treatment (not that it would be completely uncontrolled, since it still could be regulated as a VOC (although at the St. Regis facility, VOC emissions were well within benchmarks and abatement efforts focused on odor control)). On the other hand, halogenated organic emissions (primarily organic chemical compounds containing chlorine) from pulp and paper mills have been a concern for some time in the EU and in the US as well. This concern has led to sharply reduced sector use of chlorine and chlorine compounds in paper bleaching in the UK. (Note: the St. Regis mill did not have to bleach pulp for its products). Also, the EA considered dioxin emissions from the St. Regis facility wood waste incinerator and decided against establishing a permit emission limit, since measured dioxin



emissions were an order of magnitude below the relevant benchmark and a permit prohibition against burning coated or treated wood in the incinerator would keep emissions low.

The air pollutants of concern for the specialty batch chemical facilities in the analysis are fairly similar. The UK Eastman facility has air emission limits for NO<sub>x</sub>, VOC, dioxins and furans, and halogens (bromine, iodine, chlorine, hydrochloric acid, and total gaseous chlorides). The site's boiler emissions were considered small enough to not warrant imposition of ELVs, although NO<sub>x</sub>, SO<sub>2</sub>, and PM<sub>10</sub> must be monitored. In the US, the Lonza facility has limits for NO<sub>x</sub>, VOC, PM<sub>10</sub>, SO<sub>2</sub> (via a fuel content requirement), acid gases (hydrochloric acid), ammonia, thionyl chloride, and hydrogen cyanide. The differences in types of halogenated/acid gases limited likely has to do with differences in the types of products produced at the two facilities.

### **Abatement Techniques**

Where raw material substitution, process variation, or other pollution prevention techniques do not sufficiently reduce pollutant emissions, UK BAT may require add-on emission abatement methods. Overall, the types of abatement techniques available in Europe and those available in the US are similar. With today's global markets and rapid information exchange, the techniques known and practiced in the US are also well known and practiced in Europe and the UK.

Potential differences in the two systems arise in the application of these techniques – that is, the circumstances under which the techniques are required and, if required, what performance levels will be established in the permit. In the case of the St. Regis facility, a source of water pollution, the (weak) black liquor waste, was not required to be treated at the time of permit issuance (due to mitigating circumstances presented by the local environment, lack of clarity as to the significance of the environmental impacts, and the substantial cost of candidate abatement techniques<sup>350</sup>). The permit did require further study of the effects of the liquor effluent on the receiving water and further consideration of options for treating and controlling the release of black liquor to the local estuary. However, at the time the facility was closed, the issue regarding how to treat and control this effluent still had not been decided.

In the US, it is likely, although not certain, that treatment and additional control of black liquor effluent would have been required at the time of permit issuance. An evaluation of the discharge's potential to cause or contribute to an exceedance above water quality standards would have been required. If there was any indication that an exceedance could occur, a limit would be required, and necessary effluent treatment would have been mandated regardless of cost.<sup>351</sup>

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<sup>350</sup> In fact, St. Regis reported that different environmental assessments of the impacts of the black liquor discharge had returned conflicting conclusions – no impact and negative impacts (St. Regis Company Representatives. Personal communication. 19 July 2007). In addition, it should be noted that the tidal range of the Severn River Estuary (at 49 feet) is the second largest in the world (second only to the Bay of Fundy in Canada). This large tidal range coupled with the requirements in the IPPC permit that restricted discharge to certain points in the tidal cycle were mitigating factors that significantly increased mixing, flushing, dispersal and dilution of the pollutants in much larger water bodies (i.e., the Bristol Channel and ultimately the Atlantic Ocean).

<sup>351</sup> This is roughly the same analysis required in the UK. In the case of the St. Regis mill, if discharge of the black liquor effluent was forecast to violate an EU EQS, it would not have been allowed. In this instance, a part of the debate centered on where the effects of the discharge should have been measured. A 1998 study had determined that there was no environmental impact on the Severn Estuary outside of the immediate location of the outfall

Considering air emissions, control was not required for a number of process-related air vents at St. Regis, due to relatively insignificant emission levels. These were considered sources of VOC, not HAP. However, in the US many (though not all) pulp and paper air vents are required to be controlled (due to the presence of methanol and other VOCs considered to be HAPs). On balance, one might conclude that control requirements for air emissions from process sources in the US might be more stringent than in the UK, if for no other reason than the US considers such emissions to contain HAPs, while the UK does not seem to consider some of these same air emissions to be particularly hazardous. It is not possible, for the reasons stated above, to support such a conclusion with numerical analysis, however.

The Eastman and Lonza facilities employ similar emission reduction methods for air emissions. Each uses condensers on reactors and other process equipment as primary controls for VOC emissions and then ducts residual VOC emissions to a central thermal incinerator. Acid/halogenated emissions from the incinerators are controlled by scrubbers and PM10 by fabric filter devices.

### **Effect of Site-Specific and Local Conditions**

For the most part, and as stated earlier, US standards are meant to apply nationally, regardless of site-specific conditions or local factors. However, there are exceptions. For example, while CWA NPDES technology-based requirements apply nationally, water quality standards are site-specific and vary widely based on water uses and local conditions. NPDES permit requirements also vary widely based on applicable criteria and analyses of local water quality impacts. In addition, control technology determinations under the CAA major source construction permitting programs are influenced by existing air quality in the region, characteristics of the facility, and costs to apply technology. Moreover, CAA State Implementation Plans (SIPs) for a particular state will be designed to fit the particular needs of that state with respect to attainment/maintenance of ambient air quality standards. Nonetheless, even such “tailored” implementation plans are meant to apply broadly within the state and are not generally subject to site-specific conditions. The rather rigid application of widely applicable standards leads to uniformity across the nation, but also can produce widely varying environmental benefits and costs of compliance. This is somewhat mitigated by statutes that allow standards to distinguish among classes, sizes, and types of pollution sources.

In contrast, IPPC permitting appears to be a much more fluid system. The backbone of the BAT determination is the country-specific technical guidance distilled from applicable EU BREFs. As discussed in Chapter 4, the BREFs contain a survey of potential BAT techniques and associated performance levels (benchmarks) for high performing sources within the EU. Specific standards or techniques are not mandated by BREFs, but the information is to be used to establish BAT for installations in each member state, in some instances via technical guidance attuned to sector characteristics in individual member countries. In the case of the UK, national technical guidance establishes firm expectations of BAT, but the system leaves the door open to site-specific application.

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(Decision Document, St. Regis Paper Company Limited, Sudbrook Paper Mill, Caldicot, Monmouthshire, Wales. Permit No. BK 1163. 15 March 2002). Due to the factors named above, violating an EQS after mixing is almost impossible. There had been no recorded breach of the EQS for the Severn Estuary.

### ***Black Liquor Effluent at the UK Sudbrook Mill – an Example of a Site-Specific Determination***

A good example of the “fluid” application of BAT under the integrated permitting regime is the treatment of black liquor wastes (the pulping chemicals and wood wastes separated from usable pulp) at the St. Regis facility. It is common practice in the US and EU to combust black liquor from pulping operations to make use of the fuel value of the entrained wood wastes and to recover pulping chemicals, which are not combusted, for reuse. However, the St. Regis mill is relatively small and uses some recycled fiber to produce corrugated media, so the pulping waste streams are not particularly large. Additionally, the sodium sulfite pulping chemical produces a black liquor wastewater stream of low fuel value. Thus, the St. Regis facility did not recover pulping chemicals and was allowed, with some constraints, to discharge the black liquor containing wastewaters directly to the Severn Estuary.

The applicable UK technical guidance note acknowledged that recovery of black liquor from NSSC processes is not often practiced but also indicated that long-term release of the liquor into the environment was not acceptable, due to the high chemical oxygen demand (COD) levels and toxicity. The UK technical guidance note BAT discussion for the NSSC process called for consideration of options for recovery and recycling first, but then stated that the most likely option for BAT would be anaerobic/aerobic biodegradation, in several stages, with energy recovery. The St. Regis permit application stated that “the costs of effluent treatment are considered to be excessive compared to potential environmental benefits” and also that chemical recovery “at a capital cost equivalent to the current asset value of the Mill, is considered excessive.”

Therefore, the operator proposed an improvement plan for the liquor effluent consisting of three parts: (1) upgrade the recovered fiber pulping operations to produce a new product that could be made from pulp containing an increased percentage of recovered fiber, and thus reduce COD; (2) conduct an evaluation of the impact of the COD reduction on the estuary; and (3) continue investigating and report annually on environmentally beneficial process changes and effluent treatment technologies. In response, the EA, after some deliberations, issued the IPPC permit for the St. Regis mill without imposing any immediate restrictions on the mill effluent but requiring the mill to carry out a somewhat enhanced version of the mill’s proposed improvement program.

In conjunction with implementation of the permit improvement program, the mill operator and the EA exchanged several letters and held a number of meetings after permit issuance. One letter from St. Regis stated that the mill’s attempt to utilize more recycled fiber in a new product had failed, due to lack of a market for the new product. The company indicated that it was pursuing anaerobic effluent treatment instead. In a later letter, the company stated that further study of anaerobic treatment showed the technology to be unaffordable but that it continued to pursue other options. The final correspondence between the mill and the EA revealed that St. Regis was looking seriously at a process to recover the black liquor.<sup>352</sup>

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<sup>352</sup> The mill shut down before reaching a permanent solution to the problem.

This example illustrates the potential leeway that exists in determining BAT for a particular release. All during the process described above, the EA critically reviewed information submitted by the company, asked critical questions and/or requested additional information, and eventually reached agreement with the company on a course of action. (Interestingly, the multiple back and forth actions over time ended with the company again looking into chemical recovery – the first BAT option that St. Regis initially rejected.) This process stands in contrast to the US system where emission sources subject to a standard are expected to comply, generally without opportunity for negotiation.

This example is not meant to say that all BAT decisions are this drawn out or involve this degree of negotiation. However, the potential does exist for site-specific or local conditions to affect final BAT decisions. It also is likely that BAT for noise and energy use and efficiency would be highly dependent on site-specific or local conditions.

## **Pollution Prevention and Continuous Improvement**

Pollution prevention underlies many of the requirements of the integrated permitting regime in the EU/UK. The BAT approach requires that measures be taken to first prevent pollution and, only where that is not practicable, to reduce emissions. If emissions can be prevented altogether at reasonable cost, then this should be done without regard to whether any EQSs are already being met. Therefore, facility operators must justify continued emissions where prevention options exist.

To meet this generic requirement, a facility must include in its permit application a description of the installation, the activities to be carried out, and in particular, pollution prevention related information as follows: details of the raw and auxiliary materials, other substances, and the energy to be used in or generated by the carrying out of those activities; details of the technologies and other techniques that the operator proposes to use to prevent or, where that is not practicable, reduce emissions; a description of measures to be taken for the prevention and recovery of waste generated by the installation; a description of measures taken or proposed to show that energy is used efficiently; and the necessary measures to prevent accidents. Such information in applications will be determined or judged against indicative BAT in guidance documents (e.g., BREFs, technical guidance notes).

Where the permitting authority determines that specific information in the application represents BAT (possibly augmented with revisions or supplemental information), that specific information becomes part of the permit, thereby binding the facility operator to continue operating in the described manner. In addition to these initial pollution prevention related requirements, facilities must undertake ongoing pollution prevention activities as required under specific provisions, such as those for raw material use (see the subsection on materials inputs earlier in this chapter) and under the approved facility EMS provisions (see the section on facility environmental management earlier in this chapter).

Actual results from IPPC pollution prevention requirements will depend on several factors, including actual extent and diligence of the effort to find pollution prevention alternatives; how well pollution prevention requirements are monitored and enforced; how amenable a facility is to

pollution prevention efforts (perhaps a facility's processes are inherently "clean" or significant pollution prevention activities have already taken place); success in developing viable pollution prevention alternatives; and availability of resources to implement pollution prevention ideas. Thus, uneven pollution prevention results can be expected from facility to facility within a sector and among different sectors. Nonetheless, the IPPC permits should result in a concentrated effort to prevent first in order to minimize the need for any subsequent pollution controls.

In the US, regulators have tended to avoid requirements relating to pollution prevention because of fear that regulating the details of production processes will become burdensome and impede operational changes or technological innovation.<sup>353</sup> There are various media-specific exceptions to this: pollution prevention requirements are frequently included in best management conditions in NPDES permits and are often core components of stormwater and concentrated animal feeding operations (CAFO) permits; some states may include pollution prevention provisions in state permits; and RCRA requires certain facility owners/operators to have waste minimization plans.<sup>354</sup>

In addition to pollution prevention requirements described above under NPDES, RCRA, and state permit conditions, pollution prevention is encouraged in the US through various means. Such encouragement may take the form of federal or state/local voluntary programs and initiatives, which provide participants incentives for undertaking pollution prevention or industry sector initiatives through trade associations. Under some regulatory agency voluntary programs, obtaining program "benefits" hinges on a company's willingness to undertake pollution prevention activities. Such activities eventually may be codified in permits, often as state, rather than federally, enforceable conditions.

An example is EPA's Pollution Prevention in Permitting Program (P4), which pioneered federal air permits that provide operational flexibility for participating industrial facilities.<sup>355</sup> In many P4 permits, ongoing pollution prevention activities were included as enforceable conditions in order to ensure that resulting emission reductions would be appropriately credited for compliance with other permit requirements. Aside from voluntary programs, companies also may undertake pollution prevention actions as a result of company policies, to reduce costs and improve efficiency, or as a means to help comply with environmental standards or meet public expectations with respect to environmental performance. Considering all these factors, it is reasonable to assume a significant amount of self-initiated pollution prevention activity is taking

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<sup>353</sup> However, the research team was not advised that these concerns have arisen under the pollution prevention components of IPPC permits. As discussed below, it is not apparent that the UK system is either more or less able to accommodate operational flexibility than the US permitting system.

<sup>354</sup> Additionally, some states have programs requiring facilities to conduct pollution prevention reviews. Such requirements are roughly similar to the UK material use terms, although the pollution prevention planning requirements are not generally incorporated into permits. See Bennear, L.S. "Evaluating Management-Based Regulation: A Valuable Tool in the Regulatory Tool Box?" in eds. Coglianese, C. and J. Nash. *Leveraging the Private Sector: Management-Based Strategies for Improving Environmental Performance*. (Washington DC: Resources for the Future Press, 2006).

<sup>355</sup> An evaluation of P4 permits can be found at EPA, 2002. *New Source Review Improvements: Supplemental Analysis of the Environmental Impact of the 2002 Final NSR Improvement Rules*. <http://www.epa.gov/nsr/publications.html>.

place within the US, although the effort expended and results obtained will vary from facility to facility.

Since US companies generally are not required to undertake comprehensive pollution prevention programs, they respond as they see fit to various incentives (internal or external). Thus, it is expected that the integrated permitting system would produce more significant, broad-based environmental benefits from pollution prevention. However, this conclusion is not based on examination of any database – it simply follows from the comprehensive, mandatory nature of pollution prevention under the IPPC regime.

In the future, pollution prevention efforts in the US likely will expand in a world of ever increasing global competition and prices for energy/raw materials. Out of necessity, this will lead companies to put increased emphasis on pollution prevention related activities, such as implementation of EMSs with continuous improvement components, adoption of lean manufacturing practices, and development of new “green” products/processes in response to market dynamics.

## Role of Economic Factors

Under IPPC permitting, cost and economics are taken into account in BAT determinations. These factors are part of the deliberations as the EA distills broad BAT guidance from applicable BREFs for a sector into indicative BAT tailored for UK facilities. The introduction to the UK technical guidance notes for various regulated industry sectors state the following: “[a]t this national level, techniques which are considered to be BAT should, first of all, represent an appropriate balance of costs and benefits for a typical, well-performing installation in that sector. Secondly, the techniques should normally be affordable without making the sector as a whole uncompetitive either on a European basis or worldwide.”<sup>356</sup> So the EA evaluates costs and economics as part of their decisions on BAT sector guidance.

At the facility level, again as stated in the UK sector-specific technical guidance notes, “[t]he most appropriate technique may depend upon local factors and, where the answer is not self evident, a local assessment of the costs and benefits of the available options may be needed to establish the best option.”<sup>357</sup> While BAT decisions can be based on cost/benefit analyses, they are not to be based on company profitability. However, company finance may be taken into account where the BAT cost/benefit balance only becomes favorable when the facility is due for a renovation anyway (investment cycle consideration), or where a number of improvements are needed and a phased program of implementation may be appropriate.

As discussed earlier, US permit terms generally reflect performance standards (and associated monitoring, record keeping, and reporting requirements) applicable to a facility. Many standards issued at the federal or state level will take into account the cost and cost effectiveness of the

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<sup>356</sup> For example, EA, 2000, p. 1.

<sup>357</sup> EA, 2000, p. 1.

technology needed to comply.<sup>358</sup> However, once a standard has been promulgated, it applies to covered facilities as promulgated, with no further negotiations of stringency. Typically, standards do not specify the technology to be employed to reduce pollution but rather set numeric performance levels to be attained (or not exceeded, as the case may be). The facility operator then chooses how to meet the numeric limit and, thereby, exercises some control over the cost of compliance. Costs for complying with standards can vary considerably from facility to facility.

To be accurate, not all requirements of the US system stem from broadly applicable federal or state standards of performance. For example, under the CAA's NSR program, sources making significant changes to operations will be subject to emission control requirements, where determination of such requirements is based on a site-specific control options analysis. Costs and other facility-specific factors are considered in such a control options analysis.

At the St. Regis mill, costs for various methods of mitigating black liquor releases played a significant role in the continuing BAT determination dialogue between the facility operator and the EA. It should be noted that final BAT determinations must always be consistent with attaining and maintaining compliance with applicable EQSs. Cost and economic factors will be overruled where BAT must be more stringent to comply with EQSs as well as certain EU and/or UK pre-determined ELVs.

In summary, compared to the US regulatory system, IPPC-based BAT decisions allow for a somewhat more pronounced and pervasive role for cost and economic factors. US permits may contain national standards that reflect cost and economic considerations based on sector characteristics or based on different classes, sizes, or types of facilities within a sector. However, this does not extend down to the facility-specific level (except for certain case-by-case control technology determinations, such as those under CAA NSR). In contrast, an operator in the UK has the opportunity to influence the imposition of BAT based on cost and economic factors at the facility level (although the EA has the final say as to what constitutes BAT). According to EA sources,<sup>359</sup> this facility-specific cost/economic influence may extend more to the timing of compliance with required improvements than to the determination of BAT itself. The greater consideration of cost/economics occurs at the sector level and is reflected in sector-specific UK technical guidance.

Again, the backstop to any BAT decision is that it must not conflict with applicable EQSs. However, in contrast with the US system, BAT must be applied even when there are no applicable EQSs or when the receiving environment is meeting applicable EQSs. As a result, the IPPC system establishes an expectation that facility impacts will continue to be reduced over time, consistent with available technologies and economic factors, regardless of the existence of EQSs, or the current state of the environment.

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<sup>358</sup> Exceptions under the CAA include MACT standards for HAP standards, which are to be based on the best performing facilities in a sector without regard to cost, and national ambient air quality standards, which are to be set to protect public health and welfare.

<sup>359</sup> James, T., EA, Policy Manager. Personal communication. 2 May 2007.

## Flexibility

Two aspects of flexibility are discussed in the sections below. The first considers flexibility in setting permit requirements; the second considers a facility's operational flexibility under a permit.

### ***Flexibility in Setting Permit Requirements***

As has been discussed earlier (in the discussion on the role and effect of site-specific factors), permit requirements are determined differently under the UK and US systems. In the US, permits typically contain the requirements of performance standards that have been issued at the national or state level. Such standards are not negotiated for individual facilities, but apply broadly to a sector or a subset of a sector. There are exceptions where requirements are based on case-by-case technology determinations, such as under the CAA NSR program and water quality standards under the CWA NPDES program.

Under IPPC, permitting is much less a listing of applicable standards and much more a tailoring of requirements to an individual facility (within the constraints of applicable EQSs and BAT guidelines). Thus, the peculiarities of a particular facility can be taken into account when setting IPPC permit requirements and emission limits. Moreover, it is the facility operator that proposes BAT, based on analysis of alternatives (from the sector technical guidance), for plant site pollutant releases and other environmental aspects (i.e., energy, raw material selection, noise, etc.). This ensures that facility characteristics will be included in BAT analysis and eventual BAT determinations.

