



NEWSLETTER

Welcome to our 10th newsletter featuring all our new developments and interesting activities in the field. With contributions from our members, our newsletters contain insightful new pieces and keep you informed of all our upcoming events and activities so you never miss out. We hope you enjoy reading our newsletter

SoBRA - Summer Workshop 2015



<http://www.bbc.co.uk>

“Uncertainty in Human Health Risk Assessment”

The North of England Institute of Mining and
Mechanical Engineering
Wednesday 15th July 2015

The sixth in our series of SoBRA’s summer workshops will be held in the North of England Institute of Mining and Mechanical Engineering on **Wednesday 15th July**, Newcastle upon Tyne (<https://www.mininginstitute.org.uk/>)

The workshop will cover uncertainty in:

- conceptual site model and site investigation;
- exposure parameters;
- toxicology and
- bioaccessibility testing.

The workshop follows the usual format - delegates can expect a series of presentations in the morning followed by focussed discussions in the afternoon breakout sessions.

The provisional programme is available at:
<http://www.sobra.org.uk/events/>

We look forward to seeing you there!

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SoBRA's vision for 2015

Each year presents a new opportunity for SoBRA to set out its vision for the next 12 months. SoBRA takes great pride in being a Society that the brownfield community considers in high regard. I believe that this is mainly due to SoBRA's ethos of inclusivity. When you join SoBRA, you do so as an individual, not as a company. Our members have the opportunity to feed into our sub-groups and we always welcome open discussions at our workshops and conferences.



To take this philosophy to the next level, you may have noticed the introduction of our new online voting system. Members had the opportunity to vote for committee members and the location (and topic) of the next Summer Workshop. We will continue to use this functionality of the website and we promise not to bombard you too many opinion polls!



A criticism of many UK events is that they tend to be London-centric. We have tried hard to avoid this and aim to make our events accessible to those across the country. Our workshops have been held in Bristol, York, Sheffield, Manchester and we wish to continue this pattern. This year's workshop will be in Newcastle upon Tyne and next year it will be in Wales.



SoBRA is known for the work of its subgroups. However it is important that we keep abreast of the trends and needs of the sector and ensure that our efforts are focussed on where they are needed. We therefore need to ensure that our subgroups deliver on their objectives and conclude, to provide opportunities for the creation of new subgroups. To this end, we are aiming for the Groundwater Vapour and Acute GAC subgroups to deliver their final reports and close this year.



If there are any areas of interest you would like SoBRA to focus on, we invite you to email us your thoughts and ideas to info@sobra.org.uk and we will add them to our list for consideration.



2015 is also a year in which we aim to refresh our website. This will increase our ability to automate admin processes, to ensure that we keep membership fees as low as possible, and host our upcoming Accreditation Scheme. This said, it brings me nicely to the final topic.



Other than its inaugural year, 2015 will be the most significant year for the Society with the launch of our Accreditation Scheme for Risk Assessors. As discussed in this newsletter, the scheme provides a way to demonstrate your competency as a brownfield risk assessor and provides a framework for professional development. We have the ambitious aim of launching the scheme this year, so watch this space. I believe it will be another interesting and successful year for the Society and I encourage our members to get involved and contribute where they can.



Christopher Taylor - Chair

SoBRA Accreditation Scheme for Risk Assessors

As you may be aware, SoBRA is developing a scheme to accredit brownfield risk assessors.

“Why another membership scheme?! What about all of the other schemes out there?” You might ask.

As a Society dedicated to brownfield risk assessment we firmly believe that there is a need, and a desire, to demonstrate competency in this field. Being “competent” is a requirement of the National Planning Policy Framework. Furthermore, the Contaminated Land Statutory Guidance allows Local Authorities to seek the assistance of “experts” during complex risk assessment. Where does one find these competent and expert risk assessors? SoBRA was approached by its members to look into the establishment of a scheme which would allow someone to demonstrate these credentials.



After much thought and discussion, we have decided to set up a two tiered system, the final version of which is still in development. The idea is that the two tiers create a framework for professional development.

