



Information Sheet 2: Generic screening criteria

About this Information Sheet

This Information Sheet provides background material on the analysis and interpretation of the findings of an investigation of land contamination under *Part 2A of the Environmental Protection Act 1990* and the *Statutory Guidance* (DEFRA 2012). It should be used in conjunction with the method statement entitled 'Analysis and Interpretation Methodology for the Soil Investigation at Grenfell Tower'.

Generic Screening Criteria

Generic screening criteria (GSC) are criteria derived using largely generic assumptions about the characteristics and behaviour of soil contaminants, pathways and receptors. These assumptions will be conservative in a defined range of conditions. It is a similar definition to the generic assessment criteria (GAC) defined in good practice (DEFRA and Environment Agency 2004, Environment Agency 2019), but recognises the distinction made between different criteria under *Part 2A*.

GSC are contaminant concentrations in soil that for a reasonable worst-case exposure scenario are likely to pose a very low (without appreciable risk or minimal risk) or low risk to the health of site users (Environment Agency 2009a and 2009b, CL:AIRE 2014). They are derived from estimations of exposure to chemicals in soil using the CLEA model (Environment Agency 2009b, LQM and CIEH 2015, CL:AIRE 2014), taking into account different land use scenarios (such as residential, allotments, and public open spaces), which are compared with either a health criteria value (HCV) or a low level of toxicological concern (LLTC). An HCV is considered representative of either a lifetime exposure without an appreciable health risk (such as a Tolerable Daily Intake) for chemicals exhibiting a threshold effect or a minimal cancer risk (such as an excess lifetime cancer risk of 1 in 100,000) for genotoxic carcinogens where there is no theoretical threshold for adverse effect (Environment Agency 2009a). An LLTC represents a lifetime exposure of low concern for chemicals exhibiting a threshold effect or a low cancer risk (such as an excess lifetime cancer risk of 1 in 50,000) for genotoxic carcinogens (CL:AIRE 2014). In some specific cases, GSC are based on practical or regulatory levels in other media including air and drinking water and therefore may be based on a greater risk to the general public (for example, GSC for arsenic are often based on the drinking water standard (LQM and CIEH 2015) and for lead at a level of risk considered to be pragmatic (CL:AIRE 2014).

Before using GSC, the assessor must consider the robustness of the 'reasonable worst-case' assumptions underpinning them for the specific site circumstances and seek expert advice if necessary if unusual circumstances are identified. As GSC are developed according to land use exposure scenarios, it is especially important to consider situations where site use may differ from the assumed activities.

The hierarchy adopted for Stage 1 of the investigation at Grenfell Tower was (AECOM 2019):

[Category 4 Screening Levels \(C4SLs\)](#)

- GSC that are indicators of low risk to health (derived using an LLTC) and are intended to be used to identify *contaminant linkages* in *Category 4* of *Part 2A* (CL:AIRE 2014, DEFRA 2014). The C4SLs are proposed to be more pragmatic (whilst still strongly precautionary) compared to other GSC such as SGVs and the S4ULs (see below). C4SLs have been published for four trace elements (arsenic, cadmium, lead, and hexavalent chromium), benzene and benzo[a]pyrene.

Suitable for Use Levels (S4ULs)

- GSC published by LQM and the Chartered Institute of Environmental Health (LQM and CIEH 2015) that are broadly indicators of exposure without appreciable health risk or with minimal cancer risk (derived using an HCV). They are in line with developments in UK human health exposure assessment since 2009, in particular the additional land uses and exposure assumptions included in the CLEA model (version 1.07) and also reflected in the C4SLs. S4ULs are presented for an extended range of 89 substances including many metals, BTEX¹ and other hydrocarbon fractions, polycyclic aromatic hydrocarbons, phenols, chlorinated solvents and other volatile organic compounds, pesticides and explosives.

Soil Guideline Values (SGVs)

- GSC published by the Environment Agency (in 2009) that are indicators of exposure without appreciable health risk or with minimal cancer risk (derived using an HCV). They do not take into account the updated guidance on exposure assessment in the C4SLs (and are older than S4ULs). Although SGVs have been largely superseded by more recent guidance, the SGV for dioxins, furans and dioxin-like polychlorinated biphenyls are still used.

In the absence of a published C4SL for a specific contaminant, the principles of their derivation are applied by land contamination specialists to derive equivalent 'in-house' values. In the absence of an appropriate S4UL or SGV, if an HCV is available, the in-house criteria are derived using the more precautionary approach (and are consistent with S4UL and SGV values).²

In the absence of sufficient evidence to derive an HCV or LLTC, and therefore subsequently to derive GSC, specific advice from public health professionals is required. In some cases, a margin of exposure approach may be appropriate, for example when taking into account advice from authoritative organisations such as the Committee on Toxicity of Chemicals in Food, Consumer Products, and the Environment, or the European Food Safety Authority, which involves comparison between an estimate of exposure from soil (derived using the CLEA model) with an appropriate point of departure from toxicological data (such as a BMDL₁₀) to determine the ratio between exposure and toxicity (the higher the ratio, the less likely there is of a risk to health). The specific margins for minimal cancer risk or very low risk (that is, without an appreciable health effect) will vary from contaminant to contaminant based on the availability of toxicology data and potential toxic effects.

¹ An acronym for benzene, toluene, ethylbenzene, and xylenes.

² According to Defra (2014), the C4SL approach would have been applied to all contaminants of potential concern in this investigation. However, for many contaminants the LLTC, which requires specialist toxicological input, has not yet been derived and in some cases there may be insufficient evidence to deviate from an HCV representing an exposure either without appreciable health risk or a minimal cancer risk.

References

AECOM, 2019. COPC toxicity, Technical Note 8.

CL:AIRE, 2014. Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, Final Project Report SP1010. Available at: <http://randd.defra.gov.uk/Default.aspx?Module=More&Location=None&ProjectID=18341>

COC, 2018. Cancer risk characterisation methods, COC Guidance Statement G06 – version 1.1. Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/803675/G06_Cancer_Risk_Characterisation_v1.1.pdf

DEFRA, 2014. Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination: Policy Companion Document. Available at: <http://randd.defra.gov.uk/Default.aspx?Module=More&Location=None&ProjectID=18341>

DEFRA, 2012. Environmental Protection Act 1990: Part 2A. Contaminated Land Statutory Guidance. Available at: <https://www.gov.uk/government/publications/contaminated-land-statutory-guidance>

DEFRA, ENVIRONMENT AGENCY, 2004. Model Procedures for the Management of Land Contamination, Contaminated Land Report 11.

ENVIRONMENT AGENCY, 2019. Land contamination: risk management. Available at: <https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks>

ENVIRONMENT AGENCY, 2009a. Human health toxicological assessment of contaminants in soil. Science Report SC050021/SR2.

ENVIRONMENT AGENCY, 2009b. Updated technical background to the CLEA model. Science Report SC050021/SR3.

LAND QUALITY MANAGEMENT LTD, CHARTERED INSTITUTE OF ENVIRONMENTAL HEALTH, 2015. The LQM/CIEH S4ULs for Human Health Risk Assessment. ISBN 978-0-9931084-0-2.