This process requires the permitting agency, the EA, to have sufficient technical training and ability to determine whether to accept the facility's conclusions as to what constitutes BAT or to prescribe something else. In contrast, US permit writers typically must identify or confirm which standards and other requirements apply, and place them in the permit. Under the CAA, for example, permit writers, for the most part, are not required to decide the stringency of pollution control requirements for a facility, since identified standards and other requirements typically are absolute, without room for negotiation.<sup>360</sup>

In addition to flexibility in the process for determining what constitutes BAT for pollution sources at a facility, the timing of facility adoption of BAT can vary as well. The PPC Regulations direct permit writers to consider "the length of time needed to introduce the best available technique."<sup>361</sup> Some help is provided through the technical guidance notes for a sector, which will contain guidance on reasonable times for installation of various BAT candidates.<sup>362</sup>

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<sup>360</sup> While it is true that US standards are non-negotiable, there are formal mechanisms available under US statutes and regulations that allow facilities to apply and request approval for site-specific flexibility (e.g., variances under the CWA).

<sup>361</sup> The introduction to sector-specific UK technical guidance states that in instances "where [the EA determines that] there is significant difference between relevant indicative BAT [outlined in UK technical guidance] and BAT for the installation, the Permit may require further improvements on a reasonably short timescale," (i.e., through an improvement program). See, for example, EA, 2003, p. 4.

<sup>362</sup> Also, the EA-issued *Read Me First* guidance tated (with respect to meeting BAT requirements): "You should include proposals and timescales for all aspects of the installation that require improving. Improvements should be



Additionally, the UK *Integrated Pollution Prevention and Control Practical Guide (Edition 4)* states the following:

...new techniques cannot be brought into effect overnight. An operator can therefore, with reference to the guidance notes, make a case for making improvements over a specified period of time, but it should justify the measures it proposes, what environmental improvements they would bring and the timescale for making the improvements.

Regulators may accept these proposals where reasonable. Alternatively, they may impose their own improvement requirements with appropriate deadlines... Timescales known to be achievable in the sector as a whole should normally be applied unless there are compelling reasons for some delay – for example if several improvements are in progress as part of an overall environmentally-beneficial programme at a complex site.<sup>363</sup>

Thus, how soon BAT must be implemented is negotiable to some extent, based on site-specific factors and general sector guidance. Generally, US technology-based requirements carry absolute deadlines, which apply regardless of facility circumstances. An exception to this under the CWA NPDES program is that permitting authorities typically establish site-specific compliance schedules when water quality standards dictate new effluent limitations.

### **Operational Flexibility**

A second aspect of flexibility has to do with the degree of freedom a facility has to make operational changes within its permit (or conversely, the degree to which its permit impedes rapid or frequent operational changes). Typically in the US, permits reflect current operations at a facility. To make changes that will affect emissions or other permit terms under the air program, such as adding new units or modifying the operation of existing units, a facility owner/operator must first obtain a construction permit and/or a revision to the existing operating permit. In essence, a facility's ability to change operations (perhaps in response to market conditions) is limited by permit processes.<sup>364</sup> Under some circumstances, obtaining a construction permit can take a year or more. This is less true for NPDES permits where, generally, the permit modification process does not impede facility operational changes.

IPPC permits issued in the UK also reflect current facility conditions, and over time permits are revised to take into account changes in how facilities are operated. Once a permit has been issued, an operator must advise the regulator whenever proposing a change in facility operations ("change" includes a technical alteration or operational modifications that may have consequences for the environment). Minor changes that will not require variation of current permit conditions may be handled through notice only – at least 14 days prior to beginning

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completed as soon as possible and in most cases within 3 years." (See footnote 296 for more on the *Read Me First* guidance.)

<sup>363</sup> DEFRA, 2005b, p. 52.

<sup>364</sup> US EPA has been experimenting with "flexible" air permits for a number of years. Such permits feature terms anticipating certain types of facility changes over the life of the permit and allow the changes to be made as needed (i.e., without waiting for additional permit revisions). The agency has been and continues to issue revisions to NSR and permit regulations to support mainstreaming flexible air permits.

implementation. Unless the regulator acts to prevent it, the operator may make the change. A change that is totally within the scope of the original application “and will not have consequences on the environment” may be made without notice to the EA.<sup>365</sup>

Other changes that require permit revision must go through the variation process. The operator submits an application for variation of the permit, and procedures similar to the permit issuance process are followed to implement the variation. A change that is determined to be a “substantial change” (one likely to have significant negative effects on humans or the environment) must go through public comment and statutory consultation. Normally, applications for permit variation are to be “determined” (issued) within four months of receipt of a duly made application (as with applications for the initial permit for a facility), or three months if public comment and statutory consultation is not required.

In the UK it has been recognized that there are a number of chemical producers that, to stay in business, must be able to produce a range of different chemicals within a short timeframe. Such producers, without special accommodation, would be involved in a constant cycle of applying for permit variations in order to make the chemicals needed by customers. Of course the delay in obtaining approval to make new products or use new processes through permit variations could cause customers to seek other suppliers. To address this situation, the EA has introduced the concept of a Multi-Product Protocol (MPP).

A MPP allows an operator to pre-define the extent of a facility’s operating envelope, and determine BAT for that operating envelope. This reduces the need for permit variations as new chemicals are produced within the pre-set conditions defined by the operating envelope. The idea is that although a multi-product chemical facility only produces a certain set of chemicals at the time of permit issuance, it is capable of producing additional chemicals through other processes that still fall within the scope of the initial BAT determination for the facility. Thus, operation within the defined envelope under a MPP, including production of new chemical products, will not trigger the need for permit variations.

Operators seeking to establish MPPs are encouraged to make the scope and detail of their permit applications sufficient to allow anticipated future changes to be effected within the framework of the permit. To do that, applications must include the anticipated range of chemical transformations, how they will be used in a range of chemical processes, and the criteria to be used to assess the capability of the plant operator to ensure that the “environment as a whole” is not exposed to unacceptable risk. All anticipated new chemicals and processes are to be justified against BAT principles, while keeping in mind whether a new product would result in any meaningful change to the BAT assessment for the current products and processes.

The EA’s guidance on multi-product installations<sup>366</sup> provides a list of specific considerations that must be taken into account in any proposed protocol, including the following:

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<sup>365</sup> According to the *IPPC Practical Guide* (DEFRA, 2005b) and the definition of “change in operation,” “Many changes will not have consequences on the environment and will therefore not require notification.”

<sup>366</sup> EA, 2005b. *Guidance on the Use of a Multi-Product Protocol (MPP) at Chemical Installations*. <http://publications.environment-agency.gov.uk/pdf/GEHO1205BJZF-e-e.pdf?lang=e>.

- An indication in the site report of the effect of likely new chemicals/reactions on pre-existing contamination.
- A “worst case” environmental assessment covering the range of possible impacts and consequences of accidents.
- The justification for the range and scale of chemistry applied for, which must cover maintenance; management; training; technical support systems to show capability for handling new products; systems for handling part loads of raw materials remaining after a production campaign; and a description of how waste is identified, controlled, and minimized, etc. (the EA MPP guidance also contains an additional 12 considerations to be covered).
- A description of how new products and processes will be assessed and shown to be within the MPP prior to introduction (assessment criteria provided in the guidance document).

Following approval of a MPP and to avoid a permit variation when manufacturing new chemicals, the facility operator must notify the EA of the change they intend to undertake and make the case that the change fits within the MPP (i.e., justify that the scale of production, range of chemistry, and the environmental impact are covered by the MPP). The EA responds by letter either that it agrees that the change is within the facility’s MPP, or that a permit variation is required.

In the US, EPA has recognized a similar conflict set up by the requirements of air permit revision processes and the need for certain industries to make frequent and/or nearly immediate facility changes to respond to market demands. Thus, EPA has been experimenting with “flexible” air permits for a number of years. Similarly, such permits feature terms that define an envelope of facility operation, including changes and additions to existing equipment that may proceed without invoking permit revision procedures. Permit terms are included to assure that anticipated changes within the “envelope” will meet all applicable standards and other requirements.<sup>367</sup> The agency has issued some and has proposed further regulations related to NSR and CAA Title V operating permits to help mainstream flexible air permit concepts.<sup>368</sup>

Overall, it is difficult to reach conclusions regarding the extent of operating flexibility provided under the UK IPPC permitting relative to that available under US permitting systems. Anecdotal evidence may suggest that the UK is somewhat more tolerant of minor changes than the US system; and the MPP allows additional flexibility, although apparently only for multi-product chemical facilities. In the US, air permits and their revision processes are widely viewed as a

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<sup>367</sup> A similar provision is allowed under the NPDES Organic Chemicals, Plastics and Synthetic Fibers Effluent Guidelines under the CWA.

<sup>368</sup> Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR): *Baseline Emissions Determination, Actual-to-Future-Actual Methodology, Plantwide Applicability Limitations, Clean Units, and Pollution Control Projects* Final Rule, 31 December 2002 (67 FR 80185); and *Operating Permit Programs and Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR)*, Flexible Air Permitting Rule, Proposed Rule, 12 September 2007 (72 FR 52206).

significant stumbling block for companies wishing to make frequent and quick operational changes. As noted above, changes to create greater flexibility in US air permitting recently have been issued or proposed; however, broader adoption of flexible air permitting strategies, beyond the initial pilots and limited additional examples, will take time.

Finally, it is stressed that neither MPPs in the UK, nor flexible air permits in the US are to be viewed as providing flexibility at the expense of environmental protection. All environmental requirements are to be met under these flexibility tools. UK MPPs and US flexible air permits assure compliance with all applicable requirements for all anticipated changes within a defined operating envelope at a facility – basically by placing boundaries on the types of future changes that can be made, anticipating regulatory requirements, and placing terms in the permit to assure compliance with these requirements. In essence, the MPP and flexible air permits take on the work of permit variations or revisions in advance.

## Monitoring, Testing, and Reporting Requirements

### *EU/UK Monitoring Program*

Proper emissions monitoring is an integral part of any permitting system. The PPC Regulations, which implement the IPPC Directive require the following:

- Applications for a permit to contain the proposed measures to be taken to monitor the emissions.
- The permit to include conditions that
  - Set out suitable emission-monitoring requirements specifying the measurement methodology and frequency and the evaluation procedure; and
  - Direct the operator to supply the regulator with the data required to check compliance.

According to the UK *Integrated Pollution Prevention and Control Practical Guide (Edition 4)*, operators have significant responsibility for monitoring under IPPC.<sup>369</sup> Operators must propose in permit applications how they intend to monitor facility emissions. The regulator's role is to assess facility monitoring proposals and impose permit conditions that are consistent with the regulatory requirements above, and that require the operator to supply the results of emissions monitoring and tell the regulator, without delay, of any incident or accident that is causing or may cause significant pollution.

The EU's IPPC Bureau in Seville supported the IPPC Directive's monitoring requirements by publishing a reference document (BREF) on the principles of monitoring under IPPC.<sup>370</sup> The

<sup>369</sup> DEFRA, 2005b.

<sup>370</sup> EC, 2002. *Integrated Pollution Prevention and Control (IPPC): Reference Document on the General Principles of Monitoring*.

[http://www.jrc.es/pub/english.cgi/d946763/11%20Reference%20Document%20on%20General%20Principles%20of%20Monitoring%20\(adopted%20Jul%202003\)%20-%201%20Mb](http://www.jrc.es/pub/english.cgi/d946763/11%20Reference%20Document%20on%20General%20Principles%20of%20Monitoring%20(adopted%20Jul%202003)%20-%201%20Mb).

document emphasizes that, wherever possible, emissions should be monitored using the methods of recognized standard-making organizations and provides a hierarchy of standard-making organizations. Subsequently, the EA established a Monitoring Certification Scheme (MCERTS) providing a framework of published specifications and quality requirements to further guide operators in producing valid environmental measurement proposals, and to serve as benchmarks for evaluating such proposals. The scheme is built on proven international standards, such as those from ISO and the European Committee for Standardization (CEN – Comité Européen de Normalisation)) and provides industry a foundation for choosing and implementing monitoring systems and services that meet EA performance specifications. MCERTS brings together relevant performance standards for the product certification of instruments as well as the competency certification of personnel, laboratories and effluent flow monitoring inspectors. Sira Environmental operates an MCERTS website, on behalf of the EA, to maintain information on all current MCERTS certifications. The UK Accreditation Service accredits Sira to undertake the product and personnel certification activities that underpin the MCERTS scheme.

The EA has published a series of monitoring related technical guidance notes as part of MCERTS.<sup>371</sup> This series of monitoring guidance notes includes information and expectations with respect to suitability of sampling sites, safety and practical considerations when sampling and monitoring, choice of method, choice of technique, and choice of monitoring equipment. (Additional documents are expected to be published over time.) The guidance notes are complemented by additional MCERTS related monitoring documents published by the EA, which cover a range of topics, including monitoring of industrial emissions, monitoring ambient air, portable equipment for emissions monitoring, soil testing, continuous monitoring of discharges to water bodies, and measuring toxicity of effluents.

All of these documents underpin the MCERTS program. Facility operators are expected to use the published documents and MCERTS products, personnel, laboratories, and inspectors in their monitoring plans. BAT for monitoring is determined in part based on use of MCERTS to the extent feasible at a particular facility.

In summary, under IPPC facility operators must propose in permit applications the monitoring they intend to undertake to track compliance with emission limits. Thus, operators have some freedom to “select” methods, instruments, and laboratories to accomplish monitoring, although they must do so within the bounds of MCERTS guidelines, specifications, and certifications (to the extent applicable and feasible at their facilities).

It appears from the St. Regis and Eastman permits, that neither facility completely met MCERTS requirements at the time their permits were issued. MCERTS was at an early stage of implementation at the time St. Regis submitted its permit application, and its proposed monitoring followed the less specific and demanding guideline of the existing *Technical Guidance for the Pulp and Paper Sector*. Therefore, the St. Regis permit contained an improvement program item requiring the operator to “...complete an annual review of monitoring equipment used and the availability of MCERTS” and an “annual report detailing any proposed changes to be forwarded to the EA.” In this manner, the St. Regis monitoring

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<sup>371</sup> For a list of published guidance see the EA website at <http://www.environment.gov.uk/business/1745440/444671/466158/monitoring>.

program would gradually conform to MCERTS. Eastman's permit contained a similar improvement program requirement and called for the operator to upgrade to MCERTS where not currently employed.

### ***US Monitoring***

In contrast to the IPPC monitoring regime, it is common in the US for national standards of performance to be accompanied by precise specification of emissions (sources and pollutants) to be monitored and the monitoring protocol (e.g., precision, accuracy, frequency) to be used. Where performance tests (e.g., one-time sampling/analysis of stacks, effluents) are required, US EPA typically develops and proposes specific test method(s) to be used and, after public comment, promulgates them as EPA test methods. To be able to use an alternate monitoring or test method, facility owners and operators must obtain approval from the EPA Administrator (or the Administrator's designated delegate). Over time, EPA has published or specified methods covering monitoring and testing of a wide range of pollutants in air, water, and waste and in direct support of promulgated national standards.

### ***Discussion and Conclusions on Monitoring and Testing***

Previous sections of this report indicated that the IPPC system regulates more categories of environmental performance than US federal environmental regulations, including such aspects as facility environmental management systems, energy use/efficiency, offsite environmental impacts, and noise. Therefore, facilities under IPPC must monitor to show compliance with these additional requirements. For example, facilities are required to track energy use and related greenhouse gas emissions, and can be required to monitor ambient conditions beyond the facility fence line. As far as monitoring all environmental effects from facility operation, IPPC is clearly more comprehensive.

Both systems, of course, have requirements for monitoring air and water pollutants and wastes. However, undertaking a comparative technical analysis of monitoring/test methods for air, water, and land pollutants that are employed by the two pulp and paper facilities and the two specialty chemical producers was beyond the scope of this study. Such an analysis would have required side-by-side detailed inspection of comparable methods. Thus, within the time and resources available, the focus was broadly based on the way in which monitoring and testing requirements are established, and other qualitative aspects of the UK and US monitoring programs. (It is noted, however, that in a number of instances, EPA methods are recommended in UK guidance.)

As with other IPPC requirements in UK permits, the facility operator is responsible for proposing monitoring terms for its operations based on published guidance. This gives the operator some leeway in choosing methods, provided they fall within the boundaries of the guidance. In contrast, the US system, dictates monitoring and test methods for tracking compliance with national standards, which creates a very uniform program across the country. On the face of it, each way of setting monitoring requirements is suited to its parent system. The US sets nationally applicable standards; and it makes sense that all regulated facilities should ascertain compliance the same way, thus putting no facility at advantage or disadvantage in an effort to demonstrate compliance. Similarly, the UK monitoring regime proceeds from the IPPC

philosophy of using guidance (providing a range of essentially equivalent alternatives) to direct development of permits individualized to a particular facility.

The overall impression from a relatively brief look at monitoring and testing requirements under IPPC (as implemented in the UK) in comparison with US requirements is that both systems impose sufficient sampling and analytic standards to assure a reasonable quality of data. The main differences are that the UK monitoring scope is broader (potentially including monitoring of certain process-related parameters and monitoring of ambient effects beyond facility boundaries<sup>372</sup>), and the UK appears to allow operators greater ease to modify the sources monitored and frequency of monitoring. The permits for the St. Regis and Eastman facilities contained improvement program items related to monitoring. For St. Regis, the facility operator was required to provide better information on monitoring of certain pollutant sources and upgrade certain monitoring equipment (although not as a condition of permit issuance). Correspondence between the facility operator and the EA documented progress in meeting the objectives of the improvement terms, but also revealed that St. Regis considered some of the improvement requirements not practicable at the facility. The EA and St. Regis did not reach final resolution of all monitoring issues before the facility closed. For Eastman, the operator had to review monitoring equipment, personnel, and contractors against MCERTS standards and propose a timetable for achieving full certification (demonstration of certification subsequently provided to the EA).

## Integrated Decision-Making at the UK Facilities

Another feature of integration is that it potentially facilitates mitigation of cross-media effects in instances where pollution control efforts in one media transfer pollution to another media (e.g., using a water-based scrubber to eliminate VOC air emissions produces a wastewater stream with VOCs). Examination of cross-media effects potentially leads to modification of emission reduction strategies to minimize overall releases or public health risk. The Pulp and Paper BREF includes tables that illustrate how employing a particular emission reduction technique affects environmental releases other than at the principal target of the technique. For example, incinerating VOC emissions will consume energy, thus resulting in an adverse effect on energy use and at the same time producing additional air pollutants (e.g., CO, NO<sub>x</sub>). Another BREF on cross-media effects in BAT decisions provides a methodology for weighing environmental tradeoffs, including risk.<sup>373</sup>

Investigation of BAT for the St. Regis and Eastman facilities did not reveal any decisions based on cross-media effects – that is, where a BAT candidate was not required because it would produce other adverse environmental consequences. Rather, most decisions not to reduce or control emissions from certain sources were based on disproportionate costs (assuming EQS and any other environmental trigger levels would not be breached). EA representatives indicated that

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<sup>372</sup> The US CWA allows for monitoring beyond facility boundaries on a case-by-case basis. Receiving water monitoring plans require monitoring for upstream and downstream effects of facility discharge. These are typically state requirements and not many states make extensive use of this authority. The State of California is the one exception – every water discharge permit in California requires a receiving water monitoring plan.

<sup>373</sup> EC, 2006. *Integrated Pollution Prevention and Control Reference Document on Economics and Cross-Media Effects*. [http://www.eper-es.es/data/docs/Fondo%20documental/BREF\\_EFECTOS\\_CROSSMEDIA\\_paraEPER\\_68DD-4C18-830E-5466E34E6C0A.pdf](http://www.eper-es.es/data/docs/Fondo%20documental/BREF_EFECTOS_CROSSMEDIA_paraEPER_68DD-4C18-830E-5466E34E6C0A.pdf), Chapter 2.

they did not know of any truly risk-based BAT decisions involving emissions tradeoffs between different media.<sup>374</sup> In practice, it does not appear that cross-media tradeoffs occur frequently (if at all) in IPPC permits.

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<sup>374</sup> Gray, J. and James T., EA. Personal communication. 30 June 2005.



## 6. POST PERMIT ISSUANCE ACTIVITY

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This chapter looks at the range of activities that follow an IPPC permit determination in the UK – specifically the series of interactions and the relationship between the EA and the operator once an IPPC permit is issued. These later phases of the permitting process – from site visits, inspections and audits to investigations and enforcement are decentralized. That is, they are mainly carried out by EA inspectors from approximately 20 EA area offices.