- **Tier one** provides a skill set for junior staff, or those who have (or are aiming for) a solid foundation in the fundamentals of risk assessment.
- **Tier two** is aimed at senior staff, such as those responsible for signing off reports or undertaking more complex risk assessment



Our scheme has been designed to stand independently, as a home for brownfield risk assessors. It has also been designed to be compatible with the Land Forum’s National Quality Mark Scheme for Land affected by Contamination. Under this scheme, the Suitably Qualified Person (SQP) must sign a declaration stating that the work has been carried out by appropriately capable people (with reference to the Skills Development Framework) and that any specialist aspects (e.g. DQRA etc.) have been prepared or reviewed by an appropriately qualified/competent person. Being a SoBRA Accredited Risk Assessor means that you are such a person.



So joining this scheme (once it is launched later this year) provides a framework for professional development as a brownfield risk assessor for you and your staff, and a means to demonstrate to clients and regulators, that you are a competent risk assessor.

We trust that you will benefit by joining the scheme and that you will encourage others within your organisation to do the same. We will keep you updated with progress on launching the scheme, but in the meantime the latest version can be found at <http://www.sobra.org.uk/membership/accreditation-scheme>. In the meantime if you have any questions please email us at info@sobra.org.uk.

Feedback on the 2014 December conference Current issues in contaminated land risk assessment



Our joint Christmas Conference with the Royal Society of Chemistry at Burlington House in Piccadilly was sold out once again. The conference follows a popular format which includes a blend of regulatory updates, topical technical talks, updates on the progress of our subgroups, and our AGM.

We also had posters on display showing interesting case studies and research being undertaken by students in our field. In addition to all of this was excellent food, a glass (or two) of wine or a beer afterwards, and the opportunity to network with friends and colleagues from around the country. The conference is often described by delegates as “the highlight event of the year” and we hope to uphold this high standard. We look forward to seeing you all again at the end of the year.

Our next **Christmas Conference will be on the 16th December 2015**, so please pencil this date into your calendars.

SoBRA New Executive committee



Christopher Taylor
Chair



Lucy Thomas
Vice Chair



Simon Firth
Outgoing Chair



Hannah White
Treasurer



Jason Bale
Secretary



David Jackson
Website Coordinator



Frederic Coulon
Newsletter Editor



Theresa Cory
Ordinary member



Geraint Williams
Ordinary member



Alex Lee
Ordinary member

Update on SoBRA's Sub-Group Activities

1. Accreditation Scheme

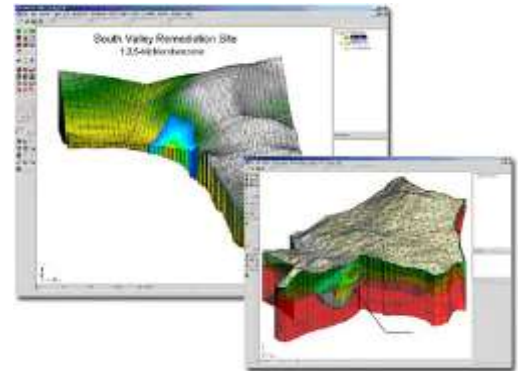
SoBRA is continuing to develop its scheme to accredit brownfield risk assessors. We held a survey in March/April this year, in order to obtain feedback from our members on the latest version of the scheme. The feedback was very positive with 83% of respondents happy with our proposed 2 tiered approach, and over 90% of respondents satisfied with the proposed skill level requirements. There were some very interesting and valid comments made, and the subgroup is meeting at the end of May to discuss these along with the next steps required to launch the scheme later this year. Details of the proposed scheme along with a summary of the results of the survey can be found at <http://www.sobra.org.uk/membership/accreditation-scheme>.



The success of the scheme will rely in part, on having a group of willing scrutineers, who will assist us in reviewing applications. If you are up for the challenge we would like to hear from you. Please express your interest in being a SoBRA Scrutineer by sending an email to info@sobra.org.uk.

2. Groundwater Vapour Modelling

The groundwater vapour modelling subgroup includes representatives (in alphabetical order) from Alcontrol, Arup, Ashfield Solutions, Atkins, Firth Consultants, Geosyntec, MWH Global, Naomi Earl, SLR Consulting, WorleyParsons and WSP Parsons Brinckerhoff. There had been a lull in activity over the last year, but now that both C4SLs and S4ULs have been published the subgroup has reconvened and is back on the case!



Prompted by feedback from SoBRA members and after much deliberation the subgroup has decided to derive the GAC based solely on exposure via vapour inhalation from groundwater (rather than including the additive effect of exposure from soil as well as was the original intention).

