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EIPPCB BREF for LCP – Final Draft, November 2004

Section	Page	Precise Proposal	Rationale
7.1.8	429	<b>Add “and gas engine”</b> to the last sentence in the 1 <sup>st</sup> paragraph to read: “In some special applications (e.g. larger plants in non-attainment areas in the USA), gas turbines and gas engines are equipped with SCR for additional NOx reduction”.	Two gas engine references with SCR are given in table 7.9 (page 439). Both reference plants are located in the USA and are taken as the basis for gas engine BAT in the BREF. In <b>non-attainment</b> areas in USA <b>LAER</b> (Lowest Achievable Emission Rate) is required where cost aspect is not considered! Therefore, SCR application with gas engines shall be considered as a special application.
7.5.4	481	In the 3 <sup>rd</sup> paragraph <b>rephrase</b> the 4 <sup>th</sup> and 5 <sup>th</sup> sentences “For further reduction of NOx, SCR can be considered ... given in table 7.37 . In table 7.37 ...” <b>to:</b> “For further reduction of NOx, SCR can be considered where local air quality standards request ... given in table 7.37 for gas turbines and boilers and in table 7.26 for gas engines (without SCR) to levels given in table 7.36 (e.g. operation in densely ..). In tables 7.37, 7.26 and 7.36 emergency machinery ...”	The given NOx BAT levels for gas engines in table 7.36 are based two reference plants located in the USA. For these plants very strict (LAER) levels are required (see above).  In the BAT definition (IPPC Directive, 96/61/EC page L257/29) also cost aspect shall be considered. Therefore the emission levels given in table 7.26 ( <b>without</b> SCR) are considered as BAT. For spark-ignited engine e.g. the NOx levels in the table are below TA-LUFT 2002)!

7.5.4	482	<p>The BAT conclusions in table 7.36 shall be changed as follows:</p> <ul style="list-style-type: none"> <li>– NOx: 90-190 mg/Nm<sup>3</sup>, CO: 100 mg/Nm<sup>3</sup>, 15 % O<sub>2</sub> for engines &lt; 50 MWth (single engine unit power)</li> <li>– NOx: 90-190 mg/Nm<sup>3</sup>, CO: 100 mg/Nm<sup>3</sup>, 15 % O<sub>2</sub> for engines using renewable gases (independent of power)</li> <li>– NOx: 20-75 mg/Nm<sup>3</sup>, CO: 30-100 mg/Nm<sup>3</sup>, 15 % O<sub>2</sub> for engines &gt; 50 MWth (single engine unit power) using natural gas</li> </ul>	<p>EIPPCB has specifically asked Member States for their view on the EUROMOT position for gas engines. A "Compilation of the TWG comments to the Executive Summary and concluding remarks" on the BREF for LCP has been issued (e-mail dated 11.11.2004). With regards to our EUROMOT proposal for gas engines, Austria, Finland, Germany, Sweden and the Dutch association of importers of combustion engines (VIV) submitted comments. Basically, there was consensus on the EUROMOT proposal (NOx: 90-190 mg/Nm<sup>3</sup>, CO: 100 mg/Nm<sup>3</sup>, 15 % O<sub>2</sub>) for engines below 50 MWth (engine power). Austria proposed to keep in the BREF the proposed emission levels (NOx: 20-75 mg/Nm<sup>3</sup>, CO: 30-100 mg/Nm<sup>3</sup>, 15 % O<sub>2</sub>) for natural gas engines, however, Austria accepted the EUROMOT proposal for all renewable gas applications.</p> <p>In view of the above feedback, the conclusions made by EIPPCB not to modify the emission levels in table 7.36 are difficult to understand. The references selected in tables 7.9 and 7.36 are based on some few plants built in the USA and follow the criterion "best ever performance plants". This cannot be the basis for a BREF and for general BAT conclusion in Europe!</p> <p>Gas engines are widely used in Europe and their advantages especially in emissions are evident. Lots of gas engines are burning renewable gases which in Europe is intensively supported (see DIRECTIVE 2001/77/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market). Cogeneration possibilities will be severely hampered by excluding engine technology from the market. This is fully against the EU policies for stimulating cogeneration. We once again make reference to our technical expertise provided to EIPPCB (see <a href="http://www.euromot.org">HTTP://WWW.EUROMOT.ORG</a> &gt; NEWS &gt; POSITIONS &gt; STATIONARY ENGINES), which has not been accurately reflected in the text.</p>
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			<p>The EIPPCB states limits for gas plants with a fuel input larger than 50 MW. An engine plant is built of several smaller engines and a 50 MWth plant means in practice an electric power of about 20 MWe. Moreover, often boilers are present at the same location so that the power input threshold will easily be exceeded. That means that many engine plants will be covered by the BAT. That will give rise to excessive costs especially for the smaller units used. Please note that the LCP Directive for gas turbines is for single units only with an individual thermal fuel input &gt; 50 MWth only! We therefore propose the power limits as single engine unit power.</p>
7.5.4 6.5.5.4	482 406	<p>Table 7.36: Table 6.48:</p> <p>Monitoring of NOx shall be changed from “continuous” to “discontinuous once every 6 month”.</p>	<p>Continuous emission monitoring for gas engines, especially for smaller ones, is not common practice, see:</p> <p><a href="http://www.euromot.org">HTTP://WWW.EUROMOT.ORG</a> &gt; NEWS &gt; POSITIONS &gt; STATIONARY ENGINES &gt; EIPPCB BREF backup document CEMS jun03.pdf</p>
6.1.10.3.3	359	<p>3<sup>rd</sup> paragraph <b>SCR</b>: The 2<sup>nd</sup> sentence “They operate with various grades of liquid fuel, ranging from ... or even orimulsion” shall be <b>modified</b> as follwos: “In operation with low grade liquid fuels special care shall be taken in order to get a properly functioning SCR. For some low grade liquid fuels SCR is <b>not</b> yet fully commercially available. SCR requires also an existing infrastructure: supply of (an expensive) reagent and spare parts, skilled operators for the maintenance. With a cost-effective environmental quality need driven approach the best overall result is obtained, and in most cases primary measures can give the best overall result.”</p>	<p>With stationary engines in context with SCR:s and Orimulsion there has been tests only in one location (test plant) in the world. This test plant faced severe clogging of the SCR-elements and the engines had to be stopped in average once a week in order to manually clean catalyst elements in the SCR. As a result, it was decided to test an “other” type of SCR. So far only a limited amount of operation hours have been obtained. SCR is <b>NOT</b> yet commercially released for this fuel type.</p> <p>There have also been malfunctioning SCR:s in some plants in the field operating on normal heavy fuel oil (heavy fuel oils with 1 .. 2 % S due to insufficient soot-blowing equipment and wrong catalyst element specification used).</p> <p>Reference is made to “2<sup>nd</sup> Draft Reference Document on Best Available Techniques for large Combustion Plants, Backup Document June” <a href="http://www.euromot.org">HTTP://WWW.EUROMOT.ORG</a> &gt; NEWS &gt; POSITIONS &gt; STATIONARY ENGINES &gt; EIPPCB BREF backup document mar03.pdf</p>