The success of the IPPC permitting system appears to rest heavily on the relationship between the facility and their area inspector.<sup>375</sup> The area inspector plays many roles – inspector, compliance assistance provider, auditor, consultant, enforcement officer, and communicator. The ability to conduct an inspection one day and present the source with a written warning (equivalent to a US notice of violation or NOV), and then discuss a potential plant modification and what will be needed in an application to vary a permit the next day, depends upon a relationship built on mutual respect and trust. This relationship appears to be important to the smooth operation of the overall IPPC system (from permit application and issuance to compliance assessment, enforcement, and continuous improvement).

### Compliance Assessment

Like many other aspects of the IPPC permitting system in the UK, EA compliance assessment activities and methodologies reflect the principles of “modern regulation” introduced in Chapter 2. As such, the EA’s compliance assessment follows from the following presumptions:

- It is the responsibility of operators to comply with legal requirements and for us [the EA] to assess whether they are complying.
- We [the EA] must balance income and resource for compliance assessment.
- Effort must be allocated according to risk and the potential for outcomes.
- Compliance assessment includes all compliance activities, not just site visits.
- All compliance assessment activities will be documented and reports made available to the operator.<sup>376</sup>

The remaining discussion in this section will outline how the EA translates these principles into practice. There are four main elements of compliance assessment under the IPPC permitting system. These include the following:

- EP OPRA;
- Compliance Classification Scheme (CCS);

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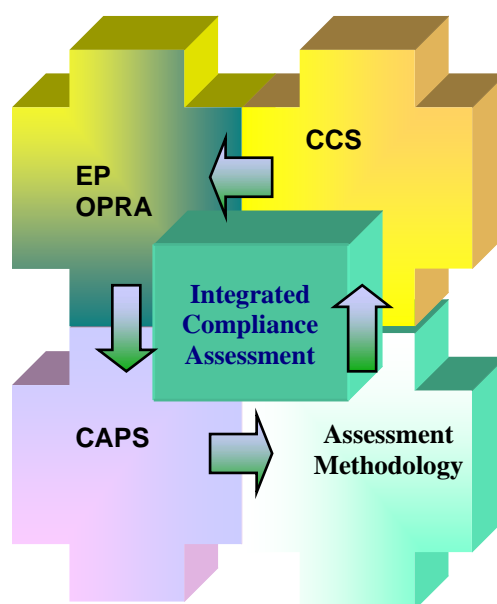
<sup>375</sup> This is an overall impression based on EPA’s observations of EA operations.

<sup>376</sup> EA, 2005g. *Work Instruction: Generic Methodology for Assessing Compliance*.

- Compliance Assessment Plans (CAPs); and
- Assessment Methodology.

Briefly, these four elements work together to form the basis for what the EA terms “integrated compliance assessment.” EP OPRA determines operator fees and consequently the allocation of EA resources for compliance assessment. This resource allocation is then reflected in the CAP. The CCS ensures consistency in scoring any permit breaches, which are then figured into the overall EP OPRA score. Finally, the EA has developed a detailed assessment methodology for the compliance data that forms the basis of the CCS. This approach is illustrated below in Figure 6.1, and followed by a discussion of each element of compliance assessment in more detail.

**Figure 6.1 – Interlocking Pieces of PPC Compliance Assessment<sup>377</sup>**



### ***Role of EP OPRA Scores in Compliance Assessment***

The EP OPRA methodology was introduced and discussed in Chapter 4 as a common, objective yardstick for measuring approximate risk for facilities under the PPC regime. By way of review, an EP OPRA score initially is calculated when a facility operator applies for an IPPC permit, and is based on four facility attributes: complexity, emissions, location, and operator performance. EP OPRA is the mechanism that the EA uses to meet its requirement to recoup the cost of its facility-based regulatory and permitting operations. To do this the calculated EP OPRA score for a facility is monetized through use of a multiplier to determine the facility’s fee for permit determination, or application fee. Initial EP OPRA scores are updated annually after permit determination (issuance), and the updated scores are used to determine the annual permitting

<sup>377</sup> Figure provided by James, T., EA, Policy Manager, 30 June 2005.

subsistence fee for a facility, (using a smaller multiplier than that used for initial permit determination). As discussed elsewhere in the report, the EP OPRA score is also used in other ways, such as for providing a benchmark for the facility itself and for the public, targeting additional sector-wide environmental improvement, and driving better facility performance by using fees as a feedback mechanism.

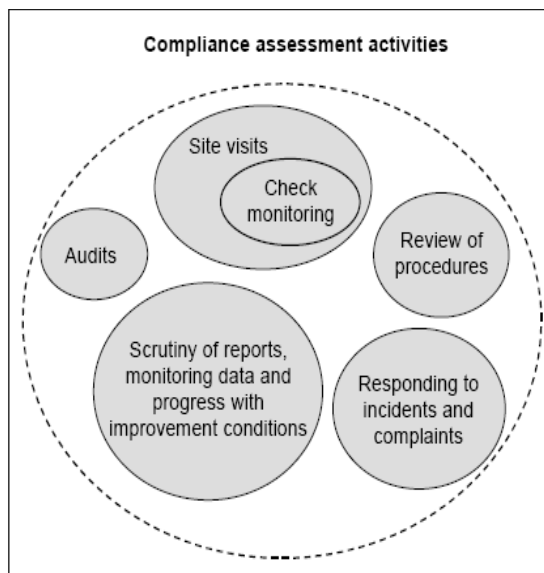
For the purposes of compliance assessment, EP OPRA is used as a means to gauge the level of regulatory effort that will be required to adequately assess compliance at facilities holding IPPC permits. Regulatory effort following permit issuance consists largely of communication and visits by the EA inspector to the facility whether this is an informal exchange or a formal inspection or audit. The frequency of audits and inspections is determined by the EP OPRA score – the higher the EP OPRA score the more frequent inspections and audits will be. EP OPRA scores are also updated on an ongoing basis to reflect the results of audits and inspections. This information is the basis for the fifth attribute of the EP OPRA score that is calculated after permit determination – the facility compliance rating. In addition to updates to reflect facility compliance, EP OPRA scores also can be updated at the request of an operator to take into account changes at a facility affecting one or more of the attributes used in the calculation.

**Compliance Assessment Plans**

The next piece of the integrated compliance assessment matrix is the Compliance Assessment Plan, or CAP. The EA uses the CAP as an internal planning tool to create a strategic framework for undertaking compliance assessment on a sector as well as on a site-specific basis. Development of a CAP ensures that compliance with each permit requirement is checked within a defined period of time and that an appropriate mix of assessment tools is identified along with an initial allocation of EA resources. Resource allocation is based on EA OPRA scores within a sector and/or local area. Compliance assessment tools and activities range from sampling and check monitoring, to full-scale facility audits. The full suite of compliance assessment activities are presented and described in Figure 6.2 and Table 6.1.

Similar to the development of the PPC Permitting Plan described in Chapter 4, the CAP sets out EA regulatory objectives and the desired environmental outcomes and then outlines the various compliance assessment activities that need to occur in order to deliver the outcomes

**Figure 6.2 –  
PPC Compliance Assessment<sup>378</sup>**



<sup>378</sup> Figure taking from EA, 2005f. *Using Science to Create A Better Place: Investigating the Effectiveness of Compliance Assessment Activities*. <http://publications.environment-agency.gov.uk/pdf/SCHO0705BJQD-e-e.pdf>, p. 9.

specified. CAPs were introduced in 2005 first to identify priority outcomes for compliance activities on a sector basis. Site-specific CAPs will be developed in instances where it is necessary to reflect and incorporate local issues, regulatory knowledge and environmental objectives.

**Table 6.1 – Description of EA Compliance Assessment Activities<sup>379</sup>**

<b>Compliance Assessment Activity</b>	<b>Description</b>
Sampling/Check Monitoring	Measurements of inputs, emissions or the receiving environment
Review of reports and data	Review of reports and data submitted by the permit holder, such as emissions and environmental monitoring data, notifications of non-compliances and technical reports.
Procedure Review	An operator may be required to submit procedures to [the EA] for agreement prior to implementation. We may also assess whether procedures referred to in permit applications and the EP OPRA profile are in place and comprehensive.
Site Inspection	Attendance at a site to check compliance with all or some of the permit conditions, or directly applied legislation (other than by check monitoring) using for example visual assessment.
Audit	In depth evaluation of an operator’s ability to comply with all, or parts of, the permit, or directly applied legislation. For example, an audit might include specific reviews of the effectiveness of an operator’s procedures and management system.

**Compliance Classification Scheme**

The CCS is a tool that the EA uses to assure operators that the agency is using a consistent approach to determining EP OPRA scores by assigning each instance of non-compliance to a category based on the potential to cause an environmental impact ranging from Category 4 (has no potential to cause an environmental impact) to Category 1 (has potential to cause a major environmental impact). Categories 2 and 3 fall in between at potentially significant and potentially minor impacts. The CCS applies to all facilities subject to IPPC as well as to a number of other regulatory authorizations and consents that remain outside of IPPC permitting. A common classification scheme across these different regulatory regimes is the basis for a consistent approach. The EA plans on expanding the use of the CCS in the future to cover such areas as emissions trading schemes.

<sup>379</sup> Based on information presented in EA, 2005g, p. 4.

In addition to providing consistency for inputs into determination of the EP OPRA score, the other goal of the CCS is to ensure consistent implementation of the agency's *Enforcement and Prosecution Policy* discussed in Chapter 3. Each of the categories in the CCS corresponds to a type of enforcement response. These are shown in Table 6.2 below.

**Table 6.2 – CCS and Enforcement Response<sup>380</sup>**

CCS Category	Normal Enforcement Response
1	Prosecution
2	Formal Caution or Prosecution
3	Warning
4	Warning

An enforcement notice may be served for any of the CCS categories listed above. In addition each of the normal enforcement responses are informed by the public interest tests stated in the *EA Enforcement and Prosecution Policy*.<sup>381</sup> As a result, the consideration of public interest may influence or change the normal enforcement response, but the overarching goal is to apply formal action by the agency in a more consistent and targeted manner across different regulatory regimes, industrial sectors and geographic areas. Finally, data collected in conjunction with the CCS is used by the EA to identify specific areas and patterns of non-compliance so that together with industry the agency can formulate an overall strategic approach for improvement over time.

### **Assessment Methodology**

The Assessment Methodology provides EA inspectors with a consistent approach to identifying and scoring individual breaches of IPPC permits.<sup>382</sup> These individual scores then become the data input into the CCS. The Assessment Methodology does this by providing a series of illustrative examples and descriptions of typical circumstances for each of the CCS categories, 1-4, for each of the elements of an IPPC permit. In the interest of providing further representation of the scope of IPPC permits and at the same time present a detailed picture of how they are assessed for compliance, each area scored by an EA inspector is listed in Table 6.3.

<sup>380</sup> EA. *Operators Briefing Note: General Principles of the Compliance Classification Scheme*. [http://www.environment-agency.gov.uk/commondata/acrobat/ccsbriefingnote\\_745332.pdf](http://www.environment-agency.gov.uk/commondata/acrobat/ccsbriefingnote_745332.pdf).

<sup>381</sup> Public Interest Factors are outlined in the *Enforcement and Prosecution Policy* (1998) discussed in Chapter 3. These factors include the environmental effect of the offence; foreseeability of the offence; intent of the offender; history of the offending; attitude of the offender; deterrent effect of a prosecution; and personal circumstances of the offender. The 2007 guidance lists several more factors: nature of the offence; financial implications; impact on legitimate business/activities; and impact on EA resources. EA, 2007b. *Guidance for the Enforcement and Prosecution Policy*, Version 17. [http://www.environment-agency.gov.uk/commondata/acrobat/epp17\\_1803748.pdf](http://www.environment-agency.gov.uk/commondata/acrobat/epp17_1803748.pdf), pp. 7-9.

<sup>382</sup> EA, 2005g.

**Table 6.3 – Compliance Assessment Areas**<sup>383</sup>

<b>Permit Condition/Criteria</b>	<b>Issue Description</b>
<b>Permitted Activities</b>	
<i>Specified by permit</i>	Catch-all used to record any issues where the nature and type of activities are not as authorized in the permit
<b>Infrastructure</b>	
<i>Engineering for prevention &amp; control of emissions</i>	Civil engineering designed to prevent or control emissions.
<i>Closure &amp; decommissioning</i>	Issues with sites closed or decommissioned.
<i>Site drainage engineering</i>	Issues associated with site drainage engineering and its effectiveness.
<i>Containment of stored materials</i>	Physical infrastructure aspects of storage.
<i>Plant and Equipment</i>	Issues associated with plant and equipment requirements
<b>General Management</b>	
<i>Staff competency/training</i>	Practical aspects of management as well as training/competency
<i>Operating procedures</i>	Procedural aspects of management and documented systems
<i>Materials acceptance</i>	Materials acceptance issues that include written procedures as well as practical application.
<i>Storage, handling, labeling &amp; segregation</i>	Management issues surrounding the storage and handling of materials and wastes.
<b>Incident Management</b>	
<i>Site security</i>	All and any security issues with both physical infrastructure and its maintenance and management.
<i>Accident, emergency and incident planning</i>	Arrangements operator has for dealing with emergencies, accidents and incident prevention or control (e.g., spill kits, emergency management plans and procedures to deal with spillages and incidents).
<b>Emissions</b>	
<i>Air</i>	Issues with both permitted point source and fugitive emissions to air
<i>Land/groundwater</i>	Issues with both permitted point source and fugitive emissions to land
<i>Surface water</i>	Issues with both permitted point source and fugitive emissions to surface water
<i>Sewer</i>	Issues with both permitted point source and fugitive emissions to sewer
<i>Waste</i>	Waste recovery and disposal issues
<b>Amenity</b>	
<i>Odour</i>	Issues associated with odour
<i>Noise</i>	Issues associated with noise
<i>Dust/fibres/particulates &amp; litter</i>	Issues associated with dust, fibres, particulates and litter
<i>Pests, birds &amp; scavengers</i>	Issues associated with pests, birds and scavengers
<i>Deposits on road</i>	Issues associated with road deposits
<b>Monitoring, Records, Maintenance and Reporting</b>	
<i>Monitoring of emissions and environment</i>	Issues regarding the adequacy of the monitoring system – what and how an operator is monitoring as well as any analytic failings.
<i>Records of activity, site diary/journal/events</i>	Issues associated with requirement to maintain records
<i>Maintenance records</i>	Issues associated with maintenance records that are required by the permit.
<i>Reporting and notifications to EA</i>	Issues associated with operator requirements to report and notify the EA or other bodies of information or events set out in the permit including the means and methods for reporting and notification.
<b>Resource Efficiency</b>	
<i>Efficient use of raw materials</i>	Issues surrounding resource efficiency so that the environmental impact of raw materials use is reduced.
<i>Energy efficiency</i>	Apart from meeting obligations and targets connected with a Climate Change Agreement (overseen by DEFRA), any issues connected with the requirement to take reasonable measures to reduce energy consumption.

<sup>383</sup> Adapted from EA, 2007c. *Methodology for Assessing Compliance (MAC) for the Pollution Prevention and Control (PPC) and Waste management License (WML) Regimes*, p. 7.

Specifically, the Assessment Methodology links each of the above permit conditions/criteria found in Table 6.3 to an appropriate mix of compliance assessment methods, a listing of what evidence would indicate non-compliance, and finally a set of examples or circumstances that illustrate each of the CCS classes from “compliant” to category 1. Use of the Assessment Methodology is qualified by the fact that it is guidance only, and that site-specific factors such as local routes of exposure and particular environmental receptors may increase or decrease the severity of the impact and the resulting CCS classification. What constitutes evidence of non-compliance and compliance and how non-compliance is classified for staff competency and training is presented in Table 6.4 below.

**Table 6.4 – Staff Competency and Training Compliance Classification<sup>384</sup>**

<i><b>Evidence of non-compliance:</b> Any failings in staff competency may result in additional breaches of any permit condition. The root cause of non-compliance can be traced back to overarching management issues and staff competency. Both the impact (e.g., the emission limit failure) and the root cause should be recorded. Documents and records of certified and accredited management systems can be checked for evidence of non-compliance. Discussions with operational staff may reveal issues during audits.</i>	
<b>CCS Class</b>	<b>Typical Observations</b>
Compliant	<ul style="list-style-type: none"> <li>Operator has adequate staff with training, maintenance, and incident procedures in place and these are documented and adhered to (e.g., site accredited by ISO 14001, EMS IIP or with several awards for excellence). Smaller sites have Acorn EMS scheme or excellent written procedures.</li> </ul>
Cat 4 No Impact	<ul style="list-style-type: none"> <li>Site has no technically Competent Management (TCM)<sup>385</sup> because the previous manager had unexpectedly left.</li> <li>Staffing numbers detailed by permit or other relevant documents not being met as required.</li> <li>Lack of understanding/awareness of lower risk permit conditions or other relevant operational documents by key operational staff.</li> <li>Evidence that staff competence is leading to management systems or procedures/guidance not being fully implemented as required by permit.</li> </ul>
Cat 3 Minor	<ul style="list-style-type: none"> <li>Agreed site attendance time not being achieved by TCM.</li> <li>Lack of training or staff awareness causes a breach of a permit condition, which has the potential to become significant in the longer term (e.g., no detailed understanding of which hazardous materials (wastes) can be accepted onto site). Small quantity of non-permitted hazardous waste being accepted at transfer station due to a lack of understanding by site operator.</li> <li>Directors and relevant site personnel not aware of permit conditions and no copy of permit available on site.</li> </ul>
Cat 2 Significant	<ul style="list-style-type: none"> <li>Due to a lack of staff training or awareness a breach of permit conditions occurs with a potential for serious impact on the environment or human health (e.g., dangerous but contained mixing in reaction vessel of incompatible chemicals).</li> <li>Untrained or inappropriately skilled staff given responsibility (by management) to manage a key piece of plant/installation, part of the operational infrastructure or a critical component of the operations that has serious safety or pollution control system implications (e.g., excavation of landfilled waste without prior notification and approval from agency).</li> </ul>
Cat 1 Major	<ul style="list-style-type: none"> <li>Due to a lack of staff training or awareness and/or poor management practice a breach of permit conditions has occurred, having the potential to cause a major environmental impact (e.g., release of chlorine gas to atmosphere due to incorrect plant operation).</li> </ul>

<sup>384</sup> Table reproduced from EA, 2006a. *Compliance Classification Scheme (CCS) Scoring for the PPC and WML Regimes*, pp. 21-23.

<sup>385</sup> TCM is a concept and requirement under waste management licensing regime in the UK.

## Enforcement of IPPC Permits

As was described in Chapter 3, the UK legal framework for the enforcement of IPPC permits has a decidedly different flavor than permit enforcement in the US. Generally, this appears to be the result of three important factors: the organizational structure and authority to allocate enforcement resources where most needed; a different cultural context and mindset; and the enforceable requirements of an IPPC permit itself. This study did not attempt a systematic detailed comparison of UK and US enforcement practices; however, EPA was able to gain certain insights into UK enforcement practices from first-hand observation as well as from discussions with EA personnel.<sup>386</sup>

### ***Enforcement Resources***

The IPPC system appears to involve frequent and flexible inspections. Under the IPPC system, there are three different types of plant visits – inspections, audits, and monitoring assessments – each with its own purpose and scope. The frequency and coverage of these plant visits are directed by several factors – the sector plan, the sector CAP, individual facility’s CAP, a facility’s EP OPRA score, and facility-specific issues such as compliance issues, improvement plan conditions, and environmental concerns. Depending on these factors, a poorly performing facility might have four inspections and two audits per year while a well performing facility might have one inspection per year and a full audit every few years. Monitoring assessments are performed by the EA to evaluate the quality of air monitoring systems. Systems that receive low scores may have EA-performed source testing and EA-installed monitoring equipment to independently verify testing results and monitoring data at the facility’s expense.<sup>387</sup>

The ability of the EA to tailor resources to the specific needs of a sector or individual facility allows for a robust facility oversight system. Each facility has its own assigned area office inspector and each inspector has assigned facilities and a workload that reflects the specific situation of each IPPC facility. Based on interviews with facilities and EA staff, it is clear that the area inspector knows each facility well and plays many roles in the permitting and compliance processes.<sup>388</sup>

### ***Cultural Context and Mindset***

As mentioned in Chapter 3, in the UK the development, implementation, and ultimate compliance with IPPC permits is the result of collaboration and continual dialogue between the facility and the EA. There is an ongoing relationship from permit development through implementation and beyond. While the responsibility for ensuring protection of the environment

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<sup>386</sup> See Appendix F for the details of the 2007 EPA site visits in the UK.

