

Guidelines – Best Available Techniques (BAT) and Best Practicable Environmental Option (BPEO)

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1.0 Best Available Techniques (BAT)

Best Available Technique (BAT) can be defined (*according to European Environment Agency*) as the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and impact on the environment as a whole.

It should be always being borne in mind that BAT is one of a number of objectives set out in section 7 of EPA 1990, which must be achieved as part of authorization conditions.

It is helpful to consider the definitions of words Best Available Techniques (BAT).

BEST – *Best* in relation to techniques, means the most effective in achieving a high general level of protection of the environment as a whole. It also means most effective in preventing, minimizing or rendering harmless polluting releases. There may be more than one set of techniques that achieves effectiveness.

AVAILABLE – *Available Techniques* means those techniques developed on a scale which allows implementation in the relevant class of activity under economic and technical viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced within the area, as long as they are reasonably accessible to the person carrying out the activity. It should be taken to mean procurable by the operator of the process in the process in question. It does not imply that the technique has to be in general use, but it does require general accessibility. It includes a technique which has been developed (or proven) at pilot scale, provided this allows its implementation in the relevant industrial context with the necessary business confidence. It does not imply that sources outside the UK are ‘unavailable’. Nor does it imply a competitive supply market. If there is a monopoly supplier the technique counts as being available provided that the operator can procure it.

TECHNIQUES – *Techniques* includes both the technology used and the way in which the installation is designed, built, managed, operated and decommissioned. It is defined in section 7(10) of the EPA 1990. The term embraces both the plant in which the process is carried on and how the process is operated. It should be taken to mean the components of which it is made up and the manner in which they are connected together to make the whole. It also includes matters such as numbers and qualifications of staff, working methods, training and supervision and also



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the design, construction, lay-out and maintenance of buildings, and will affect the concept and design of the process.

At the installation/facility level, the most appropriate techniques will depend on local factors. A local assessment of the costs and benefits of the available options may be needed to establish the best option. The choice may be justified on:

- a. The technical characteristics of the installation / facility;
- b. Its geographical location;
- c. Local environmental considerations; and
- d. The economic and technical viability of upgrading existing installations.

The determination of BAT considers in particular the following, giving regard to the likely costs and advantages of measures and to the principles of precaution and prevention:

- a. The use of low-waste technology;
- b. The use of less hazardous substances;
- c. The furthering of recovery and recycling of substances generated and used in the process and of waste, where appropriate;
- d. Comparable processes, facilities or methods of operation, which have been tried with success on an industrial scale;
- e. Technological advances and changes in scientific knowledge and understanding;
- f. The nature, effects and volumes of the emissions concerned;
- g. The commissioning dates for new or existing activities;
- h. The length of time needed to introduce the best available techniques;
- i. The consumption and nature of raw materials (including water) used in the process and their energy efficiency;
- j. The need to prevent or reduce to a minimum the overall impact of the emissions on the environment and the risks to it; and
- k. The need to prevent accidents and to minimize the consequences for the environment.



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2.0 Best Practicable Environmental Option (BPEO)

If the process is likely to involve the release of substances to more than one environmental medium, then section 7 (7) of the EPA 1990 requires that the Best Practicable Environmental Option (BPEO) is employed by the operator. BPEO can be defined as the option, which minimizes pollution to the environment as a whole, at acceptable cost, in the long term as well as the short term. A BPEO assessment for IPC should include an assessment of the environmental effects of releases and the economic implications of a number of options.

BPEO is described as “the outcome of a systematic consultative and decision – making procedure, which emphasizes the protection and conservation of the environment across land, air and water. The BPEO procedure establishes, for a given set of objectives, the option that provides the most benefit or least damage to the environment as a whole, at acceptable cost, in the long term as well as in the short term”. It is a set of procedures with the goal of managing waste and other environmental concerns. It emphasizes the protection and conservation of the environment across land, air and water. The procedure establishes for a given set of objectives, the option that provides the most benefits or the least damage to the environment, as a whole, at acceptable cost, in the long term as well as in the short term.

The significance of the concept of BPEO is by considering its elements as given below:

BEST – It is the option chosen as best and will depend on the interpretation and evaluation of the predicted impacts by whoever takes the final decision. Research and development will continue to generate new technology, which may provide improved solutions. BPEO must therefore be kept under review.

PRACTICABLE – It is one of the guidance notes on Best Practical Means (BPM) which explains how HMIP interprets the term:

“In the Clean Air Act 1956 ‘practicable’ is interpreted as ‘reasonably practicable, having regard, amongst other things, to local conditions and circumstances, to the financial implications and to the current state of technical knowledge’”. The word ‘financial implications’ can relate both to the direct capital and to the revenue costs borne by the operator of the process. The aim is to achieve a reasonable balance between the costs of prevention and / or dispersion and the benefits. Complete evaluations in monetary terms are seldom possible and experience has to be used in arriving a decision. The term ‘current technical knowledge’ refers not only to knowledge about air pollution control technology but also the effects of substances on human health, flora and fauna, construction materials, property, agriculture and amenity, etc.”

In the context of BPEO, the use of the term ‘practicable’ implies that the option must not have disproportionate financial implications. The best practicable option will not necessarily be the cheapest.

ENVIRONMENTAL – It is a central element in BPEO in the evaluation of options for their environmental effects early in the decision – making process. It is more cost effective to take



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account of environmental considerations at an early stage than to apply remedies later. It is essential to consider local and remote, short and long term effects in all environmental media. The possibility of improving the environment should always be explored. The effects on the environment of malfunctions, accidents or emergencies must also be considered. Plans should be developed to monitor environmental effects and to deal with mishaps.

OPTION – It is the procedure for selecting a BPEO which should include a diligent and imaginative search for alternative ways of achieving the desired result. It is important to look into all options and not to be hindered by preconceptions. Where it is not enough to consider the BPEO for the disposal of a waste stream without also examining the production process to see whether the waste can be avoided reduced or its nature modified (RCEP, 1988).

Principles and Procedures for selecting a BPEO include:

- a. Industrial plant which avoids emitting any pollutant;
- b. Avoiding accumulation of a pollutant in the environment;
- c. Permanent rather than temporary solutions to environmental problems.

BPEO methodology is set into six (6) stages as summarized below:

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| Stage 1 | : | Define the objective;

e.g., produce a product or provide a service and meet the objectives of Integrated Pollution Control (IPC). |
| Stage 2 | : | Generate options for achieving the objective; <ul style="list-style-type: none"> • Generate available techniques • Screen the techniques • Select a small number of options to achieve the object |
| Stage 3 | : | Assess the options <ul style="list-style-type: none"> • Environmental Assessment • Economic Assessment |
| Stage 4 | : | Summarize and present the assessment

Set-out all factors used in evaluation |



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- Stage 5 : Identify BPEO
Justify choice
- Stage 6 : Review the BPEO
- Sensitivity testing
 - Ensure there is an audit trail