Appendix B3 3a – Technical Standards

The technical standards that have been used in both the application document & also in the design and operation procedures for the plant. The use of the Energy Bref document “Burning any fuel in an appliance with a rated thermal input of 50 or more megawatt” is used, even though the plant is just under this limit, as the BAT referred to in this document is still relevant and applicable.

Also the use of the Industrial Emissions Directive in all of its guises for both large & medium plant also provides BAT guidance for this plant.

The use of technical guidance M3 for the monitoring of emissions, has enable the design of the plant to encompass all of necessary monitoring requirements and to ensure that all monitoring equipment is Mcerts and the use of contractors to conduct emission checks also have the correct Mcerts certification in this area for both the staff carrying out the monitoring & the equipment used. Also used in conjunction with technical guidance M3 is technical guidance M1 for point source emissions as well & technical guidance M2 for how to monitor emissions. These three sets of guidance notes were used in tandem to ensure that all areas of emissions monitoring were met.

The document “How to comply with your environmental permit – additional guidance for combustion activities has also been used.

Appendix B3 4a How to monitor emissions

As the thermal input of the plant is just under the 50Mw for large emissions, the plant will be designed to have monitoring capabilities, but will under the advisement of the Environment Agency either install Mcerted CEMS machines or just have the monitoring points required for periodic monitoring of gases. It will be for the Environment Agency to determine if permanent monitoring is required, as currently the figures used to determine emission volumes are from the supplier calculations and not from operating the plant. There may be a happy medium, where the plant is continuously monitored for a fixed period of time, to determine what the actual levels are and once levels have been determined. An agreement can be reached as to what frequency of monitoring will be required.

Boiler blowdown discharge would have to be monitored by approved flow meters, but boiler blowdown is triggered by the testing of the chemicals used within the boiler operating system, to prevent hard water from damaging the boilers. When levels of trace materials predominantly metals such as calcium, the system triggers the blowdown to take place. Although the engineering systems, would be unable to programme the timing of the blow down, a flow meter would be installed to determine the volume being discharged. The boiler blowdown, like the boiler blowdown from the operations at Industrial Chemicals Limited, would be discharged to the Tidal River Thames as part of this permit.

Appendix B3 4b

Point source emissions to air only

There are 2 stacks which will be the standard emission point for the 6 engines. For simplicities sake, engines 1, 2 & 3 will emit the emissions from these 3 engines via stack 1 and engines 4, 5 & 6 will emit their emissions via stack 2. There is a back-up/emergency stack for the engines which can come into play if there is an issue with any part of the plant. These stacks are the only emission points to air. The engines will be burning natural gas and as such the plant will be designed from a safety aspect to ensure that there are no gas leaks (which would have the potential to cause explosion). The programming for the operation of the engines will ensure that gas levels & pressures will be monitored constantly to ensure that there are no leaks from within the system. The HAZOP & HAZIDS that are to take place will determine the likelihood of fugitive emissions to take place from the operations of the engines and will also calculate the rate that any emission would have. SIL protection systems would also be in-place to ensure that if there were to be an unexpected emission the plant would be shut-down and operation would cease.

Appendix B3 6a

Although the plant will be operated under a different company to Industrial Chemicals it will be solely suppling the processes on the adjacent site in West Thurrock. The Electricity generated will be used to power the electrolyser used to produce Sodium hydroxide, Sodium hypochlorite & Hydrochloric acid, thus reducing the volume taken from the national grid for this process to zero.

The exhaust gases produced by this process, will be used to generate steam via waste heat boilers and this steam will then be connected to the existing boiler house circuit operated by Industrial Chemicals and provide all the steam necessary for the production of products produced on the existing EPR permit .

The hot water that is also produced via the engine jacket, lubricating oil & first stage inter-cooler, will be passed through an absorption chiller to generate chilled water at about 10˚C, which will then be piped to processes that require chilled water to operate chillers to bring down the various final products temperature (these are products produced by Industrial Chemicals).

In operating the plant in this manner, all of the energy generated & its various by-products will be utilised by Industrial Chemicals to reduce its demand on the national grid and energy consumption.

Appendix B3 6b – Changes in energy

The gas supplied to site & directly into the engines. The gas is burnt in the engines & electricity is generated via connected alternators. The hot exhaust gases are used to produce steam via waste heat boilers which is then supplied to various plants within permit BJ7298IF that require steam for their operations. There are two closed circuit cooling systems for the engines, high temperature hot water which is used as heat source for the absorption chiller to again supply cold water to various plants within permit BJ7298IF that require this chilled water as part of their processes and low temperature hot water, which is also supplied to processes within permit BJ7298IF that require hot water as part of their operating processes.