<sup>387</sup> This assessment is aided by what is known as the EA’s Operator Monitoring Assessment (OMA) Audit designed to strengthen the agency’s auditing of operator’s self-monitoring arrangements. Initially OMA will be applied to the monitoring of air emissions, but in time it will be applied to monitoring of emissions to additional environmental media. The use of OMA results in a numeric score that (1) reflects assessment of the operator’s self-monitoring using a consistent and transparent approach; (2) drives monitoring improvement; and (3) allows the EA to target and prioritize its check monitoring program.

<sup>388</sup> Interviews conducted 16-27 July 2007 at EA and IPPC facility offices. See Appendix F for details.



as a whole rests with the operator of a facility, the EA plays an active part in achieving this outcome through its role in the permitting process, oversight, and enforcement. The approach taken under IPPC focuses more on operator behavior than on end-of-pipe standards. It requires the EA to know more about facility operation and to dictate the “behavior” and techniques that the EA wants to see employed. The EA must effectively agree that the actions and behavior that a facility will undertake are what is necessary to comply with BAT. In the US, permitting authorities tend to dictate the standards that facilities must meet, and then take a hands-off approach to facility compliance. In other words, the actions, techniques, technology, or behaviors that a facility chooses to employ are almost solely at the facility’s discretion.

This agreement regarding behavior logically translates to the EA attitude that its compliance and enforcement objective is more to “put things right” rather than punish.<sup>389</sup> The facility operator is not solely responsible for determining what techniques and behavior would be employed to protect the environment; the EA is also invested in seeing that these techniques and behaviors are implemented. As a result, more collaborative approaches are used to get the desired outcome more quickly. There is a minimal use of formal enforcement to achieve compliance. In general, the UK approach appears to place less emphasis on enforcement actions as a means for improving performance than is the case in the US. This difference may be explained in part by the lack of authority in the UK to issue administrative penalties, which gives enforcement personnel fewer options than in the US.<sup>390</sup>

The EA also believes that public information about facility performance can help to influence behavior. Much information about facility performance is promptly made available to the public in the public register.<sup>391</sup> This includes the following:

- Excess emissions reports (PPC Permit Schedule 1 – Notification of abnormal emissions<sup>392</sup>) and notices of breaches of permit terms;
- Inspection reports (Compliance Assessment Report (CAR1)<sup>393</sup> and documentation of any enforcement actions;
- Quarterly and annual reports, including monitoring reports and periodic reporting on improvement program milestones;

<sup>389</sup> Mitchell, D., EA Solicitor. Personal communication. 17 July 2007.

<sup>390</sup> As discussed in Chapter 3, *The Regulatory Enforcement and Sanctions Bill* introduced in the UK House of Lords on November 8, 2007, will give regulators access to sanctions, specifically “fixed monetary penalties or discretionary requirements including variable monetary penalties, compliance notices, restoration notices, stop notices and enforcement undertakings.” These powers would be available, but *not* automatically or immediately – “The Bill does not confer the powers immediately but allows for them to be granted by area...as and when regulators are ready for and request them. A regulator...would need to have evidence that [they] (the regulator) are operating in a way that is consistent with the proportionate, risk-based approach recommended in the Hampton review before being able to proceed.” (BRE. Regulatory Services *e-UPDATE*, Issue 3. <http://www.berr.gov.uk/files/file44567.pdf>.) As use of sanctions in the UK develops, it will be useful to see how they affect enforcement practices.

<sup>391</sup> A complete listing of all documents required to be placed in the public register appears in Chapter 3.

<sup>392</sup> See Appendix L for a copy of PPC permit Schedule 1.

<sup>393</sup> See the CAR1 form in Appendix M.

- EP OPRA scores; and
- Permit variations.

In addition, an annual summary of enforcement actions against each IPPC facility as well as highlights of sector and facility-specific performance are published in annual EA Spotlight on business reports (Spotlight reports).<sup>394</sup> Like the US TRI annual report, a company's or facility's appearance in the Spotlight report can affect both the public perception of the company and the subsequent performance of the facility.

### ***Enforcing IPPC Permit Conditions***

In some respects, enforcement of IPPC permits appears to be quick, transparent, and open to the public. Breaches of permit conditions found during inspections or audits can receive prompt enforcement action. The EA inspectors can provide the facility with the results of the inspection in writing, including the identification of any violations, at the end of the inspection or audit. In the US, inspection reports are usually held as "enforcement confidential" and facilities often do not hear about alleged violations until a formal enforcement notice is served. In the UK, follow-up written enforcement notices, if needed, are usually sent to the facility within three days of the inspection and such notices are then placed in the public register. In the US, formal enforcement notices often take months, if not years, and public access to information on pending enforcement actions is limited.

All of the terms and conditions of the IPPC permit are enforceable as a legal and practical matter. While there tend to be fewer numerical limits in IPPC permits than in US permits, with most of the permit conditions being ones that dictate behavior, the EA has no problems enforcing any of the conditions. In fact, the EA prefers to bring enforcement action for the underlying behavior (actions or lack of actions) that lead to exceedences of numerical limits (e.g., failure to train employees properly, failure to adequately maintain equipment), adopting a philosophy that correcting behavior is key to ensuring continuous compliance with numerical limits.

While the EA does not currently have administrative penalty authority,<sup>395</sup> it can prosecute violators and can also suspend a permit (or portions thereof), or revoke a permit entirely if violations are not corrected. While US permitting authorities have the legal authority to revoke permits for cause, the process is difficult and seldom used, and there is no authority to simply suspend a permit or portion thereof. In the UK, egregious violations and patterns of violations can result in prosecution, and past convictions and admissions of guilt can be introduced as evidence of poor performance.

It is not clear whether the quick, transparent, and open UK enforcement process is the result of not having administrative penalties. Since there is no financial repercussion for lesser violations, facilities do not appear to dispute violations as a matter of course, but rather focus on returning to compliance so that formal prosecution or permit suspension will not be necessary.

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<sup>394</sup> The EA publishes annual Spotlight reports, which assess operator performance. Using the data gathered in the PI and by EP OPRA for individual facilities, the report shows statistics on all 11 sectors, focusing on the most recalcitrant companies in addition to those who performed well.

<sup>395</sup> See Chapter 3.

## Permit Review and Variations

### Review

Article 13 of the IPPC Directive and the PPC Regulations implementing the directive, require regulators to periodically review and, where necessary, to update existing permit conditions. Periodic review on a regular basis, is a safe guard to prevent permits from inching towards obsolescence in situations where changes in techniques and environmental conditions occur gradually and so do not trigger the review required by regulation (e.g., when there are substantial changes in BAT).<sup>396</sup>

To date, the EA has focused on completing permit determinations for all facilities under the IPPC regime. However, with that task essentially completed in 2007, the EA is now turning much of its attention to the periodic permit reviews required by the directive.<sup>397</sup> The reviews will be conducted by sector on a priority basis determined by risk and availability of revised and reissued BREF documents.<sup>398</sup> The PPC Regulations do not specify the frequency of this regular review and so leave it to the regulator (the EA) to determine. On average over time the EA expects periodic permit reviews will be conducted about once every four years.<sup>399</sup>

In addition to a regular periodic review, regulatory requirements specify that permit reviews must be carried out where (1) existing limit values need to be revised or new emission limits need to be included,<sup>400</sup> (2) substantial changes in BAT make it possible to further reduce emissions without excessive cost, or (3) the operational safety of the facility requires other techniques to be used. As a result of a permit review, the regulatory authority may need to initiate a permit variation (revision) procedure. Permit variations also may be initiated by an operator in anticipation of making physical/operational changes at a facility.

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<sup>396</sup> IPPC permits contain the following condition that is used as the basis for periodic permit review: “The Operator shall, within 6 months of receipt of written notice from the Agency, submit to the Agency a report assessing whether all appropriate preventive measures continue to be taken against pollution, in particular through the application of the best available techniques, at the installation. The report shall consider any relevant published technical guidance current at the time of the notice which is either supplied with or referred to in the notice, and shall assess the costs and benefits of applying techniques described in that guidance, or otherwise identified by the Operator, that may provide environmental improvement.” (PPC permit, Eastman Company UK Limited, Peboc Division, Llangefni Chemical Works, Anglesey, Wales. Permit No. BU 7537. November 2004, p. 5.)

<sup>397</sup> The new EA National Permitting Service, or NPS, (noted in Chapter 2) that began operations in November 2007 is responsible for the permit review process.

<sup>398</sup> The details of the EA permit review process are in the process of being developed. Consequently, there is currently no written documentation that outlines and describes the process and procedures (James, T., EA, Policy Manager. Personal communication. 12 February 2008). As a result, EPA was not able to include a full discussion of the process in this report.

<sup>399</sup> James, T., EA, Policy Manager. Personal communication. July 2007.

<sup>400</sup> “[This] circumstance might arise if new evidence emerges that at least one emission from a particular installation, although compliant with the ELV in the permit, is nevertheless causing significant pollution. Or the evidence may relate to an emission which is not subject to an ELV in the permit. This evidence may come from improved scientific understanding, from environmental monitoring or from the regulator’s investigation of complaints by the public, but whatever the source it will be for the regulator to judge whether it is sufficiently significant for the relevant conditions of the permit to be reviewed. The scope of permit reviews in these circumstances should be limited to the pollutants of concern and to the features of the installation giving rise to the pollution” (DEFRA, 2005b., pp. 63-64).

## Variations

Permit variations were covered in some detail in the discussion of operational flexibility in Chapter 5. To summarize, permits may be varied or changed at the request of either the facility or the EA to reflect changes at the facility, changes in BAT, or changes in facility performance. Permit revisions may tighten or loosen permit obligations, but must continue to reflect BAT for the facility. Importantly, numerical limits must reflect the actual facility performance and not simply the BREF guidance values.

Significant changes to the physical plant or operations at an existing facility are addressed by modifying (varying) the IPPC permit. Non-significant changes (called “minor operational changes” in IPPC permits) that do not require variation of the existing permit terms are authorized by a standard permit condition provided that the facility operator gives 14-day advance notice to the regulator and the regulator does not object.<sup>401</sup> Moreover, according to the definition of “change in operation” in UK guidance “many changes will not have consequences on the environment and will therefore not require notification”<sup>402</sup> – and presumably can be made at the facility operator’s discretion. However, a significant change requiring a formal variation notice cannot actually begin operation until the permit variation process has been completed. The determination of whether a change is significant is made by the EA, usually by the area inspector, so frequent and candid communication between the facility operator and the inspector regarding changes at the facility is critical to maintaining compliance with the permit and ensuring that permit variations are completed by the time a physical or operational change is ready to begin operation. The Multi-Product Protocol, or MPP, discussed in Chapter 5 is a process whereby classes or categories of changes are anticipated and so are pre-authorized in the permit, subject to defined conditions.

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<sup>401</sup> This is addressed by the standard permit condition “Minor Operational Changes” (under PPC Regulation 16), which states that the operator must notify the EA of any proposed change in operation and “shall seek the Agency’s written agreement to any minor operational changes...by sending to the Agency: written notice of the details of the proposed change including an assessment of its possible effects (including waste production) on risks to the environment from the Permitted Installation; any relevant supporting assessments and drawings; and the proposed implementation date. Any such change shall not be implemented until agreed in writing by the Agency. As from the agreed implementation date, the Operator shall operate the Permitting Installation in accordance with that change, and relevant provisions in the Application shall be deemed amended.” (PPC permit, Eastman Company UK Limited, Peboe Division, Llangefni Chemical Works, Anglesey, Wales. Permit No. BU 7537. November 2004, p. 5.)

<sup>402</sup> DEFRA, 2005b, p. 106.

## 7. IPPC RESULTS

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Having described the framework for permitting under IPPC as well as the actual permitting process, permit provisions, and post-permit issuance activities in the preceding chapters, this chapter discusses some of the outcomes of IPPC permitting. Since many of the efficiencies gained and potential challenges faced from the regulator's perspective can be seen throughout the descriptions of IPPC permitting in the previous chapters, this chapter focuses on environmental outcomes in the UK and impacts to the UK regulated community. The chapter also discusses IPPC results from the point of view of the EC and its review of the directive, and the resulting proposal for new EU legislation on industrial emissions.

### Environmental Outcomes in the UK

Initial review of available data suggests that IPPC has contributed to some environmental improvement in the UK.<sup>403</sup> The UK EA reports that IPPC and its predecessor, IPC, have had significant impact on the environmental performance of industry in the UK by “controlling emissions to all three environmental media, helping companies to identify pollution prevention and resource efficiency opportunities, requiring companies to follow structured environmental improvement programmes, and raising the profile of environmental issues in the corporate boardrooms.”<sup>404</sup>

Quantifying and measuring industry performance and environmental results and attributing these results directly to IPPC is difficult, however. IPPC permitting in the UK was just completed in October 2007. No overall assessment of environmental results from IPPC permitting has been completed to date and the bulk of environmental results may not be realized until several years into the regime. Additionally, it is difficult to attribute various environmental improvements specifically to IPPC since other legislation and additional factors could also contribute to increased efficiencies and emission reductions across the UK. As the discussion below demonstrates, however, it is clear that the UK has seen environmental improvements since the first IPPC permits were issued in 2001. Additionally, it is worth noting that the UK hopes as part of future efforts to incorporate measurement and evaluation of IPPC permitting in order to assess actual outcomes of the system.<sup>405</sup>

#### ***Regulated Sites Performing Better***

As described in Chapter 4, EP OPRA scores operators from A (best) to E (worst) based upon risks and hazards associated with five attributes – facility complexity, emissions, location, operator performance, and compliance. For operator performance, operators are required to operate effective environmental management systems, manage environmental risks, optimize natural resource use, be responsible for monitoring, and achieve improvements contained in the

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<sup>403</sup> EPA did not conduct an independent assessment of data to support this conclusion. What follows is a discussion of selected data compiled and reported by the UK EA.

<sup>404</sup> Gray et al., p. 5.

<sup>405</sup> James, T. “Integrated Regulation in the UK.” Lessons from the United Kingdom’s Integrated Permitting Experience: Exploring New Directions for Environmental Permitting in the US. Washington, DC. 25 October 2007.

permit improvement program.<sup>406</sup> In 2001, under IPC, slightly more than 50 percent of sites achieved band A or B for operator performance. In 2004, EP OPRA scores for operator performance improved for IPPC permitted sites – 44 percent of IPPC facilities achieved a band A rating, and slightly less than 80 percent received band A or B ratings. Eight percent were band D or E.<sup>407</sup> By 2006, 51 percent of companies regulated under IPPC were rated A, and fewer than 2 percent rated E.<sup>408</sup> EP OPRA scores show that improvements are being made in environmental operations and management.

It is also worth noting that facilities have a monetary incentive for improving their EP OPRA scores since permit fees are directly linked to the score, with poorer performing, higher risk sites paying more.<sup>409</sup> In an EA interview with a pulp and paper mill, the operator reported that the automatic fee increase linked to non-compliance and a higher EP OPRA score resulted in the facility and operators focusing on good performance and compliance. In this case, a direct link appears between changes in IPPC fees and improved environmental practice.<sup>410</sup>

### ***Fewer Pollution Incidents***

Every year the EA assesses the number of serious pollution incidents. Serious pollution incidents have been falling steadily since 2001 and were the lowest on record in 2006. Serious pollution incidents nearly halved in 2006 compared to 2000.<sup>411</sup> This decline may be associated with the integrated controls and the increased emphasis on operator responsibility and management systems required under IPPC.

### ***Fewer Releases to the Environment***

While emissions reductions cannot be directly linked to IPPC permits, data gathered in the Pollution Inventory (PI) and presented in the EA's annual Spotlight reports show general reductions in emissions to air, water and land as well as in waste transfers since IPPC permitting began in 2001.<sup>412</sup> The PI data shows that for companies making the transition from IPC to IPPC, environmental benefits were for the most part realized during the transition period itself. More significant reductions in emissions are likely to occur in sectors new to integrated permitting, such as food and drink.<sup>413</sup>

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<sup>406</sup> EA, 2005d. *Pollution Prevention and Control: EP OPRA-Based Charging Scheme and Guidance 2005/06*. [http://environment.info/commondata/acrobat/ppc\\_0506\\_scheme\\_753443.pdf](http://environment.info/commondata/acrobat/ppc_0506_scheme_753443.pdf).

<sup>407</sup> EA, 2005e. *Spotlight on Business Environmental Performance in 2004: Doing the Right Thing*. <http://publications.environment-agency.gov.uk/pdf/GEHO0705BJHA-e-e.pdf>, pp. 4-5.

<sup>408</sup> EA, 2007d. *Spotlight on Business Environmental Performance in 2006: Putting the Brakes on Climate Change*. <http://publications.environment-agency.gov.uk/pdf/GEHO0707BMMX-e-e.pdf>, p. 9.

<sup>409</sup> EA, 2005e, p. 39.

<sup>410</sup> EA, 2005f, p. 50.

<sup>411</sup> EA, 2007d, p. 9.

<sup>412</sup> The Pollution Inventory (PI) collects information on chemical and radioactive emissions from EA-regulated industrial sites in England and Wales. This inventory includes emissions from point sources, non-point and fugitive sources, and focuses mainly on air emissions. EA, 2004a. *Pollution Inventory Data Report: Trends and Analysis 1998-2001*. <http://www.environment0agency.gov.uk/pi>, p. 12.

<sup>413</sup> DEFRA, 2007a. *Mid-term Review of the UK's Implementation of the Pollution Prevention and Control Regulations*. <http://www.defra.gov.uk/environment/ppc/background/pdf/ppcregs-review.pdf>, p. 7-4.

**Air Emissions.** From 2001 to 2004, EA-regulated sites reduced releases of most air pollutants, including 1,3-butadiene, CO, PM10, and non-methane volatile organic compounds (NMVOCs), though not always steadily.<sup>414</sup> Sites reduced lead and SO<sub>2</sub> emissions by almost half between 2000 and 2006.<sup>415</sup> NO<sub>x</sub> levels have remained fairly steady since 2000, mainly due to increased economic output of power stations.<sup>416</sup> Changes in air emissions often reflect production or practice changes, such as implementing improved abatement techniques, controlling fugitive emissions, or process improvements. They may also result from plant closures, output reductions, changes in reporting, or a change in raw material costs and composition.<sup>417</sup>

**Water Emissions.** While available information on water releases is less detailed than that on air emissions, the EA reports that most releases to water by EA-regulated sites decreased between 2002 and 2006.<sup>418</sup> A 2007 review of IPPC permitting in the UK also found that many operators have improved monitoring of water releases because of IPPC.<sup>419</sup> Although improved monitoring systems may result in an increase in pollutants being reported, it should also ultimately contribute to better control of pollutant releases to water. What impact IPPC will have on water releases should become clearer as documentation and emissions tracking increases.

**Land Emissions.** Although data is lacking to track land emissions, the UK PPC Regulations provide incentive for operators to minimize land impacts. One such incentive is the requirement for industry to return sites to a “satisfactory state” at the earliest opportunity or when operations cease. The EA interprets a “satisfactory state” as restoring the site to its condition at the time of permit issuance.<sup>420</sup> One environmental consultant highlighted this requirement, emphasizing the importance of minimizing land pollution during the facility’s lifetime to save money later.<sup>421</sup> Again, how this requirement will play out in practice remains to be seen.

**Waste Production and Management.** While various pieces of legislation govern waste disposal and management in the UK, IPPC has contributed to decreases in waste production and increases in waste recovery since its implementation. IPPC appears to have had a direct effect on resource efficiency in companies and sectors new to integrated permitting, such as the food and drink industry.<sup>422</sup> The annual Spotlight reports show that waste generated overall by EA-regulated companies has actually increased since 2000 because there has been an increase in the number of sites reporting to the EA and an increase in the number of waste types to report, but that the proportion of waste recovered has also increased since IPPC permitting began in 2001.<sup>423</sup> A review of resource efficiency under IPPC showed that between 1998 and 2002, regulated companies had made a 25 percent reduction in waste disposal and a 50 percent increase in waste

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<sup>414</sup> EA, 2005e, pp. 7-8.

<sup>415</sup> EA, 2007d, p. 8.

<sup>416</sup> EA, 2007d, pp. 8-9.

<sup>417</sup> EA, 2004a, p. 6.

<sup>418</sup> EA, 2007d, p. 9.

<sup>419</sup> DEFRA, 2007a, p. 7-4

<sup>420</sup> DEFRA, 2007a, p. 5-5.

