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STANDARDS, SUSTAINABILITY & BEST PRACTICE

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Working to Standards

One of the most common questions asked to labs:

"Is this in accordance with the standard?"

And the answer is not always as simple as you'd think…

Which standard? Compliant with or based on? And how does this fit into sustainability?

Lab methods, or perhaps more accurately the requests for lab work, fit (broadly) into 3 groups.

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Working to Standards

Tightly controlled methods (Topsoil/subsoil to BS3882 and 8601, most geotechnical testing, marine dredging permits as examples) where in order to use the data for the intended purpose the testing has to comply with a strict set of criteria which informs the ultimate decision rules.

For these, sample volumes, methodologies, even down to solvents and consumables will be dictated and it is something of a done deal for labs in terms of what they must do.

Any impact upon sustainability has to come from the consideration given in the generation of the standard and any ancillary activities that the lab can affect.

Working to Standards

Recommended methods – guidance on discharge permits, for example, which will accommodate multiple potential options for how to do it. A common inclusion on standards for some chemical tests are caveats such as “using an established method”, or “by an appropriate alternative method”, the below as an example from BS772:

> Determine the metal ion content using an established method, e.g. inductively coupled plasma spectrometry, atomic absorption spectroscopy, or flame photometry. Alternatively, determine and calculate the magnesium content following the procedure described in clause 10.

This gives rise to a degree of variability, usually encompassed within “In house method based on BS xxxxx”. This is very common where the basic principles of the chemistry remain, but the standard writers very kindly accept that instrumentation and detection techniques change over time and in some cases based on the specific context.

So there are potential elements from the derivation of the standards but also with a degree of latitude the lab can impact sustainability measures.

Working to Standards

No specification, refer to lab standard methods which may in themselves relate to a standard but otherwise are derived by the lab to meet a need or client requirement.

Whilst most analytical work is based on some standard, not all is, and others may take elements from multiple sources to try and achieve a satisfactory process. Particularly with the development of methods for newly emerging substances, the driving force is innovation and quality so the onus sits with the lab to ensure they have an eye on potential sustainability factors in their method development

Accreditation

And where does accreditation fit in?

In an ideal world all tests would be individually accredited for every possible matrix variation but we know that in a real practical world this is not possible.

Standard methods can be followed and not accredited (see above) and methods not directly in accordance with specific documented standards can be accredited.

Accreditation, to ISO17025 and/or MCERTS, is an indicator for the end data user that the lab is working within the confines of a quality standard and that the data inherently carries a degree of confidence.

The labs ISO17025 accreditation (QMS) includes elements of management of things like suppliers but it is down to specific labs policies and systems as to how they account for sustainability in their supply chain and operational processes.

Sustainability

So neither adherence to a standard method nor specific test accreditation is a guarantee of increased sustainability.

As Chris mentioned, standards should be considerate of sustainability in their creation but we're also trying to push the quality of the final data

Sample volumes are a big discussion point as the footprint and disposal is a major factor for labs

With advancements in instrumentation labs are able to reduce the volume of sample material needed to achieve lower LoDs, but that has to be balanced against getting representation in subsampling

- All recent guidance for asbestos testing in soils have agreed on a larger sample size, but then this then impacts up volumes needed, transport costs, disposal costs and consumables
- Specifications still exist, based on guidance and best practice, which instruct the collection of huge volumes (6 x 1kg tubs for a basic soil classification suite is my personal record)

Sustainability

Where can individual labs try to push their own agenda?

Energy – like a business, movements towards sustainable energy sources are a straightforward step. Labs have high energy demands (ovens, cooling, instruments, ventilation/extraction) which can't be compromised, but how we fuel those? Renewable energy sources, using heat exchange systems from the high output equipment, and good process management to minimize inefficiency

Logistics – Another unavoidable necessity is getting samples to the lab, and also in some cases onward movement within lab groups or subcontracting. Often reliant on 3rd party suppliers for services, this may come down to individual labs management of how they operate. Electric vehicles or sustainable fuel types, minimize outsourcing, centralizing functions, minimize packaging .

