Advice Sheet 3 – Treatment Methods to Deal with Bacteriological Contamination

South Hams District Council

Ultra Violet

This tends to be the most popular method of dealing with bacteriological contamination in private supplies. A mercury discharge lamp irradiates the water, killing micro-organisms, by disrupting DNA. Disinfection efficiency is affected by water quality and flow rate. Consequently, water to be treated must be low in both colour and turbidity. Poor quality water should be improved prior to UV disinfection. UV irradiation equipment is compact and simple to operate. Maintenance requirements are modest, although specific maintenance is necessary ie regularly changing of the particulate filter and bulb. Other advantages include short contact time and the absence of any known by-products with any significance to health. The principal disadvantage is the absence of any residual effect, necessitating careful attention to hygiene in the storage and distribution system. Some organisms are resistant to UV irradiation, notably the parasitic ones such as cryptosporidia and giardia. If these parasites are likely to be present, enquiries should be made of the supplier/installer as to the efficiency of prefilters to remove these organisms.

Chlorination

Chlorine is continually dosed into the water to maintain a residual chlorine concentration to destroy any bacteria which may be present in the supply. If the quality of the water and hence the chlorine demand of the water varies appreciably, it is necessary to use a control system to maintain a constant chlorine residual. Free chlorine residual should remain in the range of 0.2 to 0.5mg/l, with a recommended contact time of at least 30 minutes. This is a costly labour intensive system and is generally only used for large supplies.

Ozone

Generated at the point of use, ozone is a gas produced by the discharge of an alternating current through dry air. The ozone-containing air is mixed with the raw water in a contact column. The oxygen atoms are linked in an unstable structure and are ready to combine with oxidisable matter immediately on contact. This is the property which makes ozone so potent in disinfection.

Ozone is not used for the disinfection of small supplies because of the power requirements, complexity of the equipment and relatively high capital cost.

Ceramic Candle Filtration

In this type of filter, contaminated water is allowed to filter slowly through a porous ceramic material which can filter down to 1 micron in size. This method of treatment would be effective in dealing with *cryptosporidium* and *giardia*. The filters may also be impregnated with silver, which inhibits the growth of bacteria.

Candle filters should be designed to minimise the risk of recontamination of water after filtering. Most commercial filters consist of two interlocking containers. The upper container for the candle(s), into which the raw water is poured, is usually fitted with a lid. The base of this container fits securely onto the top of the lower container; an overlapping lid prevents recontamination of the filtered water. The lower container, which collects filtered water, is fitted with a tap near the base to allow hygienic withdrawal of the water. It is important that the manufacturer's instructions for cleaning and the safe life span of the filter should be carefully followed.

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