<sup>421</sup> Murfin, J. “IPPC: Cost or Benefit?” Presentation at IChemE Seminar. Hull, UK. 9 Mar 2005.

<http://www.ttenvironmental.co.uk/library.htm>.

<sup>422</sup> EA, 2004c. *Spotlight on Business Environmental Performance in 2003: Greener Business is Good Business*, p. 4.

<sup>423</sup> EA, 2007d, p. 7.

recovery, but that other factors such as cost savings had more impact on resource efficiency than did IPPC.<sup>424</sup>

## Impacts on the UK Regulated Community

As described in Chapter 2, IPPC permitting has been influenced by a broader “better regulation” effort in the UK to drive regulatory programs toward greater efficiency and effectiveness. UK “better regulation” is committed to regulating only when necessary and in proportion to risk, reducing administrative burden, and rationalizing inspection and enforcement priorities for industry.<sup>425</sup> The program works to ensure that regulation in the UK is fair, effective, and necessary – in fact, regulatory agencies in the UK are audited against a government-wide target to reduce administrative burden by 25 percent. The outcome of the EA’s audit may influence whether or not it is awarded the authority to levy administrative penalties against violators.<sup>426</sup>

As a part of the “better regulation” agenda, the UK IPPC system streamlines the permitting process by reducing the number of regulators and regulatory regimes industry must comply with.<sup>427</sup> The EA believes that the all-in-one regulatory packaging of IPPC, together with ongoing consultation between the EA and regulated facilities, will result in lower administrative costs for industry.

Overall there is a limited amount of data available to document impacts of IPPC permitting on the regulated community in the UK. In April 2007, DEFRA completed a *Mid-term Review of the UK’s Implementation of the Pollution Prevention and Control Regulations* (Mid-term Review) to assess costs and benefits during the first five years (2000-2005) of IPPC implementation in the UK (England, Wales, Northern Ireland, and Scotland).<sup>428</sup> The Mid-term Review aimed to identify additional costs and benefits of IPPC beyond those that would have existed had IPC continued. The costs assessed in the review include policy and administrative costs to industry as well as the regulatory burden on facilities and small businesses.

The review was based on results of a survey of companies’ views and experience under IPPC. The Mid-term Review reports that there were significant limitations in the data and resources available for the study and that the findings need to be considered with this in mind.<sup>429</sup>

Additionally, it is difficult to attribute costs and benefits directly to IPPC because it is hard to determine what would have happened if IPC and other previous regulatory systems had continued or what results are due to other regulations and factors. It is also important to note that

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<sup>424</sup> EA, 2004b. *IPPC and Resource Efficiency: A Review of Progress*. [http://www.environment-agency.gov.uk/commondata/acrobat/resource\\_efficiency\\_826850.pdf](http://www.environment-agency.gov.uk/commondata/acrobat/resource_efficiency_826850.pdf).

<sup>425</sup> Kellett, p. 174.

<sup>426</sup> The EA was audited by the UK BRE and National Audit Office between September and December 2007. The review, *Effective inspection and enforcement: implementing the Hampton vision in the Environment Agency*, was published in March 2008 and is available at [www.nao.org.uk/publications/EA\\_Hampton\\_report.pdf](http://www.nao.org.uk/publications/EA_Hampton_report.pdf).

<sup>427</sup> Gray et al., p. 16.

<sup>428</sup> DEFRA, 2007a, pp. 1-2 – 1-3.

<sup>429</sup> Mid-term Review information is based on responses to a postal survey sent to all installations that had IPPC permits by the fall of 2005 as well as information from the EA’s PI and case studies. It is important to note that the response rate to the survey was low, so there are significant limitations to the data presented in the review.



while many of the costs of IPPC are being realized in the initial years of implementation, many of the benefits will be recognized over the long term. Given these caveats, the following describes some of the administrative costs and benefits associated with IPPC based on the Mid-term Review and other available sources.

### ***Industry Participation in BREF and Technical Guidance Development***

The EC and the EA involve industry in BREF and UK technical guidance note development respectively. In doing so, they seek to develop more effective guidance and address sector-specific issues and concerns early on.<sup>430</sup> The Mid-term Review surveyed industry about their participation in the BREF and technical guidance development processes. Of the approximately 20 percent of respondents who answered the questions about these processes, 85 percent said they were involved in the BREF process via their trade association and 90 percent were involved in technical guidance development also via the trade association for their sector. On average, companies reported spending \$6900 on BREF development and \$4000 on technical guidance development.<sup>431,432</sup>

In spite of the initial cost companies incur to participate in the BREF and technical guidance development processes, the expectation on industry's part is that early participation and familiarization with requirements as a result of participating will result in decreased future compliance costs.

### ***Permit Application Costs***

The primary costs to the operator as a result of IPPC permitting are the costs associated with preparation of the IPPC application as well as the application fee. The IPPC application is more comprehensive than its predecessor because of the additional factors regulated under IPPC – energy efficiency, raw material use, environmental impact, accidents, noise, odor and site condition – and reportedly more costly to prepare. The Mid-term Review asked respondents to report on the cost of preparing their IPPC application broken down by in-house staff costs, third-party consultants and other costs. On average, companies spent a total of \$97,000 on application preparation, including \$35,000 on in-house staff costs, \$43,000 on third-party consultants and \$19,000 on other costs associated with application preparation (e.g., administrative, advertising, site survey, environmental survey).<sup>433</sup> Costs associated with application preparation vary widely, however, likely depending on the complexity of the facility and corresponding complexity of the application, as well as on the proportion of application effort that was out-sourced.

EPA learned from discussions with EA and facility staff during the July 2007 UK site visits that a number of operators used consultants to help prepare applications during the first round of IPPC permit applications and that the consultants were generally expensive. Although facilities in sectors new to IPPC permitting used consultants more than sectors that had been covered by

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<sup>430</sup> Gray et al., p. 13.

<sup>431</sup> The UK's reported financial figures, expressed in Great Britain pounds (GBP), were converted to US dollars using an approximate exchange rate of 1.0 GBP to 2.0 US dollars.

<sup>432</sup> DEFRA, 2007a, pp. 3-1 – 3-2.

<sup>433</sup> DEFRA, 2007a, pp. 3-2 – 3-5. Other costs associated with application preparation were only reported by 29 percent of respondents.

IPC, the EA commented that with the tools provided by the EA and the in-house management resources each operator should have, operators should be able to prepare adequate applications without the need for consultants. Additionally, EA staff expressed that given the required content of applications (e.g., content on management systems, improvement programs, etc.), applications prepared mostly by consultants were not as good as applications prepared directly by operators, and that contributions by consultants were more valuable in technical areas such as source testing, modeling and preparation of site plans.<sup>434</sup>

In addition to application preparation costs, operators also pay an application fee. As introduced in Chapter 4 and discussed further in Chapter 6, the application fee is determined by the facility's EP OPRA score that is initially calculated when the facility operator applies for a permit. Basically, the EA determines the application fee, or fee for permit determination, by using a multiplier to monetize the facility's EP OPRA score.<sup>435</sup> EP OPRA scores vary, and consequently application fees, based on the facility's complexity, emissions, location, and operator performance.

**BAT Assessment.** Costs associated with the BAT assessment portion of the application vary widely among sectors but make up a substantial proportion of overall application costs. Companies with large-scale combustion processes spend more on BAT assessment, for example, than do smaller food and drink companies. According to the Mid-term Review, the average costs for the BAT element of the application were approximately \$34,000, broken down into \$17,000 for a facility's in-house staff and \$17,000 for consultants.

Application of BAT over the long term, however, may result in pollution prevention opportunities, raw materials use reductions, and improved energy efficiency, potentially resulting in cost savings for facilities. For those operators surveyed as part of the Mid-term Review, responses indicate that IPPC leads to improved resource efficiency for operators previously regulated under IPC and for operators regulated for the first time by integrated pollution regulation. Most companies recognized benefits in resource efficiency or waste minimization as a direct result of IPPC permitting, resulting in direct cost savings.<sup>436</sup>

### **Annual Fees**

As described above for application fees, annual charges or subsistence fees for IPPC permits are also levied based on the facility's EP OPRA score. EP OPRA scores are updated annually and the updated scores are used to determine the annual fee. The fee system is constructed to reflect the EA's level of regulatory effort required for ongoing compliance assessment.<sup>437</sup> For facilities, this means the higher the EP OPRA score, the higher the annual fee. Ideally, this promotes up front, proactive investment by companies in order to avoid high fees for those aspects of the EP OPRA score that can be varied or improved on by the operator. As mentioned earlier in this chapter, in an EA interview with a pulp and paper mill, the operator reported that the automatic

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<sup>434</sup> See Appendix F for a detailed list of EA and IPPC facility staff interviewed during EPA's July 2007 site visits.

<sup>435</sup> See the EA *Pollution Prevention and Control EP OPRA-based Charging Scheme and Guidance 2007/08* for details on charges (<http://www.environment-agency.gov.uk/business/444669/587179/1734110/506594/?version=1&lang=e>.)

<sup>436</sup> DEFRA, 2007a, pp. 2-4 – 2-5.

<sup>437</sup> Gray et al., p. 13.

fee increase built into EP OPRA for non-compliance resulted in the facility and operators focusing on good performance and compliance.<sup>438</sup> This is an example of an IPPC tool – EP OPRA – resulting in its desired effect and prompting improved environmental practice and positive, preventative behavior. In cost terms, the facility is choosing to invest in good management practices in order to avoid increased fees and expenses down the road.

### **Costs Required by Operators to Meet Permit Conditions**

The Mid-term Review reports that although operators incur annual ongoing costs of regulation under IPPC (i.e., management time, monitoring, reporting), operators would have incurred similar costs under IPC. However, 56 percent of respondents reported that they incurred (or will incur) substantial costs associated with making changes to the design or operation of their facilities to comply with IPPC BAT.<sup>439</sup> Of those 56 percent, the average reported cost for changes were approximately \$25,000 in one-time costs and \$20,000 annually. The range in costs was high, and some respondents reported cost savings. Additionally, 70 percent of respondents reported that they would incur on average \$7000 in one-time costs and \$4700 in annual costs to change monitoring systems to comply with BAT, and 63 percent reported that they would incur on average \$1800 in one-time costs and \$1600 in annual costs on modifications to reporting systems to comply with BAT.

### **EA Contact and Facility Assistance**

IPPC requires one permit per facility for all media; therefore, a facility with an IPPC permit usually must only deal with one or few permitting (and compliance) contacts at the EA. IPPC facilities indicated early on in IPPC implementation that they benefit from this EA single-point-of-contact created by IPPC. Facilities reported that this promotes a good working relationship between the facility and the EA as well as a more efficient permitting process.<sup>440</sup>

Facilities also benefit from the EA facility-friendly IPPC website. A 2005 review of the administrative burden of regulation on business in the UK called the EA website “particularly useful” and found that facilities are able to use the EA website to find regulatory information specifically tailored to their needs.<sup>441</sup> The provision of clear guidance and responsive EA contacts should theoretically decrease the time facilities have to spend developing applications and interpreting rule requirements, thus resulting in administrative cost savings. The EA also intended with development of the website to reduce the need for facilities to use outside

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<sup>438</sup> EA, 2005f, p. 50.

<sup>439</sup> DEFRA, 2007a, pp. 3-22 – 3-27.

<sup>440</sup> Facilities referenced benefits of the single-point-of-contact system in a 2001 survey of facilities implementing IPPC (EA, 2001. *Review of the PPC Application Process*, p.5). As described in Chapter 2, the EA organizational structure for permitting has changed since 2001; however, the same benefits of few EA contacts for each facility still theoretically apply because each facility still has only one permit to deal with for all media. In addition to the 2001 survey, personnel at IPPC-regulated facilities interviewed by EPA in 2007 reported that the single point-of-contact improves relationships and efficiency in working with the EA. See Appendix F for a listing of EPA’s 2007 interviews with IPPC facility staff.

<sup>441</sup> Hampton, P., 2005. *Reducing Administrative Burdens: Effective Inspection and Enforcement*. [http://www.hm-treasury.gov.uk/budget/budget\\_05/other\\_documents/bud\\_bud05\\_hampton.cfm](http://www.hm-treasury.gov.uk/budget/budget_05/other_documents/bud_bud05_hampton.cfm), pp. 5, 37.

consultants to prepare applications, which should help cut back on application preparation costs for facilities in the future.<sup>442</sup>

### ***Improved Environmental Management***

EA sources have observed that operators in some UK sectors have experienced a “psychological shift” and have taken on greater responsibility for managing environmental effects and impacts in response to IPPC requirements.<sup>443</sup> The surface coating industry, for example, which has been relatively less regulated in the past, has made significant strides in pro-actively addressing environmental performance through sector-wide collaboration and coordination. In addition, based on an EPA site visit to a pharmaceutical facility in Wales, it was clear that the comprehensive nature of IPPC requirements and the focus on management techniques had elevated and expanded the role of the EMS at the facility.<sup>444</sup> Increasingly the operator had relied on the EMS as a framework for managing the environmental effects of its operations. Multiple employee project teams had been established to focus on elements such as internal audits, and improvements in water and energy use efficiencies. In essence, the operator reported that increasingly the EMS “wraps around the PPC permit,” a fitting confluence of operator-based management and regulatory requirements.

### ***Competitiveness***

Many respondents to the Mid-term Review survey reported the perception that IPPC has had a negative impact on their competitiveness in the UK, Europe and abroad, although the review did not attempt to measure actual competitiveness effects.<sup>445</sup> Survey respondents expressed concern that IPPC application costs are unnecessarily high and that the IPPC regulations have a negative impact on their ability to be competitive. Small and medium-sized companies feel that high costs associated with IPPC permits place them at a relative competitive disadvantage compared with larger companies.<sup>446</sup> On the other hand, businesses identified cost-savings from increased resource efficiency as a result of IPPC, and half of the respondents claimed that IPPC has helped them access new markets.<sup>447</sup>

Contrary to the perception reported by operators responding to the Mid-term Review survey, some others believe that IPPC has also been important in countering some of the argument that increased environmental regulation poses a threat to economic competitiveness.<sup>448</sup> As described in Chapter 3, IPPC acts as a “tool box” to coordinate existing and deliver new EU environmental regulatory requirements, consequently diminishing the traditional argument from business that additional legislative mandates impose undue burden.<sup>449</sup> Over the last six to seven years, rather than having to create additional new and separate requirements, upwards of ten new pieces of EU legislation have been accommodated by and incorporated into the IPPC framework. In this

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<sup>442</sup> Observation based on EPA site visits to the UK in July 2007. See Appendix F for site visit details.

<sup>443</sup> James, T., EA, Policy Manager. Personal communication. 2 May 2007.

<sup>444</sup> Observations based on EPA site visits to the UK in July 2007. See Appendix F for site visit details.

<sup>445</sup> DEFRA, 2007a, p. 5-2.

<sup>446</sup> DEFRA, 2007a, p. 5-3.

<sup>447</sup> DEFRA, 2007a, p. 5-6.

<sup>448</sup> See for instance, Network of Heads of European Environmental Protection Agencies, 2005.

<sup>449</sup> James, T., EA, Policy Manager. Personal communication. 2 May 2007.

sense, the IPPC framework has thus proven to be an efficient “delivery” mechanism for the steady flow of new requirements mandated by the EU.

## EU IPPC Review and Future Direction of Directive

Although IPPC permitting was scheduled to be complete at the end of 2007 and it is early to fully realize and understand all the outcomes of IPPC permits, the EU and UK are already seeking improvements to address shortcomings of the current legislation and to strengthen the approach to integrated permitting. In December 2007 following a two year IPPC review, the EC proposed new IPPC legislation to address industrial emissions.<sup>450, 451</sup> Key issues and shortcomings identified by the EC during the review process are discussed below along with a brief overview of the proposed new IPPC Directive.

### *IPPC Review Issues and Discussion*

At the end of 2007, the EC completed a two-year review process of IPPC. The objective of the review was to improve functioning of the directive as well as interaction of the directive with other industrial-emissions related legislation without altering the fundamental principles and ambition of the present directive. To inform the review process, the EC commissioned a series of projects, including an assessment of IPPC implementation by member states, a study of incentives to improve the environmental performance of IPPC installations beyond regulatory compliance, a study of the interaction of IPPC and emission trading schemes, an assessment of IPPC impacts on competitiveness, and data gathering and impact assessment for possible amendments to and widening the scope of IPPC.

The review identified key issues with the directive and six main areas for action at the EU Community level.<sup>452</sup> The section below describes the six issues, each with a summary of the UK response so that the EC issues can be understood in the context of the UK experience.

**BAT-based permitting and the role of BREFs.** The review identified two main issues associated with BAT-based permitting and the role of BREFs. The first is a concern that some member states have over-used the flexibility provided by Article 9(4) in the directive, which states that ELVs in permit conditions should be based on BAT but without prescribing specific techniques or technology, and *while taking into consideration technical characteristics of the installation, its geographical location, and the local environmental conditions*. The concern with Article 9(4) and BAT-based ELVs raises the question of whether or not ELVs are being set appropriately, i.e., whether competent authorities use too much site-specific latitude in setting BAT-based ELVs. The EC believes this is the case and that overuse of Article 9(4) has meant that emissions are not being controlled as much as they could be. In response to this issue, the UK suggests that the EC seek to improve the approach used to set BAT-based ELVs for individual installations by providing additional guidance and clarity on the proper interpretation of Article 9(4) rather than eliminate it through EU-wide mandated ELVs.<sup>453</sup>

<sup>450</sup> This new IPPC legislation would not come into force until 2012.

<sup>451</sup> As discussed in Chapter 2, the UK enacted new integrated permitting legislation – the EP Regulations – in April 2008.

<sup>452</sup> DEFRA, 2007b, p. 1.

<sup>453</sup> DEFRA, 2007b, pp. 2-5.

A second related BAT-based issue relates to the EC concern that there is too much undocumented deviation from BAT as defined in BREFs. The UK supports additional clarification of the role of BREFs but believes that the current status of BREFs should remain unchanged – conclusions on BAT contained in the BREFs should not be binding; each competent authority should determine BAT for each installation.<sup>454</sup> To deal with deviations from BAT in the BREFs, the UK suggests that member state regulators could be required to prepare permit decision documents like the UK does.<sup>455</sup> The UK also believes that BREFs would be more effective if they contained narrower ranges for BAT-associated ELVs.

**Streamlining of interactions between the IPPC Directive and other environmental legislation.** A key issue that emerged from the IPPC review is the need to streamline IPPC with other environmental directives. The UK supports revisions of the IPPC Directive to, at a minimum, incorporate the directives on large combustion plants, waste incineration and titanium dioxide.<sup>456</sup> Streamlining should address clarity and coherence on thresholds, definitions and technical prescriptions. The UK believes that streamlining IPPC and other environmental directives would serve to make IPPC more strategic – similar to the EU air, water and waste framework directives.<sup>457</sup>

**Streamlining of monitoring and reporting.** This issue has two main components – reporting by member states to the EC and reporting by operators to regulators – and deals with burdens related to different monitoring requirements and periods under different directives as well as requirements member states feel are unjustified.<sup>458</sup> Although the UK does not find EC reporting requirements especially burdensome, the UK welcomes effective streamlining. Moreover, while the UK agrees that monitoring requirements for operators should be simplified and streamlined, the UK believes that competent authorities can best determine appropriate monitoring at individual installations. The UK would also support less prescriptive monitoring requirements, provided operators maintain necessary environmental protections.<sup>459</sup>

**Compliance and enforcement framework.** With regard to the IPPC compliance and enforcement framework, the EC's review investigated whether the frequency and stringency of periodic permit review and the frequency and rigor of inspections are adequate. The UK believes that the permit review requirements currently outlined in Article 13 of the directive provide competent authorities with a clear framework for periodically reviewing permits, and that setting a minimum permit review frequency could set a norm and deter more frequent and necessary reviews from occurring. The UK suggests that member states should instead be provided guidance on a risk-based approach to inspection and periodic permit review.<sup>460</sup> Additionally, the UK feels that consistency can be ensured through guidelines and information

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<sup>454</sup> DEFRA, 2007b, p. 4.

<sup>455</sup> Radway, A. EA, Policy Adviser. Personal communication. 17 July 2007.

<sup>456</sup> DEFRA, 2007b, p. 9.

<sup>457</sup> Radway, A. EA, Policy Adviser. Personal communication. 17 July 2007.

<sup>458</sup> DEFRA, 2007b, pp. 10-11. An example of unjustified requirements are monitoring and reporting requirements

<sup>459</sup> DEFRA, 2007b, pp. 10-11.

