

POSSIBLE TECHNIQUES FOR NON-INTRUSIVE ANALYSIS

X-Ray Methods

7. The use of X-ray methods is one technique considered to be of potential value in enabling a picture to be obtained of the interior of sealed containers such as munitions and bulk storage containers. Comparison of such an X-ray picture of the internal construction of a munition with a data base for other, conventional, munitions or direct observation of the X-ray may enable conclusions to be drawn regarding the likelihood of the particular munition under examination having a chemical fill; the necessary data bank will need to be developed and practical means of carrying out the comparison on site will need to be devised. The simple exercise of taking two X-ray pictures of the same container when inclined at different angles can, for example, reveal a liquid fill by the movement of the meniscus. Use of X-ray methods may, however, also reveal other details of the internal design and construction of such sealed containers in addition to providing information on the possible nature of the fill.

8. Following the first meeting of the TGI the UK has held discussions and observed demonstrations of X-ray methods for non-destructive inspection of materials with experts, including some from manufacturers and suppliers. The conclusions so far drawn are encouraging.

9. Portable equipment is available, although developed for other uses. X-ray equipment designed specifically to support CWC on-site inspections will be readily transportable but may not be man-portable; similar comments apply to gamma radiography (see below). The power and shielding requirements referred to in CD/CW/WP255 do not appear to impose such significant constraints as was anticipated at the time that paper was written.

10. An unexpected finding was that a modification of X-ray methods, using gamma radiography, may well enable information to be obtained on the physical state of the contents of a sealed container and in particular whether it has a 'liquid' fill. This merits further study in order to assess the feasibility and practicality of using X-ray/gamma radiography to deduce the presence of a liquid fill in sealed containers.

11. It is likely that sufficient information is already available to permit the construction, by suitable combination of existing modules, of a demonstration instrument specifically for CWC use once the specific instrument design parameters have been identified. These need to be related directly to the perceived role and concept of use of such an instrument in supporting on-site verification inspections. The definition of the role and detailed concept of use, therefore, needs to be defined and agreed.

Ultra-sonics

12. Some discussions have been held with experts in the field of ultra-sonics and it has been confirmed that ultra-sound could give information on the physical state of the contents of a sealed container. In particular it may well be possible to distinguish between contents that are solids, are powders or are liquid. Information may also be elucidated on particle sizes in the case of powders and on viscosity and density of any liquids present in sealed containers, thus further characterising the