| Title of Document Energy Efficiency (2009) | | | |
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| | | **Applicability** | **In place / Proposed** |

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| **BAT 1** | BAT is to implement and adhere to an energy efficiency management system (ENEMS) appropriate to the local circumstances. | Applicable | In place |
| **BAT 2** | BAT is to continuously minimise the environmental impact of an installation by planning actions and investments on an integrated basis and for the short, medium and long term, considering the cost-benefits and cross-media effects. | Applicable | In place. |
| **BAT 3** | BAT is to identify the aspects of an installation that influence energy efficiency by carrying out an audit. It is important that an audit is coherent with a systems approach (see BAT 7). | Applicable | Proposed. An energy audit has been commissione. |
| **BAT 4** | *When carrying out an audit, BAT is to ensure that the audit identifies the following aspects;* | Applicable | Proposed. Refer to BAT 3. |
| **a)** | energy use and type in the installation and its component systems and processes. | | |
| **b)** | energy-using equipment, and the type and quantity of energy used in the installation. | | |
| **c)** | possibilities to minimise energy use, such as:<br>• controlling/reducing operating times, e.g. switching off when not in use (e.g.<br>• ensuring insulation is optimised,<br>• optimising utilities, associated systems, processes and equipment). | | |

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| **d)** | possibilities to use alternative sources or use of energy that is more efficient, in particular energy surplus from other processes and/or systems. | | |
| **e)** | possibilities to apply energy surplus to other processes and/or systems. | | |
| **f)** | possibilities to upgrade heat quality. | | |
| **BAT 5** | BAT is to use appropriate tools or methodologies to assist with identifying and quantifying energy optimisation. | Applicable | Proposed. The audits will follow best practice. |
| **BAT 6** | BAT is to identify opportunities to optimise energy recovery within the installation, between systems within the installation (see BAT 7) and/or with a third party. | Applicable | Proposed. The energy audit will identify actions that have the potential to optimise energy recovery. |
| **BAT 7** | BAT is to optimise energy efficiency by taking a systems approach to energy management in the installation. Systems to be considered as a whole include:<br>process units<br><br>heating systems such as:<br>steam<br>hot water<br><br>cooling and vacuum<br><br>motor driven systems such as:<br>compressed air<br>pumping<br>lighting<br><br>drying, separation and concentration | Applicable | Proposed. |

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| **BAT 8** | *BAT is to establish energy efficiency indicators by carrying out all of the following* | Applicable | Proposed. |
| **a)** | Identifying suitable energy efficiency indicators for the installation, and where necessary, individual processes, systems and/or units, and measure their change over time or after the implementation of energy efficiency measures. | | |
| **b)** | Identifying and recording appropriate boundaries associated with the indicators. | | |
| **c)** | Identifying and recording factors that can cause variation in the energy efficiency of the relevant process, systems and/or units. | | |
| **BAT 9** | BAT is to carry out systematic and regular comparisons with sector, national or regional benchmarks, where validated data are available. | Applicable | Proposed. |
| **BAT 10** | *BAT is to optimise energy efficiency when planning a new installation, unit or system or a significant upgrade by considering all of the following* | Applicable | In place. EED is central to all new equipment procurement/upgrade. |
| **a)** | The energy efficient design (EED) should be initiated at the early stages of the conceptual design/basic design phase, even though the planned investments may not be well-defined. The EED should also be taken into account in the tendering process. | | |

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| **b)** | The development and/or selection of energy efficient technologies. | | |
| **c)** | Additional data collection may need to be carried out as part of the design project or separately to supplement existing data or fill gaps in knowledge. | | |
| **d)** | The EED work should be carried out by an energy expert. | | . |
| **e)** | The initial mapping of energy consumption should also address which parties in the project organisations influence the future energy consumption, and should optimise the energy efficiency design of the future plant with them. For example, the staff in the (existing) installation who may be responsible for specifying design parameters. | | |
| **BAT 11** | BAT is to seek to optimise the use of energy between more than one process or system within the installation or with a third party. | Not Applicable | Given the nature of the energy systems at the installation there is no opportunity to optimise the use of energy between systems or with third parties. |
| **BAT 12** | BAT is to maintain the impetus of the energy efficiency programme by using a variety of techniques. | Applicable | Proposed |
| **BAT 13** | *BAT is to maintain expertise in energy efficiency and energy-using systems by using techniques such as:* | Applicable | In Place |
| **a)** | Recruitment of skilled staff and/or training of staff. Training can be delivered by in-house staff, by external experts, by formal courses or by self-study/development. | | |
| **b)** | Taking staff off-line periodically to perform fixed term/specific | | |