<sup>460</sup> DEFRA, 2007b, p. 12.

sharing through the EU network for Implementation and Enforcement of Environmental Law (IMPEL).<sup>461,462</sup>

**Scope of the legislation.** This issue includes the question of whether the scope of IPPC should be extended to include more industrial activities and clarification of what is covered by the activity definitions in the current directive. The UK position is that other activities (e.g., waste treatments) should only be included if it is justified by environmental risk, if the activity can be regulated consistent with IPPC principles, and if IPPC would make a difference.<sup>463</sup> Regarding clarification of activity definitions in the current directive, the UK supports studies to address the issue and encourages clarification by means of amendments to the directive.<sup>464</sup>

**Emission trading of NO<sub>x</sub> and SO<sub>2</sub>.** Emissions of NO<sub>x</sub> and SO<sub>2</sub> from IPPC-regulated installations are significant and legislation is sometimes inefficient at driving the most cost-effective solutions. The IPPC review called attention to the potential need to add provisions to the directive to enable member states to set up emissions trading schemes for these pollutants. The UK feels such provisions would provide needed flexibility for dealing with these emissions and is in support of adding them.<sup>465</sup>

### ***Proposal for a New IPPC Directive on Industrial Emissions***

As mentioned at the outset, the IPPC Review process culminated in the EC's proposal for a new directive on industrial emissions designed to strengthen the provisions already in place and to further reduce industrial emissions throughout the EU. The proposal aims to improve health and the environment, create a more level playing field across the EU, and simplify current legislation. Specifically, the draft legislation proposes the following:<sup>466</sup>

- Combine seven existing directives related to industrial emissions into a single clear and coherent directive, including the IPPC Directive, the Large Combustion Plants Directive, the Waste Incineration Directive, the Solvents Emissions Directive and three directives on titanium dioxide. Not only will this improve the coherence of existing legislation, but it will also reduce administrative burden by combining permit requirements, simplifying permit issuance and streamlining reporting.
- Improve and clarify the concept of BAT in order to ensure a more coherent and EU-wide application of BAT. The new legislation will clarify specific cases when deviations from

<sup>461</sup> IMPEL is an informal network of environmental authorities from EU member states that seeks to promote more effective application of environmental legislation across the European Community through encouraging the exchange of information and experience and the development of environmental legislation, with particular emphasis on European Community legislation. See the IMPEL website for more information (<http://ec.europa.eu/environment/impel/index.htm>).

<sup>462</sup> Radway, A. EA, Policy Adviser. Personal communication. 17 July 2007.

<sup>463</sup> Radway, A. EA, Policy Adviser. Personal communication. 17 July 2007.

<sup>464</sup> DEFRA, 2007b, p. 13.

<sup>465</sup> Radway, A. EA, Policy Adviser. Personal communication. 17 July 2007.

<sup>466</sup> EC, 2007. *Questions and Answers on the Commission's Proposal for the Revision of Industrial Emissions Legislation in the EU.*

<http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/07/623&format=HTML&aged=0&language=EN&guiLanguage=en>.

indicative BAT are acceptable and will require justification and documentation. This will help resolve concerns raised during the IPPC review related to the overuse of Article 9(4) as described above.

- Introduce minimum provisions on environmental inspections of installations, the review of permit granting conditions, and reporting of compliance. These will address issues raised during the IPPC review by ensuring consistency in the frequency and stringency of permit review and facility inspections.
- Extend the scope of the legislation to include additional industrial activities and clarify the scope of certain activities already covered by the existing legislation.

Although it is not covered in the new legislation, the EC will also continue to address issues raised during the IPPC review related to the limitations on the use of NO<sub>x</sub> and SO<sub>2</sub> emission trading systems within the current legislation. The EC will continue to build on experience from the EU's carbon trading scheme to develop possible EU-wide rules for NO<sub>x</sub> and SO<sub>2</sub> emissions trading. Finally, the EU will continue to review IPPC permitting, and the proposed new legislation will make its way through the process ending with passage by the European Parliament. The process will take several years, and the EC will continue to support member states to improve the implementation of existing legislation until the new legislation is passed.



## 8. OBSERVATIONS AND FINDINGS

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The preceding chapters of this report detail the UK EA integrated permitting system from a design perspective and in practice. In this chapter, we offer a number of broad observations and more specific findings on the distinctive elements of the UK system – ways in which it differs from the environmental permitting system in the US and ways in which it parallels the US system.

We hope that these observations and findings will be of interest to US permit practitioners and regulatory and policy experts. They are intended to stimulate dialogue with our stakeholders that will (1) foster a better understanding and assessment of the potential benefits and drawbacks of an integrated system in the context of the US permitting regime, (2) spur additional research and analysis on integrated permitting approaches, and (3) explore opportunities for applying lessons learned and aspects of the IPPC approach and methodology in the US.

In conclusion, we emphasize that we have studied only a few permits and, therefore, ask the reader not to attribute to these observations and findings more certainty than warranted. It is possible that in practice the differences between the UK and US systems are not as great as they appear from formal structures and our limited exposure to permitting operations. Nevertheless, we believe that our research supports at least preliminary conclusions that may inform both policy innovation and further research. As an introduction to the detailed and comparative findings that follow, we first offer a few observations on key attributes of the UK system (also summarized in the box below).

### Observations

Most obviously unique to the IPPC permitting system is the **comprehensive and multi-media focus** on a facility's entire environmental footprint. While this is important to highlight, what might be more important is to understand the operational aspects of this holistic focus – in particular the permitting and programmatic tools the UK uses to address all environmental impacts of a facility's operations. For example, the UK developed and uses a cross-cutting, multi-media electronic environmental assessment and appraisal tool (or H1, described in Chapter 4) to generate a comprehensive picture of a facility's environmental footprint and to identify the best overall environmental option or BAT to incorporate in a facility's integrated permit. The IPPC approach also requires analyses and actions to **prevent pollution first** and only thereafter to reduce it (such as through emission limits and technology-based controls). An IPPC permit also puts a great deal of emphasis on ongoing **improvement over time** (rather than on compliance with static requirements). An IPPC permit both reflects the current performance of a facility, and through such requirements as implementation of management systems, acts as a forcing mechanism for continuous improvement.

A major defining aspect of the UK system is its **sector-based approach**. The UK manages and organizes the environmental regulation and the implementation of permitting and compliance assessment on a sector basis. Whether it is issuing standard-setting guidance or setting priorities for individual permits or facility inspections, sectors are the basis for action.

Another key distinction in the regulation of a UK facility’s environmental footprint is a shift **in responsibility from the regulator to the facility operator**. In the UK, a facility operator is responsible for translating national technical guidance in order to demonstrate facility-specific BAT in the IPPC permit application for all aspects of facility operations and for ensuring that the facility operates consistent with the application and all other permit requirements. The UK system also focuses heavily on **facility management**, which is reflected in permit requirements and OPRA scoring. IPPC permits address BAT for facility management, which includes implementation of a management system, and OPRA considers the quality and effectiveness of the management system in its scoring.

This report described earlier IPPC permits as dynamic and living documents – it is also notable that the entire UK IPPC system is designed to enable and facilitate **adaptation to address new environmental issues, techniques and approaches**. Current UK PPC legislation has incorporated and continues to incorporate an increasing number of EU legislative mandates into one overarching system. BAT guidance documents are also slated to be updated periodically with the latest developments to BAT. Given these vital aspects of the IPPC system, it will be interesting from both an academic and practical standpoint to watch and see how the system continues to evolve.

<b>Key Attributes of the UK’s Integrated Permitting System</b>	
❖	Seeks the best practical environmental option to prevent and minimize harm to the environment as a whole.
❖	Addresses the entire environmental footprint of an industrial facility including non-traditional environmental impacts (e.g., raw material use, energy use and efficiency, noise, vibration, and groundwater contamination) through enforceable permit requirements.
❖	Focuses permit obligations on sustainable, pollution prevention oriented operator behavior as the primary driver for facility environmental performance.
❖	Uses a single permit to address all aspects of a facility’s environmental footprint.
❖	Establishes facility-specific permit requirements based on EU/UK guidance.
❖	Uses sector-based strategic planning and management to regulate and permit industrial facilities.
❖	Requires the operator to assume increasing levels of responsibility towards managing and reducing environmental impacts.
❖	Requires operators to continuously seek and as feasible implement opportunities for improving overall environmental performance.
❖	Uses a scoring system that reflects facility-specific “risk” (the potential for adverse environmental impacts) to set permit fees, determine compliance/enforcement priorities, to manage agency workload and resources, to establish facility and sector benchmarks and thus create incentives for improved performance.
❖	Includes public access to a wide variety of information about facility performance, including inspection reports, permit variances, facility “risk” scores, prosecutions, as well as prompt and complete public disclosure of every permit transgression.
❖	Relies on frequent communication and a consultative and advisory relationship between the regulator and operator through all phases of the permit process from permit development to compliance and enforcement.
❖	Designed to assimilate and adapt to changes, such as new legislative mandates, technological developments, and facility performance changes.
❖	Addresses ongoing pressures to rationalize and optimize use of both agency and industry resources.

## Findings

Through our research and analysis, we have not sought to judge which permitting system is better overall, nor have we attempted to measure the performance of either the UK or the US system. Indeed, it was beyond the scope of this study to assess the many factors and variables that affect performance and ultimate environmental outcomes. Additionally, each system is itself too complex to make a simplistic determination that one or the other is superior. Each system has also developed and continues to operate in a very different social, historical and political context. Rather, the intent of this report is to learn about the UK integrated approach in its entirety, understand how the permitting process works, and identify lessons or pathways for improving the US permitting system.

In an effort to capture and highlight the lessons gleaned from this study, the findings below compare and contrast different aspects of the UK and US permitting systems. The findings are grouped under broad organizing concepts, and within each finding the UK and US systems are compared and/or contrasted. (The US aspects are shown in italics.)

### ***UK Integrated System Uses Single Standard-Setting Concept to Set Limits and Address Pollution Prevention and Sustainability***

1. The permitting system in the UK, as well as the governing EU IPPC Directive, takes a **comprehensive and pollution prevention-oriented approach** to environmental protection, using end-of-pipe controls where pollution prevention and management controls are not sufficient or practicable. The IPPC system seeks to achieve a “high level of protection for the environment as a whole” by looking broadly across a facility’s entire footprint at all environmental impacts. *In contrast to the UK system, US environmental permitting is directed by media-specific environmental statutes, focusing primarily on separate impacts of specific pollutants on individual media. Each US statute operates independently, with relatively little comprehensive, national direction by overarching statutes.*
2. Implementation of the IPPC system is based on a **single standard-setting approach, BAT. The BAT concept – the most effective and advanced stage of techniques and their associated performance ranges designed to achieve a high level of protection for the environment as a whole – applies to standard-setting across all environmental media.** In order to facilitate the determination of BAT for all permit applications, **the UK has developed a set of cross-cutting tools** (e.g., sector and horizontal technical guidance (in many cases derived from EU BREFs) and, in particular, the H1 tool). *In contrast, US media-specific environmental statutes and their corresponding programs each have a distinct basis and definition for their standards. In the US, cross-cutting multi-media tools and methodologies are rare.*
3. On a sector basis, EU BREFs outline BAT for all aspects of facility operation. BREFs result from a process of negotiation and consensus among stakeholders that considers EU-wide variations in industry operations and economics. **The BREFs often include multiple candidate techniques considered compatible with the concept of BAT and their expected emission and resource consumption levels (often ranges that represent higher performing facilities).** The purpose is to provide general indications of what should be

considered reference points for determining BAT-based permit conditions. **Individual member states and/or individual permit writers are required to translate performance expectations laid out in the BREF to individual facility permits, taking into account the objectives of the IPPC Directive – to first prevent and then reduce pollutant emissions to achieve a high level of protection to the environment as a whole.** *In many cases, US technology-based standards fall within BAT performance ranges. The one possible exception to that is a US CAA standard invoked for areas with poor air quality that may fall at the top end or exceed BAT performance ranges.*<sup>467</sup>

4. Facility operators in the UK, as part of the permit application, must address, implement, and report on **pollution prevention opportunities and sustainable resource use**, such as raw material substitution, water use reductions, and energy efficiency improvements across the entire facility. *Such considerations are generally a voluntary overlay in the US where the emphasis is on meeting single media performance standards.*

### **Regulation of Whole-facility Footprint is Foundation of UK Permits**

5. Under IPPC, **a single permit addresses all aspects of a facility’s environmental footprint.** For instance, one permit for the entire facility includes conditions designed to prevent or reduce air, water, and land emissions; manage, recover, and dispose of waste; address sustainability (e.g., energy efficiency, water, and raw material use); and decommission operations. *In contrast, the US relies on separate media-specific permits for air, water, and waste, which in some cases include conditions that address only certain portions of a regulated facility’s operations. As such, several permits may be needed for any one US facility, each focusing on individual media and the impacts of specific pollutants; sustainability or pollution prevention factors are often not conditions of the permit itself.*

### **UK Permits Tailor Standards to Facility-Specific Conditions**

6. UK standards or BAT for all environmental aspects of a facility are determined through the permit issuance process. Although certain presumptions of what constitutes BAT are set forth in the EU BREFs and UK technical guidance, final BAT determinations for an individual facility can vary from these presumptions based on facility characteristics and local conditions. For example, BAT-based numeric limits (ELVs derived from sector benchmarks) may be adjusted in a permit to reflect site-specific conditions. This includes both BAT-based limits adjusted to reflect environmental quality standards or local geographic conditions (e.g., depletion of a local aquifer) and facility-specific characteristics and conditions (e.g., equipment and technology already in use at the facility). **In essence, the UK permit writer considers and reconciles facility-specific conditions with sector-wide BAT indicated in the BREF or UK technical guidance.** Using this approach, IPPC permitting is able to mesh local and facility-specific conditions with sector-wide considerations. *By contrast US technology-based standards are established through national regulations applying broadly to sectors, with some accommodation of sizes and types of facilities within a sector – but not down to the level of an individual facility. US regulators*

<sup>467</sup> This is a reference to US CAA LAER, a highly demanding, “best in class” standard based on the lowest emission rate achieved in practice and unique among US environmental standards, LAER is generally imposed without regard to cost.

may make adjustments to national standards within a permit based on environmental quality considerations; but except under certain circumstances, such standards cannot be changed through permitting to take into account the circumstances of an individual facility.<sup>468</sup>

7. In the UK existing facilities not operating to BAT indicated in UK technical guidance may be subject to **legally binding improvement program permit conditions**, which are tailored to the individual facility and move the facility towards (but not necessarily always as far as) the indicated BAT standards. *IPPC improvement program conditions do not have a direct counterpart in the US permitting system; the closest analogue would be regulatory compliance dates (set several years out from promulgation of new standards), but these are not facility specific.*
8. Individual facility operators in the UK **may not be required to meet BAT indicated in national UK technical guidance over the timeframe of a permit's improvement program**. Given certain conditions at a facility (e.g., layout of the physical plant), it simply may not be reasonable or feasible for an operator to install the indicated BAT within the time limits of an improvement program (typically three years). *Absent individually applied for and negotiated regulatory or permit flexibility (available on a very limited basis), requirements for compliance with US national and most state regulatory standards are generally fixed and absolute.*
9. The facility-specific nature of UK BAT determination (and the fact that IPPC permits reflect current facility performance) means that **facilities that are capable of not only achieving but surpassing BAT indicated in the UK technical guidance, will be required to do so for the relevant and applicable aspects of facility operation**. *By contrast, US facilities are not legally subject to requirements for performance beyond the national or state standards.*
10. **Both the IPPC and US systems require facilities to further reduce emissions and discharges in the event that such releases have unacceptable environmental impacts**, such as causing or contributing to a violation of an ambient air or local water quality standard.
11. **UK facilities must be in compliance with permit terms once an IPPC permit is issued; however, compliance deadlines for BAT are not mandated** by UK IPPC legislation. Sector-specific permit *application* deadlines are set in the PPC regulations, but subsequent application determination (i.e., permit issuance) schedules are not legally binding. As a result, compliance deadlines vary based on individual facility circumstances (including those associated with improvement program conditions). *For the most part, US regulatory standards contain pre-determined and exact deadlines.*

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<sup>468</sup> Case-by-case determinations of permit limits under the CAA NSR program can take into consideration facility characteristics. However, such determinations create new source-specific limits that can be no less stringent than applicable regulatory standards, which also continue to apply. Note that the adjustment of standards to reflect facility characteristics is distinct from the tightening of permit limits to ensure attainment of environmental quality standards; the latter is done both under IPPC and under most US permitting programs.

## **UK Permits Require Ongoing Focus on Continual Improvement**

12. An IPPC permit is a living document **that both reflects the current performance of a facility and also serves as a forcing mechanism for continual improvement.** Importantly, permit limits must reflect the actual facility performance and not be limited by the BREF benchmark values. Beyond current performance, IPPC permit conditions that require implementation of an environmental management system and ongoing scrutiny of material inputs drive operators to continually seek and where feasible, implement performance improvements – conditions designed to progressively minimize a facility’s environmental impact.<sup>469</sup> *In contrast, a US permit typically contains nationwide, sector-specific emission limitations. Compliance with these set limits is the objective. Therefore, there generally is no requirement for continuing to improve performance beyond applicable emission limits. However, at the federal and state level, voluntary programs exist that may motivate companies to perform beyond regulatory compliance. In addition, some US companies challenge themselves to reach superior, sustainable outcomes based on perceived advantages in the competitive market and internally-driven corporate stewardship objectives.*
13. Regulators both at the EU and UK level also have an **ongoing responsibility to improve – to keep BAT (standard-setting) technical guidance documents up to date and consistent with the latest developments and advances in BAT techniques and technologies.** *Similar expectations are mandated by US statutes and are carried out through the national rulemaking process. National rulemaking in the US typically entails significant transaction costs.*<sup>470</sup>

## **UK Manages Environmental Permitting on a Sector Basis**

14. **Sectors play a significant role in the IPPC regulation of industrial emissions both in the EU and in the UK.** Sectors are the basis for the delivery of integrated and multimedia standards for IPPC (through EU BREFs and sector-specific UK technical guidance on BAT). Additionally, in order to make the IPPC permitting effort more manageable, the UK required (in the PPC regulations) a phased, sector-based schedule for IPPC permit applications and demonstration of BAT. *In a number of cases (e.g., CAA MACT and CWA Effluent Guidelines standards), the US also uses sectors in the delivery of regulatory requirements, but on a media-specific and sometimes even on a pollutant-specific basis. With very limited exceptions, roll-out of multiple (media-specific) standards in the US is not coordinated across a sector.*<sup>471</sup>
15. **At a strategic level, the UK sets regulatory, permitting and compliance assessment priorities on a sector basis through the use of sector planning.** The EA (ideally) begins the permitting process with the creation of a sector plan that focuses broadly on the

<sup>469</sup> The IPPC permit requirements that drive the ongoing improvement referenced in this finding should not be confused with IPPC improvement program conditions that are confined to specific compliance milestones over a finite time period.

<sup>470</sup> Additional inquiry and research may determine whether or not the process for updating IPPC BAT guidance is any less cumbersome or timelier than the US rulemaking process. As mentioned in Chapter 4, the EC has (relatively recently) initiated the BREF review process for a half dozen or so sector BREFs.

<sup>471</sup> One exception is the 1998 Cluster Rule which promulgated air and water standards for the pulp and paper sector simultaneously (63 FR 18504 and 63 FR 42238).

significant environmental risks posed by industry activities and on long-term performance targets and metrics designed to drive sector-wide improvement over the next 15 years. PPC sector permitting plans translate sector plans to priorities for individual permits. Compliance assessment plans outline similar sector-wide strategy and priorities for compliance assessment activities for a sector and sometimes for a geographic area. *Using sectors as an overarching strategic planning and management tool for industrial regulation and permitting is limited in the US – often driven by relatively narrow (media-specific) federal program (sometimes voluntary) or state interests. At the federal level, sector-based (multi-media) compliance assistance is common, and while special enforcement initiatives target whole sectors, these tend to focus on individual media and sometimes only on certain types of pollutants. Some states use a multimedia, sector-based approach to regulate and assist businesses in certain sectors; however, these programs focus on very small sources in a limited number of sectors and do not involve issuing individual permits.*<sup>472</sup>

### **UK Legal and Permitting Structure is Flexible and Fluid**

16. UK PPC **legal authority is less prescriptive and detailed** than corresponding legal authorities in the US. The PPC Act incorporates by reference the IPPC Directive and other national pollution authorities, not specifying detailed requirements as would typically be seen in US statutes. Moreover, even the PPC regulations do not contain the sort of complex detail that is found, for instance, in the US CAA. While not a part of UK legal authority, sector-specific detail on BAT is contained in non-binding guidance – the BREFs and UK technical guidance developed by the EA. The result is additional technical discretion for the EA – *discretion not provided EPA or state agencies in the US.*<sup>473</sup>
17. **The UK PPC legal framework has a greater capacity to incorporate new requirements quickly.** Since enacted, the PPC framework has successfully absorbed and implemented ten new pieces of EU legislation. This trend continued with enactment of the next generation of environmental permitting regulations (the EP Regulations) in April 2008. *By contrast, the US has no overarching environmental statute that frames and delivers new requirements – thus often no straightforward and comprehensive means to address new knowledge and environmental priorities.*<sup>474</sup>
18. In permit applications under IPPC, facility operators must propose BAT for the various site activities and propose improvement programs for complying with the indicated BAT, if not

<sup>472</sup> More information on these state programs, referred to as the Environmental Results Program, can be found at <http://www.epa.gov/permits/erp/index.htm>.

