ENVIRONMENTAL TESTING FOR ANTHRAX SPORES

IMPORTANT – PACKAGING REQUIREMENTS - SAMPLES MUST BE PACKAGED CORRECTLY FOR TRANSPORT.

HSE will supply sample kits with the necessary containers and packaging to be used for transportation to HSE's Science and Research Centre Buxton. These kits are available on request and are free of charge. Please use this packaging.

These samples are classified as 'Diagnostic Samples' and can be sent by Royal Mail. The package should be labelled "BIOLOGICAL SUBSTANCE, CATEGORY B." Adjacent to this, inside a diamond mark whose lines are at least 2 mm thick, must appear the text "UN 3373" in characters at least 6 mm high.

Routinely 10g of sample is used in the analysis, although smaller samples of around 1g can be tested. Place sample in to supplied clear plastic container. Surround sealed container with absorbent material and place in green plastic container. Place green containers in a suitable box with appropriate packaging. Label outside of the box as described above.

If you are using your own packaging, please make sure each sample is packaged in a rigid container, surrounded by absorbent material, and then double-contained in a second rigid container with appropriate packaging before placing all samples in a strong outer box. The samples and outer box must be labelled as described above.

Customer Information

Current prices are available from our website at:

http://www.hsl.gov.uk/online-ordering/analytical-services-and-assays/microbiology

Samples should be dispatched together with a completed EM2 Analysis Request Form (describing the nature and number of specimens for analysis) accompanied by a How to Pay form – these can be found here:

http://www.hsl.gov.uk/online-ordering/analytical-services-and-assays.aspx

and despatched to:

Sample Reception, Room L.2.51, HSE Science and Research Centre, Harpur Hill, Buxton, Derbyshire, SK17 9JN

Customers are informed by telephone or email of the results as soon as they are available and this is followed by a written report of the results within 7 working days. Typically, if a positive result is found from, for example, an area of building land, a further set of samples is submitted for testing focussed on a specific location to verify initial tests and determine the extent of contamination.

Analysis for anthrax must be carried out in isolation and samples will be destroyed following analysis, therefore if further analysis is required, duplicate samples must be provided. Please contact the Sample Reception Team (0203 028 3383 or registration.sample@hse.gov.uk) for further advice.

Exclusions

Samples that arrive damaged or in incorrect packaging may not be analysed.

Preparation of witness statements and cost of Expert Witness appearance must be negotiated separately.

Limited interpretation of results for sampling carried out in an environment not observed by scientists.

Accreditation

HSE Science Division operates a quality management system certified by Lloyds as complying with the ISO 9001 standard.

Background Information

The bacterium *Bacillus anthracis* is the causative agent of the disease anthrax. It is a bacterium which produces spores - cells with tough outer coats that allow survival for many years in the environment. Once the spores enter an animal or human, the spores return to actively growing bacteria and cause disease.

Bacillus anthracis is a disease of herbivorous animals (cattle, goats, sheep, horses) which are infected after ingesting spores from the soil. An infected animal sheds bacteria back into the soil, thus continuing a cycle of infection. Anthrax as a disease in animals is prevalent in tropical/subtropical regions in many areas of the world, including Africa, the Middle East and southern Asia. The disease can be passed on to humans by direct contact with the spores or through contact with infected animal products.

Anthrax in humans is a rapidly developing infection either of the skin, lungs or intestines. Skin infection (cutaneous anthrax) can be caused by direct contact with spores or from contaminated wool or hides. Infection of the skin results in dry black scabs forming at the point of contact. Pulmonary (lung) or inhalation anthrax, caused by breathing in the spores, results in fever, haemorrhaging of the lung, shock and eventually death unless promptly treated with antibiotics. Intestinal anthrax can occur following the consumption of poorly cooked contaminated meat, but is only a potential problem in developing countries.

Monitoring for the presence of anthrax spores in the environment

Human anthrax infection in the UK is rare, averaging less than one case per year for the last ten years. However, there is the potential for human exposure to anthrax spores through contact

with contaminated environmental samples, especially as the spores can survive in the environment for decades. The following workplace activities pose a potential risk as follows:

- Handling contaminated animal products, such as imported cashmere goat hair or wool, from countries where animal anthrax is endemic. Under previous HSE administered legislation, the Anthrax Prevention Order (now subsumed under COSHH) and in HSE guidance HSG174 Anthrax; Safe working and the prevention of infection, there were specified disinfection procedures to eliminate anthrax spores from animal hair, but if these are not followed there may be a risk of anthrax spores being present and it is appropriate to consider testing as part of the risk assessment prior to handling the materials.

- Other animal products such as untreated leather or bonemeal from anthrax endemic countries potentially can also be contaminated.

- It was the practice years ago to use animal hair to strengthen plaster during premises building. Because of the ability of anthrax spores to survive for long periods, it is possible for them to be present in building material if contaminated animal hair was used and potentially they could be released into the atmosphere in dust from renovation work.

- Land previously used for animal based industrial processes, e.g., tanneries, abattoirs, or agricultural land where diseased animals have been buried, could potentially have 'hot spots' of anthrax spores in the soil.

Testing Method

The analysis carried out tests for the presence of anthrax spores in environmental samples based on molecular methods (DNA detection) and culture-based methods. A representative sample is mixed with a nutrient solution and incubated overnight. At the same time, bacterial agar growth medium plates inoculated from the samples are incubated. The following day, any colonies on agar plates which have the appearance of *Bacillus anthracis*, and subsamples from the incubated solutions, are treated to extract DNA. A technique called polymerase chain reaction (PCR) is then used to amplify (increase in concentration) any DNA sequences present that are unique to virulent *Bacillus anthracis* (i.e., capable of causing disease). The tests are compared with sequences from *Bacillus anthracis* DNA (positive controls) to give a test result for presence or absence of *Bacillus anthracis* from a sample.