The GAC will be the concentration in groundwater protective of chronic health risks to the above ground receptor assuming that vapour migration and inhalation (indoors and outdoors) from groundwater are the only exposure pathways. Like any GAC the user will have to consider the applicability of this assumption within the context of their conceptual site model. For example, exposure to a given volatile contaminant may also occur from plant uptake or direct contact with groundwater (if shallow and/or abstracted for supply) or from overlying soil sources. In such circumstances, the assessor may have to consider additivity in exposure from these pathways.

The GAC will be derived using the updated inhalation rates used for the C4SLs project and updated health based guidance values, where available. Our intention is to produce a short technical report available to SoBRA members later this year that presents tables of GAC for various land-uses, how they were derived and how they should and should not be used. If you would like to be involved in the subgroup please email info@sobra.org.uk

3. Acute Generic Assessment Criteria

The subgroup currently comprises representatives (in alphabetical order) from AMEC Foster Wheeler, Environmental Health Sciences, ERM, Firth Consultants, Jacobs, Public Health England, URS and WSP Parsons Brinkerhoff.

The subgroup has developed a methodology for deriving acute generic assessment criteria (AGAC) for soils that are protective of human health for various acute risk scenarios. The methodology involves an initial risk screening to identify which routes of exposure (oral, dermal or inhalation) could present a plausible acute risk for a given contaminant. Algorithms have then been identified to calculate AGAC for child and adult worker receptors for each of these routes of exposure.

The methodology has been tested for nine contaminants: arsenic, benzene, cadmium, chromium VI, cyanide, lead, phenol, trichloroethene and vinyl chloride.

The acute toxicity reference values and AGAC are now being peer reviewed and the report is hoped to be published this summer. If you are interested in being a report reviewer then please email info@sobra.org.uk



4. Asbestos

The sub-group comprises representatives (in alphabetical order) from Alcotrol, Campbell Reith, ERM, Geotechnology, IOM, Jacobs, KIWA CMT Testing, Leap Environmental, Lucion, Mole Valley District Council, RSK, Smith Grant and AECOM.

The subgroup has completed the summer workshop report, which is freely available to SoBRA members at <http://www.sobra.org.uk/resources/>. Concurrently the group has been developing sampling protocols and is commencing work on the flowcharts. Data is being obtained from laboratories to demonstrate typical frequencies of asbestos found in soil and also the quantities found in soil so people understand the range found in soil.

Also, funding has been found and the asbestos in soil sampling programme is now underway. The progress will be published on the SoBRA website for our members use and subsequently will become part of the JIWG risk assessment chapter later in the year. In the meantime we really would appreciate our members and particularly any contractors in releasing anonymized data. For further details please visit [CL:AIRE webpage](#) on Asbestos in Soil, Made Ground, Construction and Demolition Materials



5. ISO/BS Standards

The subgroup has very recently been established to keep SoBRA members informed of developments in standards relevant to risk assessment. The aim is to allow members to receive, and hopefully comment on, drafts of standards as they arise. The group would welcome anyone interested in participating in the above, please email info@sobra.org.uk (copied to mike.quint@ehsciences.com and geraint.williams@alcontrol.com)



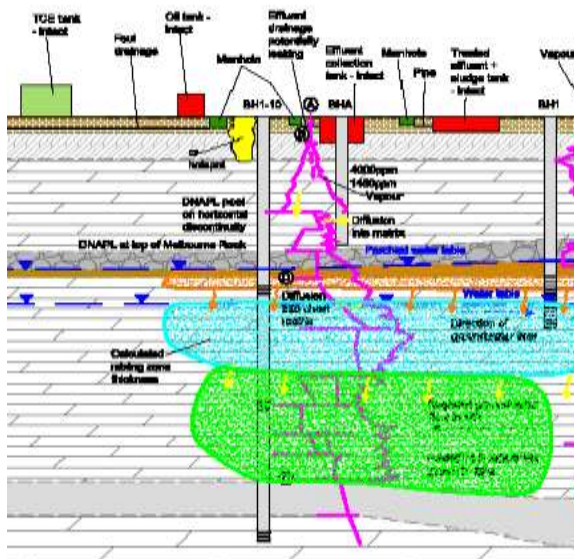
Case studies from the posters presented at the 2014 December conference



Case study 1: Site assessment and controlled waters DQRA of a former electroplating works on a chalk aquifer

Background

In 2010, under close liaison and involvement with the local authority and Environment Agency, RSK undertook a groundwater investigation of a site previously occupied by an electroplating works. Records of site inspections undertaken at the site by the NRA 1993 indicated that a number of illegal discharges had occurred on site and that the housekeeping of drummed chemicals and liquid wastes, and unbunded bulk storage facilities, was poor.