<sup>473</sup> It is interesting to note that from the point of view of the EC, this discretion and other flexibility provided by the integrating permitting system does not come without some cost. As discussed in Chapter 7, the EC has considered making the BREFs legally binding as well as withdrawing the flexibility granted by Article 9(4) of the IPPC Directive (discussed in findings 5-9) due to the concern that some member states are not realizing the full potential of IPPC in controlling industrial emissions.

<sup>474</sup> In the US, new knowledge and priorities must be incorporated into the existing medium-specific legal structure through an often cumbersome process (e.g., the CAA was amended in 1990 to provisions, among other things, to address CFCs, expand regulation of hazardous air pollutants, and add an operating permit program. In addition, the CAA establishes a schedule for when new requirements for reducing PM<sub>2.5</sub> emissions would be incorporated into Title V operating permits. The PM<sub>2.5</sub> standards were promulgated December 18, 2006; if CAA schedules are met, Title V operating permits will be reopened and revised to incorporate new emission limits around May 18, 2015.)

already met. Where such proposals ultimately are accepted by the permitting authority – the EA, the final permit may reference pertinent sections of the application rather than develop separately composed requirements that reflect BAT. Thus, many of the **detailed permit conditions may appear in the application rather than in the permit itself, thus seemingly, IPPC integrated permits are often relatively brief documents.** *In the US, permit documents and requirements are generally self-contained with the exception of requirements incorporated by reference, such as reference test methods and start-up, shutdown and malfunction plans (under CAA Section 112). US permits are also generally more voluminous, especially when considering the combined length of US air, water and waste permits.*

### ***New Sources, Existing Source Modifications, and Permit Changes are Treated Differently than in the US***

19. For a new “greenfield” source, an IPPC permit is not required until the source begins operation. **There is no permit or review required prior to beginning construction** (i.e., the facility operator does not obtain a construction permit). As a practical matter, however, most new sources in the UK apply for their IPPC permit well before operation is scheduled to begin, and often well before construction actually begins, so that BAT requirements can be ascertained prior to committing resources to construction. *Construction permits are not required by the US water permitting program, but by contrast, the US air permitting program has an extensive pre-construction permit program, which means that permits must be obtained before construction begins.*
  
20. A new facility in the UK will normally be expected to comply with or go beyond BAT indicated in the BREF or UK technical guidance. For most aspects of facility operations, an existing facility will be able to operate using BAT techniques and at BAT performance targets. In some cases and for certain aspects of facility operations existing facilities may not be able to operate at the indicated BAT at the time the permit is issued. Where techniques or performance levels fall significantly short of the indicated BAT, a facility-specific improvement program may be required to bring performance up to (or as close as is feasible to) indicated BAT levels. Despite this allowance for some variation at particular existing installations, **the presumption under IPPC is that all facilities, new and existing, are subject to BAT standards.** *In the US, it is typical for separate federal standards to be set for new and existing facilities (where both types of facilities are regulated), with new facility standards being the more stringent and roughly on a level with IPPC BAT performance ranges. As in the UK, new facilities must meet standards upon startup, while existing sources will be given time to install controls to meet applicable standards. However, particularly in the air program, some existing facilities may be subject to little or no regulation, despite the fact that new facility counterparts are subject to a federal standard.*<sup>475</sup>

<sup>475</sup> For example, under the US CAA program for “criteria” air pollutants, states are tasked with implementing programs to assure compliance with criteria pollutant ambient air quality standards. States with relatively clean air may not need to regulate existing facilities, or may not regulate them rigorously, in order to meet these ambient standards. Another example of the US approach to regulating new sources versus existing sources is the program for hazardous air pollutants under section 112 of the CAA. EPA establishes sector specific standards for both existing sources and new sources. Under this program, there is no requirement for existing sources to improve performance to the level of a new source.



*In general, the US federal system does not require existing facility upgrades in areas of good air quality, unless an existing source makes a modification.*

21. **UK permits may be changed at the request of either the facility or the EA to reflect changes at the facility, changes in BAT, or changes in facility performance.** Permit revisions can tighten or loosen permit obligations but must continue to reflect BAT for the facility. *In the US, permit modifications are not generally initiated by the permitting authority to reflect changes in facility performance.*
22. Generally, an operator at an IPPC permitted facility must notify the EA of any proposed change in operation before it is put in effect, following an assessment of the change's effects on the environment. **The determination of whether a facility change requires a permit variation is made by the EA, usually by the area inspector.** *In contrast to the UK system, the US air permitting system includes complex applicability provisions and thresholds to determine what permits are required before physical (construction) or operational modifications may occur.*

### **UK System Fosters High Expectations and Shared Responsibility by Operators and Regulators**

23. Fundamentally, under the IPPC system facility operators are expected to manage the entire footprint of a facility. **The onus is on the operator (in the permit application) to propose and demonstrate BAT for all environmental impacts of facility operations** (*rather than leave it exclusively to the regulator to prescribe what sources and emissions must be controlled, as is often the case in the US*). This includes BAT for preventing and minimizing environmental discharges; properly managing, maintaining, and operating their facility; minimizing energy and raw material usage; and minimizing waste (reduce, reuse, recycle, and dispose of properly). Furthermore, **on an ongoing basis, operators must also identify, and where feasible, implement performance improvements.** *The US system does require facilities to comply with emission limits for air pollutants, discharge limits for water pollutants, and to properly handle, store, and transport waste. However, there is no US legal obligation to do better than compliance with applicable standards, even if a facility is capable of doing better. For various business (or other) reasons, some US facilities engage in footprint reduction activities that go beyond traditional compliance with air, water, or waste regulations. (Of course, these footprint-related activities are not usually permitted.)*
24. UK integrated permits also include **the requirement of implied BAT whereby facility operators are expected to prevent or reduce emissions from an activity even if that activity is not explicitly covered by a permit condition.** *Generally, US facility operators have relatively limited obligations beyond the need to meet emission standards, and do not have to identify and address or control sources left unregulated or residual environmental effects.*
25. Cumulatively, the comprehensive regulatory requirements and expectations under the IPPC system **are designed to promote a stewardship ethic** among facility operators. *In contrast, most attempts to influence stewardship behavior in the US stem from federal and/or state*

*voluntary programs, company or industry association initiatives, international business standards, or citizen group pressures – and are distinctly extra-regulatory.*<sup>476</sup>

26. Under the EA IPPC system, **the EA is actively involved in both setting the desired environmental outcomes as well as in helping to ensure the desired behaviors.** *Under the US system, governmental agencies establish the desired environmental outcomes, but then take a hands-off approach to how facilities actually comply with their environmental obligations.*<sup>477</sup>
27. UK **permit writers must be equipped to deal with all environmental effects** addressed under IPPC and also must be able to sufficiently understand the technical aspects of a facility/sector that bear on BAT determinations. On a facility-specific basis, EA permit writers both set performance targets and evaluate techniques used to achieve targets. UK regulators are also expected to stay abreast of new developments in BAT. This level of broad expertise – sometimes a result of prior experience in industry – *is not typically required of US permit writers, where permits are media-specific and not usually subject to determination of facility-specific emission limits (i.e., technology-based performance standards are established nationally, are not subject to change, and only need to be properly identified in the permit).*<sup>478</sup>
28. The **success of the IPPC permitting system relies on effective and robust relationships**, in particular the relationship between the facility and the local area inspector who plays many roles – inspector, compliance assistance provider, auditor, consultant, enforcement officer, and communicator. This relationship appears to be the “grease” that keeps the overall IPPC system running smoothly. *In contrast, US inspectors generally do not play this varied a set of roles or develop as robust a relationship with facility managers.*

### **UK Compliance and Enforcement Model Emphasizes Consultation and Change in Underlying Behavior**

29. The EA expects **that each and every obligation in an IPPC permit will include adequate testing, monitoring, and recordkeeping – certain information is reported quarterly and/or annually to the agency.** This includes all hard numerical emission limits, as well as soft obligations, such as elements of the environmental management system, repair and

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<sup>476</sup> See, for instance, *Everyday Choices: Opportunities for Environmental Stewardship* (EPA, 2005) and National Advisory Council for Environmental Policy and Technology (NACEPT), 2008. *Everyone’s Business: Working Towards Sustainability Through Environmental Stewardship and Collaboration*. <http://www.epa.gov/ocem/nacept/reports/index.html>. The 2008 NACEPT report offers a different perspective on opportunities for stewardship in the US: “There is widespread misperception that EPA’s primary stewardship tool consists of voluntary partnership programs. The reality is, however, that the Agency has many additional assets to promote stewardship, such as regulatory programs, grants, information, public speeches, and in-house operations. EPA achieves its most effective results when it uses these tools in concert. Environmental regulation is the Agency’s most powerful stewardship tool.” (NACEPT 2008, p. 21)

<sup>477</sup> While often distinct and distant from permitting and enforcement programs, EPA and many state environmental agencies do provide compliance assistance.

<sup>478</sup> In the US there are a few programs where case-by-case determinations are made (e.g., CAA BACT for PSD permits), but the scope of these determinations are limited to media-specific control technologies and do not include the range of techniques and environmental issues addressed in an IPPC permit.

maintenance obligations, pollution prevention efforts, improvement program conditions, and energy and raw material efficiency efforts. *In this respect, UK integrated permits are quite similar to US media-specific permits.*

30. **Under the IPPC system, there are three different types of plant visits** – inspections, audits, and monitoring assessments – **each with its own purpose and scope. The UK uses one tool, EP OPRA, to determine inspection frequency.** *There is no one tool used in the US to determine inspection type and frequency, each of the media programs (air, water, waste, toxics, etc.) spell out different requirements for inspections.*<sup>479</sup> *State and local inspectors conduct evaluations and inspections generally following EPA guidance (although inspection frequency may be negotiated between EPA and states).*
31. All aspects of the permit process are accomplished via continual dialogue between the UK EA and the regulated facility. **The UK particularly emphasizes the use of cooperative consultation as an alternative to more formal enforcement actions.** The UK **collaborative and negotiated enforcement approach** appears to get its teeth from the unilateral, regulatory power of permit variation and revocation – and the ultimate threat of criminal prosecution. Currently, **the EA lacks the authority to impose administrative penalties.**<sup>480</sup> *In practice, US federal and state permitting authorities*<sup>481</sup> *engage in frequent dialogue with permittees (during permit development, implementation, and modification). However, in addressing issues of noncompliance, the US system usually relies on its civil enforcement authorities, including judicial and administrative penalty authority.*<sup>482</sup> *The US can also pursue criminal sanctions, where necessary.*
32. All of the terms and conditions of the IPPC permit are enforceable as a legal and practical matter. IPPC permits include traditional numerical limits and equipment and work practice standards, along with their accompanying requirements for testing, monitoring, recordkeeping and reporting. IPPC permits also include many conditions that dictate behavior and actually incorporate the details of facility-developed management systems, pollution prevention programs, waste minimization programs, and energy efficiency programs as enforceable permit requirements. In fact the EA places more emphasis on “upstream” facility management, than on “downstream” limit violations. In this regard, **the EA actually prefers to bring enforcement action for the underlying behavior, such as failure to train employees adequately or to maintain and operate equipment properly, in order to prevent a more significant environmental breach and consequence.** *In comparison, US permits seldom incorporate the content of facility environmental management systems, operation and maintenance plans, or pollution prevention plans; although, US permits may require a facility to have an operation and maintenance plan or a*

<sup>479</sup> For example, under the stationary source air program, EPA guidance says that full compliance evaluations should be conducted at major sources at least every two years.

<sup>480</sup> As discussed in Chapter 3, *The Regulatory Enforcement and Sanctions Bill* introduced in the UK House of Lords on November 8, 2007, will give UK regulators the ability to make a case for access to administrative penalties.

<sup>481</sup> In the US, most federal permitting programs are delegated to the states which serve as the primary permitting authorities, though in some jurisdictions the federal government may be the permitting authority.

<sup>482</sup> US civil enforcement includes judicial and administrative penalty authorities to return violative facilities to compliance, to deter future noncompliance, to assess penalties reflecting statutory factors such as the seriousness of the violations, and to recoup economic benefit of noncompliance.

*personnel training program. As such, US enforcement actions focus more on violations of numerical limits and other specific permit terms rather than on the underlying behavior that might lead to a violation.*

33. The UK integrated permitting system **requires prompt reporting of each transgression of a permit condition and for transparency; these reports are placed in the public register.** Inspectors provide the facility with the results of the inspection in writing, including the identification of any violations found during the inspection or audit, at the end of the inspection. EA inspectors and facility representatives may openly discuss operational issues during inspections. Within three days of the inspection, written enforcement notices are usually sent to the facility and then placed in the public register. *In the US, it is standard procedure for inspectors to hold closing conferences with facility representatives regarding compliance requirements, compliance assistance, and potential follow-up. A formal notification of violations, however, is provided only following legal review of the inspection findings; this process may take an extended period of time.*<sup>483</sup> *In general, facility-specific enforcement notices are not available to the public (although basic compliance history for larger facilities is accessible on-line).*<sup>484</sup>

### **UK Culture of Trust Shapes Public Expectations and Involvement**

34. On a formal basis **UK EA procedure explicitly commits to keeping the public regularly informed of activities related to IPPC permitting (e.g., permit determinations or issuance, operator performance, and enforcement actions).** *The UK public participation procedures for IPPC permitting are roughly similar to those in the US.*
35. In practice, the degree and nature of public involvement in the UK appears inextricably linked to its cultural and historical backdrop – that is, one of public trust in the government complemented by a strong cooperative relationship between regulators and regulated. **UK environmental groups appear less likely than their US counterparts to challenge permit issuance or enforcement decisions. Moreover, UK nongovernmental environmental organizations do not generally react and take action – legal or otherwise – in response to national rulemakings.** *In contrast, US environmental groups frequently take legal action at the federal level to challenge the validity and substance of national rulemakings. In*

<sup>483</sup> While a US inspector may convey verbally at the end of an inspection conditions that the facility may wish to revisit, inspectors are not legally authorized to formally determine violations of rules or permit conditions. The facility operator may receive a written follow-up of the inspection, but often this is not provided until a formal notice of noncompliance is issued. Absent imminent or substantial endangerment to human health or the environment requiring immediate notification, it may take an extended period of time for a US facility to receive a violation notice. There are program exceptions where inspectors can be authorized to issue expedited settlement offers (ESO) (e.g., stormwater, underground storage tanks, etc.) to a facility for minor, easily correctable violations observed during an inspection or evaluation. Generally speaking, in an expedited settlement approach, a respondent receives a proposed consent agreement and the penalty complaint at the same time, and must agree and respond to the ESO within a specified time, or the offer is withdrawn.

<sup>484</sup> Basic information on inspections and compliance status for large facilities is available on the EPA website (Enforcement and Compliance History On-line (ECHO) database at <http://www.epa-echo.gov/echo/>), but actual inspection reports, follow-up correspondence, notices of violation, etc. generally are not publicly available. Depending on EPA regional policy, inspection reports themselves may be deemed enforcement confidential.

addition, many individual permits are challenged by local or even national environmental groups.

### **Agency Organization and Management Differs from that in the US**

36. In the UK, **regulatory responsibilities are split between the political, rulemaking government department (DEFRA) and the “implementing” agency (the EA).** *In comparison, in the US political leadership and national rulemaking are functions of US EPA, and implementation and enforcement are functions shared between US EPA and the states.*
37. In a number of important respects, governance of the EA is corporate. As the “corporate” body responsible for environmental permitting, the EA must offset permitting expenses with revenues. **In large measure, EP OPRA is the resource management tool that enables the EA to balance the books and rationalize the use of resources.** *In contrast, US EPA and to a lesser extent US states are not subject to these corporate balance sheet pressures on a program by program basis.*

### **UK System Linked to Broad Technological and Regulatory Developments and Trends**

38. **The EC is charged with the ongoing responsibility to periodically update BREFs in response to advances and changes to sector-level BAT.** Once this EU process is complete, the UK will reflect these changes in domestic technical guidance on BAT. Ideally these changes to EU and national guidance will coincide with the EA periodic review of individual IPPC permits, which would then be modified to reflect changes in BAT. *Similar requirements and expectations exist in the US for updating standards and subsequently adjusting permits to reflect changes; however, this is primarily a regulatory process in the US and so may occur over a longer time period.*
39. The integrated permitting system across the EU and in the UK operates in a regulatory context not too dissimilar to that in the US – namely in the midst of pressures to reduce demands on business and government resources without compromising environmental results. **The EU and UK “Better Regulation Agenda” – an effort to modernize, rationalize, simplify and streamline government regulation – has been a significant influence on the design and functioning of UK environmental regulatory programs (including integrated permitting).** *Similar regulatory reform initiatives and pressures have been launched in the past in the US and, although less clearly identifiable, are present today.*<sup>485</sup> In some instances the “Better Regulation Agenda” has been codified in UK law and regulations, *something that occurs with less frequency in the US.*

### **Concluding Remarks**

As noted previously, we have not sought to make an overall judgment on the relative merits of the permitting systems in the UK and the US. However, our understanding of the IPPC system has led us to observe that as a matter of conceptual design, an integrated permitting system like

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<sup>485</sup> The US “National Partnership for Reinventing Government” launched in March 1993 bore a close resemblance to the UK “Better Regulation Agenda.”

the IPPC has the theoretical potential to produce, over time, environmental results beyond those that the US system currently achieves.<sup>486</sup> By specifying pollution prevention and abatement controls for the environment as a whole, ensuring that each facility actually employs the best available techniques, and requiring performance to continually improve over time, an integrated approach could in theory reduce emissions and discharges to levels below those currently required by the US system. Conversely, as was discussed in Chapter 2, an integrated approach may offer the possibility of a smoother and more predictable path toward any given level of environmental protection (which would be determined through the ongoing policy debate in each country). From this perspective, the central question is not what environmental goals are achieved, but rather whether an integrated approach offers a better way of achieving them.

Whether these benefits would be achieved, either in the EU or in the US, would depend of course on policy decisions regarding matters such as the relative weight given to stringency of national standards and administrative efficiency, and on how the approach is implemented, including the degree of commitment at all levels to ongoing performance improvement. However, the conceptual potential inherent in an integrated approach warrants, we believe, further exploration and experimentation to assess whether that potential can be realized.

## Next Steps

This report does not include recommendations for action. Instead, we hope that its content and findings provide a foundation for understanding the general provisions of the EU and UK integrated permitting systems and ultimately for identifying areas fruitful for experimentation and innovation that would lead to improvements to the US system. A broad range of perspectives and opinions exist regarding the effectiveness and efficiency of environmental permitting of industrial facilities in the US. For more than two decades, there has been interest in the US in whether environmental permitting can be improved through innovative approaches to foster continual performance improvement, use public and private resources more productively, and to focus attention on achieving sustainable outcomes rather than merely complying with regulations. The experience in the UK may help inform that ongoing debate.

Progress toward the next phase of experimentation with new approaches and tools observed in the UK very much depends on dialogue with those who spend their professional lives concerned with and engaged in the daily business of permitting in the US. Recognizing this, EPA will continue the work begun by this study by inviting interested stakeholders to participate in an ongoing discussion about opportunities for applying and experimenting with tools and approaches from the UK system in the US.

