ANNEX 2

ANNEX ON INSTRUMENTS

This Annex provides general descriptions of the major instrumental methods of chemical analysis which have been referred to in the main part of the Report. All of these techniques are now available with integrated computer-controlled operation and with dedicated computer-based data storage, data manipulation and information display capabilities. The integration of the basic instrumental methods with microcomputers and advanced information display techniques has increased the utility and versatility of the instrumental techniques very greatly. These comments apply to all the instrumental techniques described in this Annex and will, therefore, not be repeated under each Section.

Gas Chromatography

Gas chromatography (GC) is primarily a method of separating a mixture of volatile compounds into the individual components by partitioning the mixture between a liquid stationary phase and a flowing gas stream, usually at elevated temperatures. The nature of the stationary phase, and the temperature programme used, both of which can be varied, are the major factors which affect the effectiveness of separation of the components of the mixture. A variety of different detectors can be used to detect the individual components as they emerge from the chromatographic column.

Although GC was developed primarily as a means of separating complex mixtures into their individual components, continued development of the technique now enables it to fulfil additional functions. For example, by using detectors which are specific, or relatively specific, for certain atoms, the presence of chemicals containing those atoms can be demonstrated by GC techniques; examples are the atomic emission detector (AED, for individual elements), thermoionic detector (NPD, for phosphorus and nitrogen), flame photometric detectors (FPD, for sulphur and phosphorus), the electron capture detector (ECD, for halogen atoms) and the flame ionization detector (FID, for carbon/hydrogen/oxygen compounds). The detectors now used are very sensitive, detection limits frequently being at the picogram level.

GC is not intrinsically an identification technique but when the same sample is separately analysed under a variety of different chromatographic conditions