Appendix B3 6c Climate Change Levy

The gas supply to the main ICL site is where the gas for the power plant is taken from. At the power plant connection we have a primary gas sub-meter that monitors all gas delivered to the plant, in addition we have 12 secondary gas sun-meters (2 on each engine) which act as a backup in case of the failure of the primary sub-meter.

On the input side (gas fed into the power plant); as the gas is being used for the generation of electricity the gas is not susceptible to the main rates of CCL but instead is susceptible to the CPS (Carbon Price Support) rates of CCL. Industrial Power Ltd (IPL) will qualify for the CHPQA (Combined Heat and Power Quality Assurance Programme) which relieves the CPS rates of CCL by 100%, in other words by qualifying for the CHPQA this removes all CPS rates of CCL charges on gas fed to the power plant.

On the output side (electricity generated); due to IPL qualifying for the CHPQA no CCL is charged on power supplied to on site processes operated by either IPL or Industrial Chemicals Ltd (ICL). However any electricity generated by IPL which is exported to the local area network via the IPL grid connection will be subject to the CPS rates of CCL.

Appendix B3 6d Raw Materials, other substances & water

The engines being stalled in this plant are operated using only natural gas as per their design. The 2 boilers that will be installed to heat the water, will be fed by mains water and the use of boiler treatment chemicals will be the only other addition to this system. The use of boiler treatment chemicals is used to ensure that boilers operate efficiently and reduce the build-up of scale within the boilers. The presence of this scale can over time render the boilers inefficient and then standard maintenance processes will take longer and then the machines will be prone to damage.

Appendix B3 6e Waste Avoidance

The engines are designed to use natural gas only and as such there is only the unused gases within the natural gas formulation that are waste and will be emitted to air. At this point in time, there is no technology available or process operated on the sister site (Industrial Chemicals Limited) that would use the NOx gases or the COx gases produced in their production. The thermal energy from the tri-generation power plant in the form of steam and cooling will also be sold under contract to Industrial Chemicals for the various processes on site that require steam/heat/cooling to enable their manufacturing processes to be completed. It is estimated (as this is a new plant & exact figure-work will not be available until the plant becomes operational) that there will be boiler-down waste water that will not be suitable (due to the trace metal & boiler treatment chemical content) for use elsewhere on the site. This boiler blow-down water would then be discharged via the surface water drainage system on site to the River Thames. The way that the boilers are dosed with the treatment chemicals, is done by calculation of the existing water hardness and will be automatically dosed and then, automatically discharged. Boiler blow-down from the Industrial Chemicals permit (BJ7298IF) already has consent in its permit to discharge to the River Thames, as does the National Grid site (adjacent to both Industrial Chemicals & Industrial Power) and utilises the existing surface water drains. The volume from this discharge along with the existing permitted volumes still is nowhere near the volume that the previous power station that was located on this site discharged to the river.

There will be waste oil stored on site which is generated from the 6 Jenbacher gas engines, this waste oil will be collected periodically by an approved licenced waste carrier and sent for recycling at a permitted site.

Appendix B3 Appendix 1 11 Cost benefit assessment

No cost benefit assessment was carried out, as the power being generated by the power plant was to be sold to the sister company of Industrial Power, known as Industrial Chemicals Limited. The power generated is to be sold to Industrial Chemicals to power the Chlor-alkali plant that currently operated under permit BJ7298IF, as Process 3. This will be added to the EPR permit BJ7298IF as a Directly Associated Activity. The same also applies to any steam or hot water generated by the power plant. These will also be sold to Industrial Chemicals to help reduce the burden to the National Grid and the general power depletion that operating Process 3 creates. The power plant will generate enough electricity to operate Process 3 plus other EPR processes that currently operate under the permit BJ7298IF and also if there is any spare, any future processes that could operate under permit BJ7298IF.

Appendix B3 Appendix 1 12 Combined Heat & Power Assessment

There is no combined heat & power assessment for this project & process. The power generated by this process will be supplied directly to Industrial Power's sister company Industrial Chemicals Limited who's facility/permitted area can be located directly beside the power plant. All hot water 7 steam produced by the power plant along with the electricity will be supplied & sold to Industrial Chemicals to provide heat, steam & power to the processes that are operated under permit no. BJ7298IF. There will be no surplus energy, hot water or steam, due to the nature of the manufacturing processes that are currently being operated on the site and with the technology currently used by Industrial Chemicals on other sites for possible/potential products that could be also eventually produced under permit at the West Thurrock site, would also use any surplus steam & hot water and depending on the volumes of products manufactured, then may still be some requirement to take power from the national grid to produce extra steam & hot water. The aim of the two permits with regards to operations is that they are symbiotic and need each other to survive and operate.