In addition, EPA realizes that this report does not represent a comprehensive study of the UK integrated system and that much more remains to be learned about the integrated approach and

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<sup>486</sup> This study did not attempt to determine whether the IPPC system actually produces greater reductions in discharges to the mainstream media – air, water, waste – than are being achieved in the US. As discussed in Chapter 5, the initial steps to determine the relative stringency (as reflected in numeric limits in the permits) were limited by differences between the US and UK facilities, differences in the ways pollution limits are expressed, and the dynamic nature of requirements applicable to the facilities under the two permitting regimes (i.e., both sets of facilities would be subject to future requirements that they did not yet meet).

its relevance to environmental protection in the US. With this in mind, EPA also encourages further research related to integrated approaches, including key aspects of the UK system not fully explored in this study, IPPC experiences and methods in other EU Member States, and cross-cutting and integrated approaches currently being practiced in US states. EPA invites and seeks to work with stakeholders interested in developing ideas for and carrying out such research.





## 9. GLOSSARY

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**Available Techniques (UK)** – Those techniques developed on a scale that allows implementation in the relevant industrial sector under economically and technically viable conditions taking into consideration the costs and advantages whether or not the techniques are used or produced domestically as long as they are reasonably accessible to the operator.

**BAT Reference Document (BREF) (EU)** – Sector-specific or cross-sector issue-based (e.g., economic and cross-media effects, energy efficiency, and monitoring) guidance documents published by the EC (Environment Directorate-General), which follow from an exchange of information on BAT between the member states. BREFs do not constitute binding requirements, but competent authorities in each member state must take account of BAT outlined in the BREF when making domestic and facility-specific determinations of BAT.

**Best Available Control Technology (BACT) (US)** – Under the CAA PSD program, the air pollution control technology that provides the maximum degree of pollutant reduction for major new or modified sources in areas that are already clean (or are in attainment), which the permitting authority determines on a case-by-case basis is achievable for a facility. Energy, environmental and economic impacts as well as other costs are considered in the determination of BACT.

**Best Available Techniques (BAT) (EU)** – The basis for determining IPPC permit conditions and defined in the IPPC Directive as “the most effective and advanced stage in the development of activities and their methods of operation, which indicates the practical suitability of particular techniques for providing in principle the basis for ELVs designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole.” See also glossary entries on indicative BAT, BREF BAT and implied BAT.

**Best Available Technology (US)** – Technology-based standard established by the CWA as the most appropriate means available on a national basis for controlling the direct discharge of toxic and nonconventional pollutants to navigable waters. Best Available Technology effluent limitations guidelines, in general, represent the best existing performance of treatment technologies that are economically achievable within an industrial point source category or subcategory. In establishing Best Available Technology, EPA considers the age of equipment and facilities involved, the processes employed, the engineering aspects of control technologies, process changes, the cost of achieving effluent reductions and non-water quality environmental impacts.

**Best Available Technology not Entailing Excessive Costs (BATNEEC) (UK)** – The main basis for determining standards under Integrated Pollution Control (IPC) industrial authorization (permitting) regime – now replaced by BAT under IPPC.

**Best Conventional Pollutant Control Technology (BCT) (US)** – Technology-based standard established under the CWA for the discharge of conventional pollutants, including biochemical oxygen demand (BOD), total suspended solids (TSS), fecal coliform, pH, oil and grease from existing industrial point sources. The BCT is established in light of a two-part "cost

reasonableness" test which compares the cost for an industry to reduce its pollutant discharge, with the cost to a Publicly Owned Treatment Works (POTW) for similar levels of reducing pollutant loading. The second test examines the cost-effectiveness of additional industrial treatment beyond Best Practicable Control Technology (BPT). EPA must find limits that are reasonable under both tests before establishing them as BCT.

**Best Practicable Control Technology (BPT) (US)** – The first level of technology-based standards established by the CWA to control pollutants discharged to waters of the US. BPT effluent limitations guidelines are generally based on the average of the best existing performance by plants within an industrial category or subcategory.

**Best Practicable Environmental Option (BPEO) (UK)** – Introduced by the RCEP in 1976 as an optimum combination of available methods of disposal to limit damage to the environment as a whole to the greatest extent achievable for a reasonable and acceptable cost. RCEP further refined BPEO in 1988 as the outcome of a systematic and consultative decision-making procedure – the option that provides the most benefit and the least damage to the environment across air, water and land as a whole, at acceptable cost, and in the long-term as well as in the short-term. The only reference to BPEO in UK primary legislation was in the EPA of 1990 as the basis for industrial authorizations under the IPC regime.

**Biological Oxygen Demand (BOD)** – A common measure of pollutant organic material in water. BOD indicates the amount of putrescible organic matter present in water. The BOD test measures the amount of oxygen consumed by living organisms while they are utilizing the organic matter present in waste. Low BOD is an indicator of good quality water.

**BREF BAT (UK)** – BAT as it is assessed in sector level BREFs and/or in UK technical guidance notes. BREF BAT represents the most effective and advanced stage in the development of activities and their methods of operation, and indicates the practical suitability of particular techniques for providing the basis for ELVs designed to prevent and, where that is not practicable, to reduce emissions and the impact on the environment as a whole. The principles for determining BAT are the same for existing and new facilities; however, final standards may differ. New facilities are generally expected to comply with or go beyond indicative BAT, whereas existing facilities may be subject to permit conditions that require an upgrade to as near new (indicative) standards as is possible.

**Chemical Oxygen Demand (COD)** – A measure of the capacity of water or wastewater to consume oxygen during the decomposition of organic matter and the oxidation of inorganic chemicals such as ammonia and nitrate. COD is expressed as the amount of oxygen consumed in mg/L. Results do not necessarily correlate to the BOD because BOD only measures the amount of oxygen consumed by microbial oxidation and is most relevant to waters rich in organic matter.

**Clean Air Act (CAA) (US)** – The governing statute for air pollution prevention and control in the US. The original CAA was passed in 1963; but it was not until 1970 that there was a stronger comprehensive federal air pollution control program. The 1990 CAA Amendments

dramatically expanded and revised the 1970 law. EPA often refers to the 1990 amendments as the 1990 Clean Air Act.

**Clean Water Act (CWA) (US)** – The CWA is the primary federal law in the US that governs water pollution and water quality protection. The statute was passed in 1972 and employs a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters so that they can support the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water. Major amendments to the CWA were enacted in 1977 and 1987.

**Competent Authority (EU)** – The authority or authorities or bodies responsible under the legal provisions of the member states for carrying out the obligations of the IPPC Directive.

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (US)** – CERCLA, commonly known as Superfund, was enacted by the US Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. The taxes collected went to a trust fund for cleaning up abandoned or uncontrolled hazardous waste sites.

**Conventional Pollutant (US)** – The CWA specifies the following as conventional pollutants: pollutants that increase BOD, total suspended solids, pH, fecal coliform, oil and grease. Nonconventional pollutants are pollutants not specified as conventional or as toxic (e.g., Aldrin/Dieldrin, DDT, Endrin, Toxaphene, Benzidine, and Polychlorinated Biphenyls (PCBs)).

**Criteria Pollutant (US)** – Any air pollutant for which EPA has established a National Ambient Air Quality Standard (NAAQS): carbon monoxide (CO), lead, nitrogen oxides (NO<sub>x</sub>), ground level ozone, particulate matter (PM), and sulfur oxides (SO<sub>x</sub>). Criteria pollutants are measured in air quality control regions to determine whether an area meets or does not meet the federal air quality standard (attainment or non-attainment of NAAQS). Permissible levels of criteria pollutants are set using science-based human health and environmental criteria.

**Department of Environment, Food and Rural Affairs (DEFRA)(UK)** – The governmental department responsible for environmental protection in the UK. DEFRA initiates and sets the legislative agenda for Parliament each year. DEFRA is headed by the Secretary of State for Environment, Food and Rural Affairs and several additional Government Ministers, each responsible for certain elements of DEFRA's mission. DEFRA sponsors and oversees the work of various public bodies responsible for final delivery of services that fall within DEFRA's purview.

**Emission Limit Value (ELV) (EU and UK)** – The mass, expressed in terms of certain specific parameters, concentration, and/or level of an emission, which may not be exceeded by a facility during one or more periods of time. ELVs may be BAT-based or statutory, the latter existing for

certain groups, families or categories of substances. BAT-based ELVs are the emissions expected from a well-performing facility implementing the indicated BAT.

**Environment Agency (EA) (UK)** – The leading public organization for protecting and enhancing the environment in England and Wales. The agency regulates industry and inspects industrial sites to protect the environment and people from pollution and environmental risks to health. The EA is an executive non-departmental public body formed under the UK Environment Act in 1995. The EA is sponsored by DEFRA and legally is comprised of a 14-member board appointed by and accountable to Parliament through DEFRA Ministers. The EA Board delegates day to day operations to the EA Chief Executive and staff. The EA is organized into head, regional and area office staff along with various national services. Under IPPC the EA regulates PPC Part A(1) installations.

**Environmental Assessment Level (EAL) (UK)** – Provisional (non-statutory) benchmarks for substances released to each environmental medium obtained from a variety of published UK and international sources. Environmental benchmarks are used as an indicator of a degree of environmental impact that can be considered acceptable for a particular substance to a receptor or environmental medium (i.e., the concentration for a substance after dispersion into the receiving environment) set at a level below which no harm is likely.

**Environmental Permitting (EP) Regulations (UK)** – Enacted on April 6, 2008, to streamline and consolidate the PPC permitting and waste management licensing systems into a single permitting system. The EP Regulations also make available standard permits and reduce the amount of statutory consultation required for permit determinations. The 2008 EP Regulations replace the PPC regulations.

**Environmental Protection Operator and Pollution Risk Appraisal (EP OPRA) (UK)** – A screening methodology designed by the EA to provide approximate risk or environmental hazard potential information that is used to help plan the agency's overall inspection and monitoring activities and target effort towards specific processes and operators according to their approximate risk levels. Use of EP OPRA results in a facility-specific score based on five attributes: complexity, emissions, location, operator performance and compliance rating.

**Environmental Quality Standard (EQS) (EU and UK)** – Statutory benchmarks prescribed for certain substances used to define the upper bound of a concentration of substance in the environment that is considered tolerable. The PPC Regulations define EQS as a requirement that must be fulfilled at a given time by a given environment as set out in EC legislation, or by a UK domestic requirement or objective that may be relevant in the determination of BAT. EQS are also known as “target” or “ambient environmental standards” where conformance is measured by reference to the effect of a pollutant on the receiving environment.

**European Commission (EC) (EU)** – The executive branch of the EU. The EC proposes legislation, implements EU decisions, upholds EU treaties, and is responsible for the day-to-day running of the EU. The EC operates as a cabinet with one commissioner per member state. The EC also refers to the larger administrative body of EU civil servants who are divided into departments called Directorates-General. The main role of the EC's Environment Directorate-

General is to initiate and define new environmental legislation and to ensure that agreed upon measures are put into practice in the EU member states.

**Hazardous Air Pollutant (HAP) (US)** – Under the CAA, one of 188 substances and compounds that are known or suspected of causing cancer or other serious health effects, or adverse environmental effects for which EPA is establishing MACT standards. A major source of HAPs is one that emits 10 tons per year of a single HAP or 25 tons per year of multiple HAPs.

**Horizontal Guidance 1 (H1) (UK)** – Guidance for the Environmental Assessment and Appraisal of BAT designed to provide supplementary information relevant to all industrial sectors to assist permit applicants in responding to the requirements described in IPPC sector guidance notes. H1 provides methods for quantifying environmental impacts to all media; a method for calculating costs of environmental protection techniques; and guidelines on resolving cross media conflicts and making cost/benefit judgments.

**Implied BAT (UK)** – Under the PPC regulations, the implied duty on the part of the operator to use BAT to prevent or reduce emissions that are not covered by specific permit conditions. This is intended to cover the most detailed level of plant design where the operator will usually be in the best position to understand in practical terms what pollution control means.

**Indicative BAT (UK)** – Indicative requirements (e.g., standards, benchmarks, techniques, improvement timescales) noted in the relevant UK sector IPPC technical guidance note. Indicative BAT is based on an analysis of the costs and benefits for typical or representative plants within a sector. Indicative BAT should be applied unless there is a strong justification for an alternative.

**IPPC Directive (EU)** – A 1996 EU Directive (96/61/EC) concerning integrated pollution prevention and control. The IPPC Directive mandates an integrated approach to environmental protection throughout the EU to prevent or, where that is not practicable, to reduce emissions to air, water and land in order to achieve a high level of protection of the environment as a whole. Operators of industrial installations covered by Annex I of the IPPC Directive are required to obtain an authorization (environmental permit) to operate from competent authorities in EU member states. About 50,000 installations are covered by the IPPC Directive across the EU.

**Local Authority (LA) (UK)** – Local governments in the UK which include London metropolitan borough councils as well as unitary, metropolitan and county councils in England and county or borough councils in Wales. Local authorities act as the IPPC regulator for smaller and less complex Part A(2) installations.

**Lowest Achievable Emission Rate (LAER) (US)** – Under the CAA, the emission rate for criteria air pollutants that is the lowest possible that is achieved in practice for an industrial category and required for new or modified air pollution sources in air quality non-attainment areas without regard to cost.

**Maximum Achievable Control Technology (MACT) (US)** – Under the CAA, a technology-based emission standard for a particular industrial category for reduction in HAPs for new and

existing sources. When developing a MACT standard for a particular source category, EPA looks at the level of emission control currently being achieved by the best performing similar sources through various control methods, such as clean processes, control devices and work practices.

**National Ambient Air Quality Standards (NAAQS) (US)** – Established under the CAA for six criteria pollutants based on the latest scientific knowledge to protect human health and welfare with an ample margin of safety. NAAQS are used by states as the basis for individual source emission limitations in SIPs. SIPs are the principal tool for control of criteria pollutants from existing stationary sources. When NAAQS are violated for one or more criteria pollutant, in a particular geographic area it is designated as a non-attainment area. Sources in a non-attainment area are subject to more stringent controls.

**National Pollutant Discharge Elimination System (NPDES) (US)** – A national permitting program under Section 402 of the CWA for regulation of pollutant discharges from point sources to waters of the US. Point sources include industrial facilities, municipal governments and some agricultural facilities. This system is managed by EPA in partnership with states. EPA has authorized 45 states to issue permits directly to point source dischargers. NPDES discharge limits are set based on technology-based effluent limitations and, where necessary, water quality standards. Discharges are illegal unless authorized by an NPDES permit.

**New Source Performance Standards (NSPS) (US)** – Section 111 of the CAA, “Standards of Performance of New Stationary Sources,” requires EPA to establish federal emission standards for source categories that cause or contribute significantly to air pollution. NSPS ensure that the best pollution control technology is used by new sources regardless of location. These technology-based standards for new and modified sources are intended to promote use of the best air pollution control technologies, taking into account the cost of such technology and any other non-air quality, health, and environmental impact and energy requirements. These standards apply to sources that have been constructed or modified since the proposal of the NSPS regulations. NSPS have been promulgated for generic categories of sources like boilers and volatile liquid storage tanks, as well as industry sector-specific processes.

**New Source Review (NSR) (US)** – A federal program under the CAA that affects new major stationary sources of air criteria pollutants and major modifications to major sources. NSR ensures that air quality is not significantly degraded from the addition of new and modified factories, industrial boilers, and power plants. Permits for construction of new or modified sources in attainment areas are referred to as Prevention of Significant Deterioration (PSD) permits and require BACT; permits for sources in non-attainment areas are referred to as non-attainment areas (NAA) permits and require LAER. For areas in attainment, new source review is triggered by a major modification – defined as any physical change in the method of operation that would result in a specified net emissions increase of any pollutant subject to regulation. For areas in non-attainment, a major modification is one that causes any increase in emissions.

**Part A(1) Installation (UK)** – Any installation comprising one or more Part A(1) activities (an activity listed under Part A(1) of Schedule 1 to the PPC Regulations and regulated by the EA), or

any Part A activity plus certain waste activities. Part A(1) installations are issued integrated permits and tend to have larger and more complex operations. There are approximately 3700 Part A(1) installations in England and Wales.

**Part A(2) Installation (UK)** – An installation comprising one or more Part A(2) activities (an activity listed under Part A(2) of Schedule 1 to the PPC Regulations and regulated by local authorities) and which is not a Part A(1) installation. Part A(2) installations are issued integrated permits and tend to have smaller and less complex operations. There are approximately 500 Part A(2) installations in England and Wales.

**Pollution Prevention (P2)** – Pollution prevention is the reduction or elimination of waste at the source by modifying production processes, promoting the use of non-toxic or less-toxic substances, implementing conservation techniques, and re-using materials rather than putting them into the waste stream. Since pollution prevention is a key policy in US national environmental protection, a number of partnership programs and other EPA initiatives utilize this approach in their work. It is also a central feature of the EU IPPC Directive.

**Pollution Prevention and Control (PPC) Act (UK)** – The PPC Act, enacted in 1999, is the primary legislation that implements the IPPC Directive in the UK and authorizes the development of regulations. Specifically, Sections 1 and 2 of the Act confer on the Secretary of State the power to promulgate regulations providing for a pollution control system that meets the requirements of the IPPC Directive and for other measures to prevent and control pollution.

**Pollution Prevention and Control (PPC) Regulations (UK)** – The PPC (England and Wales) Regulations 2000 (SI 2000/1973) is secondary legislation which implements the IPPC Directive. The PPC Regulations have been amended a number of times since 2000 with a significant amendment in 2005 to amend procedures for public participation.

**Prevention of Significant Deterioration (PSD) (US)** – Applies to new major sources or major modifications at existing sources for pollutants where the area the sources is located in is in attainment with NAAQS. PSD requires the installation of BACT, an air quality analysis, an additional impacts analysis and public involvement. PSD is intended to ensure that air quality does not diminish in attainment areas.

**Resource Conservation and Recovery Act (RCRA) (US)** – Passed in 1976, RCRA gave EPA the authority to control hazardous waste from "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. RCRA focuses only on active and future facilities and does not address abandoned or historic sites.

**Safe Drinking Water Act (SDWA) (US)** – The Safe Drinking Water Act, originally passed in 1974, was established to protect public health by regulating the public drinking water supply. This law focuses on all waters actually or potentially designated for drinking use, whether from above ground or underground sources. The Act authorized EPA to establish national health-

based standards to protect against both naturally occurring and man-made contaminants that may be found in drinking water. Originally the SDWA focused primarily on treatment as the means of providing safe drinking water at the tap. The 1996 Amendments enhanced the Act by recognizing source water protection, operator training, funding for water system improvements and public information as important components of safe drinking water. Oversight of drinking water systems is conducted by states – all except one state have primacy, the authority to implement the SDWA in their jurisdiction.

**State Implementation Plan (SIP) (US)** – Section 110 of the CAA requires state and local air pollution control agencies to adopt federally approved control strategies to minimize air pollution. The resulting body of regulations is known as a State Implementation Plan. SIPs generally establish limits or work practice standards to minimize emissions of the criteria air pollutants or their precursors. SIPs also include special control strategies for nonattainment areas. When approved by EPA, the state is delegated federal authority for air quality regulation.

**Technical Guidance Notes (TGN) (UK)** – UK domestic guidance for England, Wales, Scotland, and Northern Ireland that addresses required standards and BAT drawing on the information contained within EU BREFs. TGNs are designed to complement the BREFs – BREFs are cross-referenced throughout the TGNs. TGNs contain indicative standards for both new and existing installations as well as timetables for upgrading existing facilities. Operators must justify departures from indicative requirements – the TGN itself may identify factors that would support any such departure.

**Techniques (EU)** – As defined in the IPPC Directive, both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned.

**Title V Operating Permit (US)** – Title V (five) of the 1990 CAA Amendments requires all large (major) sources and a limited number of smaller sources (called “area,” “minor” or “non-major” sources) of air pollution to obtain an operating permit. Title V operating permits may apply to minor sources if the source emits federally regulated HAPs or is subject to some other federal air pollution standard. Title V permits were designed to improve compliance by clarifying what facilities must do to control air pollution.

**Water Quality Criteria (US)** – The CWA directs EPA to develop criteria for water quality that accurately reflect the latest scientific knowledge about the effects of pollutants on aquatic life and human health. In developing these criteria, EPA examines the effects of specific pollutants on plankton, fish, shellfish, wildlife, plant life, aesthetics, and recreation in any body of water. This includes specific information on the concentration and dispersal of pollutants through biological, physical, and chemical processes as well as the effects of pollutants on biological communities as a whole. States may use the criteria developed by EPA to help set water quality standards that protect the uses of state waters, or they may develop their own water quality criteria. EPA publishes human health and aquatic life criteria and is currently developing sediment and biological criteria. These criteria are complementary; each is designed to protect specific types of living organisms or ecological systems from the adverse effects of pollution.



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