An inventory undertaken by RSK of chemicals stored at the site showed that there were a total of 88 tanks, tubs, drums or jars of potentially hazardous materials including trichloroethylene (TCE), zinc cyanide, sodium cyanide, various oils, acids and alkalis including chromic acid, and metal based dyes. An effluent tank and effluent pit were also located on the site and a CCTV survey of the sites chemical drains indicated that the drainage system was in a poor state of repair. Anecdotal evidence had been provided to the EA, that the sites drainage went to a soakaway on site, although no other evidence of this could be found.

The site was located in an environmentally sensitive location, on a Principal Chalk aquifer in a groundwater source protection zone to a nearby public supply well, which had ceased abstracting groundwater due to contamination with respect to chlorinated solvents, principally TCE. The site was suspected by the EA as being the source of chlorinated solvents in groundwater.

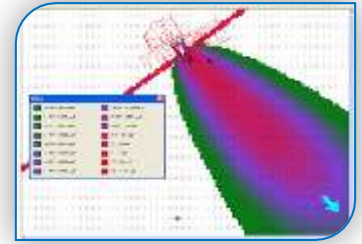
Challenges

The Client had limited funds available for investigating the site. Groundwater beneath the site was at a depth of some 20m below ground level and since solvents are dense non aqueous phase liquids (DNAPLS) and sink to the base of the aquifer (some 50m in this case), the investigation had to ensure that the extent of solvent contamination could be identified. This resulted in potential high costs for the client to install a number of monitoring wells across the site. This challenge was overcome by agreeing with the Environment Agency to install a single deep multilevel well to 50m adjacent to the previously identified source of the chlorinated solvent contamination on site. The well was installed with three groundwater monitoring ports at depths of 21m, 35m and 50m to assess the vertical extent of contamination.

The investigation was designed to gain as much information as possible from this single well. The EA gave RSK access to nearby off site boreholes to enable groundwater levels and the direction of groundwater flow to be determined. A second challenge was to locate the possible historic soakaway. This was achieved by excavating trenches in the likely area of the soakaway, spaced in order to obtain a 95% chance of locating the feature.

Outcome

The investigation identified a sequence of Made Ground and drift deposits (locally absent) overlying the White Chalk and Grey Chalk. The detailed logging indicated that the Grey Chalk was characterised by a sequence including the Melbourn Rock, Plenus Marls, Totternhoe Stone and Chalk Marl. The hydrogeological characteristics of the site were influenced strongly by this geological profile.



The physical properties of the Chalk determined by the investigation indicated a varied hydraulic conductivity and porosity with depth. The results of the investigation indicated a 'perched' aquifer at the top of the Chalk water table where the hydraulic conductivity was low. A 'deeper' aquifer was encountered beneath this 'perched' aquifer where the hydraulic conductivity was higher. The direction of groundwater flow from the deeper aquifer was indicated to be towards the public supply well. During the investigation DNAPL was not detected and using the 1% rule, it was concluded that the borehole was not down hydraulic gradient of a DNAPL source on site.

The results of the data analysis and conceptual hydrogeological model were used to undertake a detailed quantitative groundwater risk assessment utilising CONSIM. The results of this assessment indicated that TCE and heavy metal contamination originating from the site was perched above plenus marls and that the downward migration of contaminants was significantly hindered by the presence of this layer. Mass balance calculations for contaminants of potential concern indicated that there was greater mass of contamination in the deep aquifer, compared to that in the 'Perched' aquifer, indicating that the mass of contaminants migrating from the 'Perched' aquifer was reducing.

The results of the quantitative groundwater risk assessment confirmed that the site was not responsible for impacting the public supply well and indicated that groundwater remediation was not required, saving the Client hundreds of thousands of pounds in remedial costs.

Vivien Dent (VDent@rsk.co.uk)

Case study 2: Towards a unified bioaccessibility method for organic pollutants, and the potential consequences for brownfield redevelopment

S R Lowe¹, C D Collins², M R Cave³, C Vane³

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Background

Contamination in soils, particularly those associated with former industrial sites, is a significant barrier to the re-use of brownfield land. As such, much work has gone into exhaustive and extensive methods for the determination of potential contaminant levels, and the subsequent risk to human health¹. However, total contaminant concentration is only one part of the contaminated land puzzle.