6.1.10.3.3	359	<p>3<sup>rd</sup> paragraph <b>SCR</b>: 7<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> sentences  “Operators of large diesel engines for power generation often have the task of reducing CO, HCs and particle emissions, as well as NOx. Often noise pollution must .... SCR systems including oxidation catalysts bring .... In addition to reducing NOx emissions by up to 90 % and 80 – 90 % reduction in CO and hydrocarbons, a 30 % reduction in particulate matter and a noise reduction 8 – 10 dB(A) can be expected for average engine power.”</p> <p><b>Whole text to be deleted.</b></p>	<p>A SCR will produce CO, when a part of the hydrocarbons in the flue gas is “burned” . On the same page (359) there is a correct statement (3<sup>rd</sup> paragraph) “... <i>An SCR can be equipped with an additional oxidation layer for the reduction of CO and NH<sub>3</sub> but this is not recommended when operating on liquid fuels (such as HFO) containing sulphur. An oxidation catalyst will oxidize a part of SO<sub>2</sub> to SO<sub>3</sub> and as a consequence additional particulate is formed (sulphate)</i>”.</p> <p>In the same paragraph it is said “<i>A larger diesel engine has low emissions of unburned (CO, HC).</i>” → <b>NO</b> oxidat for reduction of CO, HC should be used !</p> <p>When operating on heavy fuel oil (HFO) the particulate consists mainly of unburnable ash, when operating on a light fuel oil the particulate is to a big content consisting of “burnable” SOF (Soluble Organic Fraction). The statements given in the text <b>are not correct</b> when operating on <u>residual liquid fuels (containing sulphur, ash)</u>. The noise reduction of the SCR-unit is plant specific and usually air silencers are installed in order to comply with the noise regulations.</p>
Example 6.2.3.2	372	<p><b>Description:</b> last sentence “An additional advantage of SCR systems is its effect of reducing other pollutants such as hydrocarbons and soot to a certain extent, and as well a sound reduction of about 8 – 10 dB(A)”.</p> <p><b>Delete this text.</b></p>	Reasoning see above.