Sustainability

Recycling & Disposal – whatever a lab receives but doesn't use needs disposal, and often disposal is based around the hazardous nature of the material submitted. However… Examples seen across industry of

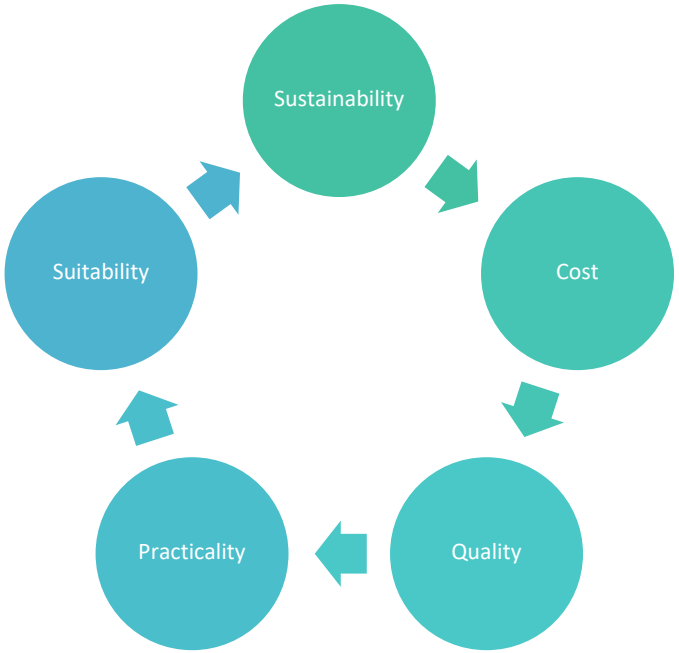
- Re-sue of material under specific waste codes for Earthworks materials, recycled aggregates and even ceramics
- Segregation of specific materials – glass, plastics, wood, aluminium, bubble wrap – for recycling by a number of specific companies
- Recycling/reuse of solvents in other lab areas
- Reductions in sample volumes – where not dictated by specific standards
- Use of less impactful solvents – where not dictated by specific standards

External activities – knowing a lot of what we do can only change so much, what can we do to offset that in other aspects of our lives and work?

Best Practice

Working to standards and best practice guidance should in theory mean that, with newer iterations more so, some consideration is given to sustainability.

But as ever, there needs to be an equilibrium between:



Best Practice

Standards or guidance may give a ‘technically superior’ approach, and have considerations of sustainability in it’s development but is their a solution that gives fit for purpose data which may minimize impact?

Best Practice

VOCs in soil

- Soil Vapour testing
- BS10176
- Traditional soil sampling
- PID

Each offer different solutions with different quality/detail of result but at markedly different cost and potential impact (consumables, solvents, logistical requirements, etc.)

Just because a standard may have allowances for sustainability in it's creation, doesn't mean it's the best solution in every situation.

Best Practice

- Context
- Data quality requirements
- Speed
- Cost
- Logistics/practicalities/location
- Matrix
- Accreditation
- Critical levels of interest

All considerations for delivering a fit for purpose and considered solution. And something every lab will be happy to discuss at project inception as to the most appropriate solution to a problem

Summary

Standards give us a great starting point for potentially sustainable solutions

Their use give greater consistency across the industry and clarity for the end data users

In the chemical lab industry at least there is still a lot of variety in both the potentially applicable standards and their application

In trying to get the best overall solution which encapsulates all factors then early engagement with your lab partner is essential.

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THE SUSTAINABILITY OF STANDARDS IN CONTAMINATED LAND INVESTIGATION

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UK Site Investigation

1970's - Nuisance issue

1980's – Waste, Brownfield land - Political issue

1990's – Environment Act, EA /SEPA, Water - Financial issue

2000's – CLEA, Waste, Sustainability – A Way Forward? Moral issue? Scientific basis?

Regulators established to police and provide advice on select parts of it

Planning established as the mechanism to capture contaminated sites

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Site Investigation and Sustainability

Site Investigation is driven by unknowns…

Concentrating on the contaminants of concern will improve sustainability

What do you already know? What do you need to know?

What is the best way to find out? What other aspects come into play?

