

## **Chartership guidance note for geoscientists specialising in contaminated land**

Many geoscience graduates specialise in land contamination work. Candidates may apply for Chartered Geologist (CGeol) or Chartered Scientist (CSci), both of which have equal standing and convey the same professional status. Candidates applying for CGeol must specifically prove their competence against the following Chartership criteria:

1. Understanding of the complexities of geology and of geological processes in space and time in relation to their speciality
2. Critical evaluation of geoscience information to generate predictive models

A first degree in a non-geological subject does not preclude candidates from successfully achieving CGeol status providing the above competences are met. Candidates who cannot meet these requirements, including geoscience graduates who are now more involved with other sciences like chemistry, toxicology, physics and biology may find it more appropriate to demonstrate competence under the criteria for CSci. Candidates should seek advice and guidance from their mentor, and from the Chartership Officer at the Society in preparing their application, and for the most appropriate route to chartership.

As a guide, candidates are expected to be experienced and proficient in:

- Environmental Management including licensing, permitting & waste management
- Site Investigation: planning, drilling, sampling and preservation, field and laboratory testing, and health & safety
- Contaminant hydrogeology: physical hydrogeology with interaction of contaminant fate and transport processes
- Gases to receptors including humans, controlled waters, ecology, buildings and services. Some applicants will also have a knowledge of radiological risks
- Remediation options appraisal and strategy development, including understanding of remediation techniques and how to assess the feasibility of various options against criteria such as sustainability
- Remediation implementation, including design, monitoring, setting up, operation, decommissioning, verification and validation of the process
- An appreciation of other inter-related disciplines including: geotechnics, hydrology (drainage, and flood risk), ecology, geophysics, archaeology, stakeholder engagement, project management, financing, valuation and insurance

In addition to the scientific methods which inform their work, those specialising in land contamination should understand the legislation and regulations applying in their country of work. For example, in England candidates should, as a minimum, be conversant with the following:

- DEFRA Circular 01/2006, Part 2A of the Environment Protection Act, 1990 (currently being revised); (*different versions apply in Scotland and Wales*)
- PPS 23 (currently being revised); (*different versions apply in Scotland and Wales*)

- BS5930:1999 as amended 2007: Code of practice for site investigations
- BS10175: 2011 Investigation of Potentially Contaminated Sites - Code of Practice
- BS 8485:2007 Code of practice for the characterization and remediation from ground gas in affected developments
- Environment Agency. 2010, GPLC1 Guiding Principles for Land Contamination
- Environment Agency 2000. R&D Publication 95. Guidance on the assessment and monitoring of natural attenuation of contaminants in groundwater
- Environment Agency. 2008 R&D Publication 66. Guidance for the safe development of housing on land affected by contamination

Current contaminated land regimes advocate a risk-based approach to the management of contaminated sites. Risk assessment incorporates the source/contaminant - pathway - receptor framework. It is fundamental that land contamination specialists apply their geological skills in the development and updating of conceptual ground models. This is because 3D (or 4D) conceptual site models (CSM) underpin the source-pathway-receptor framework. The conceptual model is used to design intrusive investigations; whose findings then allow the preliminary conceptual model to be updated with information from logging, aquifer testing, specialist sampling, analytical testing and monitoring (water, ground gas and vapour). The CSM can also be used to inform remediation options appraisal and to demonstrate how remediation has successfully broken pollutant linkages at a site.

Gaining Chartership for many Geoscientists specialising in Contaminated Land will be the first stage in their professional qualifications and with further appropriate knowledge and experience in land condition will be eligible to apply for SiLC (Specialist in Land Condition) status. For more information see [www.silc.org.uk](http://www.silc.org.uk) or contact the Society's SiLC representatives.

Many contaminated land investigation, assessment and remediation activities fall under the Engineering Geology discipline and as such reference to the Engineering Group Training Guide is recommended: <http://www.geolsoc.org.uk/cgeol>

One common area that scrutineers of contaminated land candidates have found to be lacking is not being able to demonstrate an appropriate level of understanding with respect to hydrogeology and controlled waters risk assessment. This includes appropriate conceptual site models including contaminant distributions characterisation of groundwater environments (not just the contaminated water but also heads, hydraulic gradients, permeabilities etc); migration and exposure pathways; guiding approaches to remediation and verifying remedial works. Being able to draw contaminant hydrogeology cross sections at the qualitative and quantitative stages of risk assessment is a unique contribution that earth scientists may specifically make. For these to be realistic the cross sections must be based on a sound understanding of the engineering geology of the site.