H-CC 5-11c- Abatement Details

The proposed cremators operate on a clean-burn principal and incorporate secondary combustion zones designed to maximise the destruction of harmful pollutants. The design is such that the cremators are able to maintain the products of combustion at a temperature of at least 850°C for a period of not less than two seconds. This both maximises combustion efficiency and ensures the destruction of pollutants such as carbon monoxide, organic compounds and dioxins and furans.

In normal use, the cremators will operate with a minimum secondary chamber temperature of 800°C as is required in the relevant Process Guidance Note. This reduction in temperature has a minimal impact on the emissions abatement performance as the it is offset by an increase in secondary chamber residence time and, for some pollutants, the use of the abatement reagent. (The primary benefits of the lower temperature are the reduced cremator gas usage and shorter preheat times.)

The hot flue gas leaving the cremator (>800°C) is immediately cooled by the flue gas cooler to below 170°C. This rapid cooling of the flue gas minimises the reformation of dioxins and furans which had previously been destroyed in the cremator.

Any dioxin or furan not destroyed by the abatement process will be absorbed by the activated charcoal component of a reagent which is added to the flue gas after it leaves the flue gas cooler. This use of activated carbon is accepted as the best available method of abatement for PCCD/F and the technology is similar to that offered by all other cremator manufacturers. In this instance, fresh reagent is added throughout the cremation cycle. The dosage rate is such that it will ensure that there is sufficient carbon present to remove any peak pollutant concentrations which may occur during a cremation e.g. when the coffin breaks open.

Particulate emissions from the new cremators are initially minimised by the design of the cremator itself, in particular: the hearth, the flue ways and the combustion air arrangements. This good design should ensure that the amount of solid material left on the hearth is maximised. To further ensure particulate emissions are minimised, access will be provided to cremator flue ways to allow them to be cleaned at regular intervals. Any particulate discharged from the cremator itself will be removed by the use of use a high efficiency bag filter which has a collection efficiency of 99%. These units are self-cleaning to ensure maximum efficiency and incorporate differential pressure monitoring to detect any deterioration in the filter integrity.

The emissions of pollutants such as: hydrogen chloride, sulphur dioxide and mercury are essentially dependent upon the composition of the coffin and its contents rather than being a function of cremator design. Emissions of these pollutants can only be reduced by the application of flue gas abatement plant, which in this instance is being fitted.

In the case of mercury emissions these are to be reduced by via two abatement routes: the particulate filter and the addition of an active reagent. After the flue gas cooler, flue gas temperatures are less than 170°C at the bag filter. This means that a fairly high proportion of the mercury in the cremator flue gas is present in a solid phase rather than a vapour form and will be therefore be collected directly in the bag filter. Any mercury present in vapour form is adsorbed by

the activated charcoal component in the reagent additive and this too will be collected in the bag filter. This method of abatement is again the industry standard and considered to be the BAT option.

Hydrogen Chloride is produced by the incineration of the human remains and is not destroyed in the combustion process. The plant has been designed so that flue gas temperatures exceed the acid dew point throughout the cremation equipment. This means the acidic components in the flue gas are present in vapour form only and will not be removed by a bag filter. To overcome the problem, a powder reagent is added to exhaust gas stream which reacts with the acid gas to form an inert, solid waste product which will be removed by the bag filter. The component in the abatement additive used for HCl removal is sodium bicarbonate. As with the other abatement techniques used in the proposed plant, this process is generally accepted to be the most appropriate for acid gas abatement and is similar to that offered by all other cremation equipment suppliers.

Emissions levels of SO_2 from cremators are very low and no limits are applied. The amount present is directly related to the nature of the charge and are as such not related to the cremation process itself. Emissions testing has indicated unbated concentration levels to be less than 20 mg/m^3 and this will be further reduced by the abatement plant.

Emissions of NOx from cremators primarily relate to the material being cremated and the manner in which combustion takes place. No limits apply to NOx emissions; however, the Novus cremator incorporates low NOx burners as part of the design and the manufacturer can provide a SCR abatement option.

Carbon dioxide is produced by the combustion process and this is solely dependent on the type and mass of material being cremated. Other than minimising gas usage, the amount of CO_2 emitted is beyond the control of the operator. Modern cremators are however fairly energy efficient and staff will be made aware of efficient operating techniques.