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| | investigations (in their original installation or in others. | | |
| **c)** | Sharing in-house resources between sites. | | |
| **d)** | Use of appropriately skilled consultants for fixed term investigations. | | |
| **e)** | Outsourcing specialist systems and/or functions | | |
| **BAT 14** | *BAT is to ensure that the effective control of processes is implemented by techniques such as:* | Applicable | In Place/Proposed. . |
| **a)** | Having systems in place to ensure that procedures are known, understood and complied with. | | |
| **b)** | Ensuring that the key performance parameters are identified, optimised for energy efficiency and monitored. | | . |
| **c)** | Documenting or recording these parameters. | | |
| **BAT 15** | *BAT is to carry out maintenance at installations to optimise energy efficiency by applying all of the following:* | Applicable | In Place/Proposed**.** FHR has a preventative maintenance programme in place and the new plant will be included in the programme. |
| **a)** | Clearly allocating responsibility for the planning and execution of maintenance. | | |
| **b)** | Establishing a structured programme for maintenance based on technical descriptions of the equipment, norms, etc. as well as any equipment failures and consequences. Some maintenance activities may be best scheduled for plant shutdown periods. | | |
| **c)** | Supporting the maintenance programme by appropriate record keeping systems and diagnostic testing. | | |

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| **d)** | Identifying from routine maintenance, breakdowns and/or abnormalities possible losses in energy efficiency, or where energy efficiency could be improved. | | |
| **e)** | Identifying leaks, broken equipment, worn bearings, etc. that affect or control energy usage, and rectifying them at the earliest opportunity. | | |
| **BAT 16** | BAT is to establish and maintain documented procedures to monitor and measure, on a regular basis, the key characteristics of operations and activities that can have a significant impact on energy efficiency. | Applicable | Proposed**.** FHR will prepare an Energy and Resource Management Procedure, which will take into account the need to monitor and measure all of the key characteristics of the installation's activities that have a significant impact on energy efficiency. These characteristics will be identified in the report on the energy audit (Ref BAT 3). |
| **BAT 17** | Combustion. | Not Applicable | |
| **BAT 18** | Steam Systems. | Not Applicable | No steam systems at the installation. |
| **BAT19** | Heat Recovery. | Not Applicable | |
| **BAT 20** | Cogeneration. | Not Applicable | No cogeneration systems at the installation |
| **BAT 21** | BAT is to increase the power factor according to the requirements of the local electricity distributor by using techniques such as those in Table 4.3, according to applicability. | Applicable | In Place/Proposed**.** Power factor correction has been applied at the existing plant. |
| **BAT 22** | BAT is to check the power supply for harmonics and apply filters, if required. | Applicable | Proposed. FHR will engage an electrical engineer to review energy management systems at the installation, which will address the efficiency of electric motors. |
| **BAT 23** | BAT is to optimise the power supply efficiency by using techniques such as those in Table 4.4, according to applicability. | Applicable | Proposed. FHR will engage an electrical engineer to review energy management systems at the installation, which will address the efficiency of electric motors. |

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| **BAT 24** | *BAT is to optimise electric motors in the following order;* | Applicable | Proposed. FHR will engage an electrical engineer to review energy management systems at the installation, which will address the efficiency of electric motors. |
| 1 | Optimise the entire system the motor(s) is part of. | | |
| 2 | Optimise the motor(s) in the system according to the newly-determined load requirements, by applying one or more of the techniques in Table 4.5, | | |
| 3 | When the energy-using systems have been optimised, then optimise the remaining (non-optimised) motors according to Table 4.5. | | |
| **BAT 25** | BAT is to optimise compressed air systems (CAS) using the techniques such as those in Table 4.6, according to applicability. | Not Applicable | |
| **BAT 26** | BAT is to optimise pumping systems by using the techniques in Table 4.7, according to applicability. | Not Applicable | |
| **BAT 27** | Heating, Ventilation and Air Conditioning | Not Applicable | No HVAC system at the installation. |
| **BAT 28** | BAT is to optimise artificial lighting systems by using the techniques such as those in Table 4.9 according to applicability. | Applicable | |
| **BAT 29** | Drying, Separation and Concentration. | Not Applicable | |