Accessibility

Competence

Reliance

Scientific Certainty

Repeatability

Sustainability

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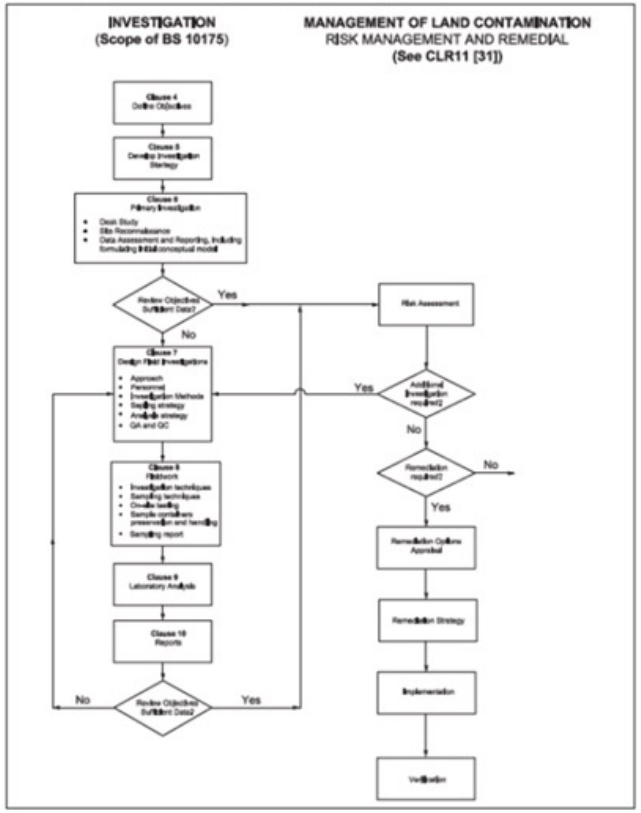
Standards

- Why use or create them?
- Promotes good practice
- Encourages innovation and passes on knowledge
- Levels the playing field
- Provides surety to Clients and Regulators
- Confidence in findings
- Promotes professionalism
- Avoids re-inventing the wheel…
- Produced and accredited by a national or international bodies
- Produced by experts in the field
- Subject to scrutiny by fellow experts, interested parties and public



Guidance Vs Legislation

- Most “standards” in our field are in fact guidance documents
- BS10175, BS8485, ISO18400
- “You should” not “you must”
- But… Usually expected to justify deviations from it
- Other bodies produce guidance, is it of equal relevance?
- Standards can also be suggestions or ways of doing things – i.e. guides to good practice
- Examples: AGS – Data Format, Asbestos, Site Investigation, Made Ground, Etc.

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Sustainability and Standards

Standards are supposed to promote sustainability

Following standards advice should be the most sustainable way of achieving their goals…

Compliance with legislation – little duplication of effort

Can be specifically related to sustainability:

ISO 18504: Sustainable Remediation

Can be present as a specific goal to achieve in many standards along with carbon reduction, cost effectiveness, etc. (9001,14001)

Sustainable doesn't always mean cheaper, but should ensure continuance

Clients often do not value Contaminated Land Risk Assessment, Investigation and Standards but view them as necessary evils driven by legislation… It can be so much more…

bsi.

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Sustainability

Can be designated as a goal during any part of the investigation, design and development process

Should ideally be in all of it from start to finish

Sustainable goals are not always the most cost effective in the short term but always will be in the longer term

Standards should suggest and reflect the most sustainable way of undertaking a specific task

Compliance with standards should therefore be sustainable by default

bsi.

Conclusions

Investigations, models, assessments and data management all have good standards

These are now designed to promote or aid sustainability as a project goal or requirement

Sustainability can (and arguably should) be built in to all parts of the development process

Sustainability specific standards are now available for certain other parts of processes – remediation / management

Compliance with standards should always be more sustainable by default

Compliance should also tick the boxes of the regulators

Comments and Thoughts

Waste and asbestos are the current elephants in the room…

BS10175 should be your first port of call for site investigation

Should form part of a considered management strategy

CSM's are key

Over-conservative risk assessment is unsustainable

UK processes can be sustainable if set as a goal and the regulator is happy

Need to be scientific in your justifications and reasoning

Sustainability is not always less costly, but is always more effective in the longer term

Data gathering, retention and transfer will also help over time

Thanks for listening