6.3.3.3	379	Table 6.23:	No plant size is given. This is probable a small peak/emergency plant. However, this document is for big thermal power plants and
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		<p>In the column “Fuel oil S wt-% or SO2” <b>remove</b> reference to “Diesel DIN 51603 and DIN 590”.</p> <p>In the column “Remarks” <b>remove</b> “3.8 MW marine propulsion”.</p>	<p>small stand-by plants operating on an expensive fuel will give a wrong picture of achievable cost-effective values!</p> <p>The reference is not a power plant. The marine reference seems to be <b>based on a leaflet only</b> from Ceramics. Data is questionable.</p>
6.5.5.2	405	<p>Table 6.47</p> <p><b>modify</b> Table 6.47 in order to <b>align</b> the table with Table 6.20</p>	<p>Whereas Table 6.20 reflects the state-of-the-art, in Table 6.47 there still are unrealistic values given for dust emission levels when engines are operated with HFO, which typically is fuel with high ash content and high sulphur content. The two tables are inconsistent!</p>
6.5.5.4	406	<p>2<sup>nd</sup> paragraph: “the Miller concept ...HAM”</p> <p><b>add</b> to the list “Fuel water emulsion”</p> <p><b>add</b> to the list “other humidification methods”</p>	<p>The list of measures to reduce NOx is incomplete because the use of emulsified fuel (FWE = Fuel Water Emulsion) which is proven in power plants and onboard vessels is not mentioned. This measure is more often used than "direct water injection" and "HAM". (Up to our knowledge DWI actually no longer is offered. FWE+CR offers the better results, marine engine users report "due to unsolved wear problems". Therefore, if DWI is mentioned at all the other measures should be mentioned also.</p>
6.5.5.4	406	<p>3<sup>rd</sup> paragraph: “During the last decade the NOx emissions from ... efficiency of the engine”</p> <p><b>delete text</b> “in combination with SCR” from the sentence.</p>	<p>NOx emissions from engines have been reduced by almost 40 % through primary measures, only during the last decade. This has nothing to do with SCR. The current text unfairly neglects engine development.</p>
6.5.5.4	406	<p>Table 6.48</p> <p><b>Add</b> text from 6.1.10.3.3 (page 359) – see above</p> <p>Make <b>reference</b> to tables 6.21 – 6.22</p> <p>Add to the column BAT for each engine type “Fuel water emulsion” (see above)</p>	<p>Table 6.48 states as BAT with NOx only SCR. Information about the fuel composition and applicability of the SCR needs to be added (see our above proposal, 6.1.10.3.3, for page 359). SCR for Heavy Fuel Oil Fired Engine Plants may be restricted by the fuel sulphur content particularly in case of four-stroke engines if the SCR inlet temperature is too low in order to avoid ammonia hydrogen-sulphate formation.</p> <p>A reference to tables 6.21 – 6.22 should also be given. In a cost-</p>

			effective environmental driven approach these will in some cases be BAT due to technical constraints and costs of the SCR.
6.1.10.3.1	356	<p>1<sup>st</sup> paragraph, 5<sup>th</sup> and 6<sup>th</sup> sentences: “Highly viscous and high sulphur oils are combusted in boiler LCPs. In combination with SO<sub>2</sub> wet scrubbing at these LCPs, the wet ESP technique is applicable as a pretreatment for particulate removal”.</p> <p><b>Remove this text.</b></p>	The text seems to be for boilers, but the chapter is intended for engines.
Executive summary		<p>In case the EUROMOT comments will not be adequately considered, include the following wording basically proposed by EURELECTRIC (comments from 2004-12-10) but adapted to EUROMOT’s requirements, to the subsection “submitted information”:</p> <p>EUROMOT has provided extensive information into the BREF LCP but cannot agree that the final document adequately reflects the extensive experiences of its members in both building and retrofitting abatement equipment to diesel and gas engines.</p> <p>EUROMOT does not consider that the BREF sufficiently addresses what is practical and achievable for all reciprocating internal combustion plants. In particular, it views the examples of plant performance as unrepresentative, since they concentrate on “Best Ever” emissions, taken from isolated cases, rather than reflecting the spectrum of feasible performance for plant operating under commercial conditions and loading patterns. In addition, EUROMOT views the current paucity of relevant cost data as being damaging to the overall credibility of the document and notes that the BREF itself has indicated a deficiency in this area.</p>	<p>EUROMOT has provided extensive information towards the development of the draft of the BREF LCP:</p> <ul style="list-style-type: none"> <li>– EIPPCB bat1 jan01.pdf</li> <li>– EIPPCB bat data.pdf</li> <li>– EIPPCB bat2 jan01.pdf</li> <li>– EIPPCB BREF march03 comments euromot 060603.pdf</li> <li>– EIPPCB BREF march03 backup document 060603.pdf</li> <li>– EIPPCB BREF BAT gas engines comment euromot dec03.pdf</li> <li>– EIPPCB BREF BAT gas engines comment euromot aug04.pdf</li> <li>– EIPPCB BREF BAT gas engines annex deliveries.pdf</li> </ul> <p>EUROMOT always was in favour of the development of the BREF LCP, and explicitly supported the inclusion of diesel and gas engines – in the LCP Directive these engines are excluded from the scope. However, our support is given on the basis of a sound evaluation of technical and economical impact (energy, environmental, and economic impacts and other costs through application of an available technique).</p> <p>EUROMOT has some major concerns about the final draft text and has made suggestions for changes to both the main text of the BREF and to the Executive Summary. If these cannot be incorporated then it may be difficult for EUROMOT to accept the BREF unless the proposed paragraph is inserted into the Executive</p>

		Overall, EUROMOT's concern is that these two principal issues make the document largely irrelevant for practical BAT assessments for the majority of European diesel and gas engine plants."	Summary and the main text.
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