In order to determine a physiologically accurate measure of risk, it is important to consider the fate of contaminants once they are consumed by the receptor – the bioavailable fraction of a known contaminant, which can be measured and expressed as a percentage figure in relation to a determined total soil concentration. In addition to greater physiological accuracy, and a more human health based assessment, the inclusion of bioavailability data can reduce overly precautionary assessment, which can deter the re-use of brownfield sites² and reduce the necessity for removal of contaminated soils and on-site remediation.

Bioavailability analogues for human exposure can be provided through *in vitro* tests, though these are associated with significant financial and ethical costs, and are time consuming. *In vitro* tests allow for the modelling of contaminant bioaccessibility, which can be used to simulate the bioavailable fraction found in animal studies within a much shorter timeframe, free of ethical issues and at lower cost, utilising laboratory equipment and facilities currently available to the contaminated land industry. The study outlined in this article explores the potential for a unified method for the assessment of bioaccessibility in POP (Persistent Organic Pollutant) affected soils.

Development of a method

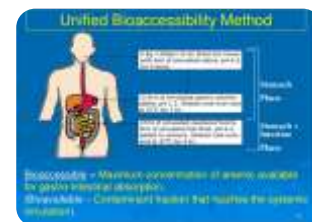
Although gaining momentum in the assessment of elemental contamination in brownfield soils, there is currently no accepted unified bioaccessibility testing method for the assessment of bioaccessibility derived risk from POPs, such as PAHs and PCBs, which are widespread in brownfield soils^{3,4}. Additionally, these compounds have a recognised tendency to accumulate within lipid rich body tissues⁵, presenting an elevated hazard to human health, and environmental longevity⁶.

This article introduces an EPSRC funded EngD project, a partnership between the University of Reading and British Geological Survey, to establish a unified *in vitro* bioaccessibility test, in accordance with the guidelines of BARGE for physiological accuracy and repeatability. The project includes the assessment of bioaccessibility of PCBs from soil matrices using the CE-PBET (Colon Extended Physiologically Based Extraction Test) and FOREhST (Fed ORganic Estimation human Simulation Test) methods, developed at the University of Reading and British Geological Survey respectively. Both methods have been utilised in previous studies to test for bioaccessibility in PAH contaminated soils^{7,8}. The project also aims to explore novel and existing chemical clean-up methods in order to maximise analyte recovery from produced supernatant samples.

Current work and outcomes

The project is currently investigating PCB bioaccessibility from soils associated with an accidental dispersal of PCBs due to a fire at former industrial site. The study consists of soils from 34 locations, and is being run in parallel with an *in vitro* study, using samples from the same sites, operating at the Universite de Lorraine. Bioaccessibility tests are being conducted using both methods, and assessed using GC/MS at the British Geological Survey.

This work is expected to lead into further bioaccessibility studies linked to former industrial sites in the greater London area.



Final goal of the project is to investigate the role of physiologically based bioaccessibility modelling in brownfield land re-use. It is hoped that the development of a versatile, repeatable unified method will encourage greater brownfield re-use, and lead to a more sustainable outlook for urban development. The inclusion of a robust bioaccessibility element in contaminated land assessment will offer developers, Local Authorities and consultants more options in their recommendations for responsible and sustainable re-use.

Acknowledgements

This work is funded and supported by the Engineering and Physical Sciences Research Council (EPSRC), the University of Reading and British Geological Survey.

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SoBRA's Bursaries and Scholarships



SoBRA has a [bursary and scholarship scheme](#) available to SoBRA members to help promote research and furthering knowledge related to land contamination risk assessment in the UK.

SoBRA is looking forward to receiving applications for consideration.

Joining the Society – how, when?



We welcome applications for membership from individuals that have an interest in risk assessment. You can join at any time of the year and at any stage of your career. For further please visit our website at <http://www.sobra.org.uk/membership>

Members can renew their annual membership on-line and will be sent a reminder email to do so two weeks before their subscription is due. If at any stage you forget your password click on the link below the log-in box in the top left hand corner of the SoBRA website and follow the instructions you receive on the email that you will then receive.

Want to Contribute?

If you have an idea for an article or would like to include an event listing in the next SoBRA newsletter, please e-mail us at info@sobra.org.uk

