ISO/TC 190 ISO/NP 18504

Soil quality:
Guidance on sustainable remediation

Qualite du sol:
Lignes directrices sur l'assainissement durable

Professor Paul NATHANAIL
University of Nottingham
Convenor of ISO/TC 190 ISO/NP 18504

Ευχαριστω

- Paul Bardos
- Karin Holland
- Mike Smith
- Long suffering students
- Alexander Nathanail
- SURF

February 27, 2012

SURF's mission is to make every phase of every cleanup more sustainable.

Protecting the Environment

***DuPont Corporate Remediation Group** launch forum focused on protecting the environment across the globe.*

Dave Ellis, a senior scientist for the DuPont Corporate Remediation Group (CRG), has spent years studying a great conundrum facing environmental remediation professionals—how to clean up the environment without making it dirtier in the process.

Bulldozers, dump trucks and heavy equipment used during cleanups burn millions of gallons of fuel and emit many millions of tons of carbon dioxide and airborne particulate matter. Cleaning up a contaminated property also requires a lot of electricity, natural gas and diesel fuel.

"The primary, non-negotiable goal of any remediation must be to protect human health and the environment," Dave said. "But the emission of global warming gases is an unfortunate, unintended consequence of large-scale remediation."

That's why environmental remediation professionals put DuPont science to work to prevent the cleanup of hundreds of pounds of contaminants in the soil from creating millions of pounds of contaminants in the air.

About five years ago, Dave and his colleagues around the world formed SURF, the Sustainable Remediation Forum.

"SURF's mission is to make every phase of every cleanup more sustainable," Dave said. "Regulators, businesses and the public have become increasingly aware of site remediation, and they're demanding cleanups with smaller environmental footprints."

SURF scientists set sustainable remediation goals and devise ways of reducing the amount of energy consumed and emissions created during environmental cleanups. Some methods include on-site treatments, which reduce the number of trucks used to transport contaminated soil or water and the use of biomaterials to encourage the natural attenuation of potential contaminants.

Environmental regulators and policy makers around the globe are taking notice of SURF's work. Dave said that over the next several years, sustainable remediation principles will move from the cutting-edge to the commonplace.

"A warming planet needs remediation solutions that reduce greenhouse gases," Dave said. "Our goal is to deliver them to people when they need them and before they demand them."

Dave Ellis and colleagues formed SURF, the Sustainable Remediation Forum.

Land Quality Management

- Specialist SME consultancy
  (so small we're not even a boutique consultancy!)
  - Risk assessment
  - Remediation options appraisal and verification
  - Expert witness/ intelligent client
- Known for cutting edge consultancy
- Development of
  - LQM/CIEH Generic Assessment Criteria
  - LQM/CIEH Dose Response Roadmaps
  - KeyCSM (with Keynetix)
  - Contaminated Land Ready Reference (with Paul Bardos)
- Training
  - regulators, developers, practitioners everywhere

University of Nottingham

Online Masters in Contaminated Land Management

- Taughts modules:
  - Site investigation
  - Risk Assessment
  - Remediation
  - Urban Regeneration
- Dissertation
- Optional study tour

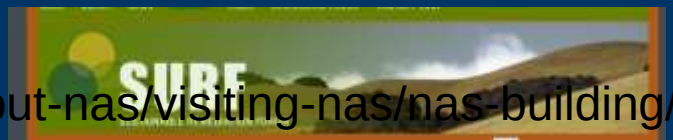
Members of the National Expert Panel on Contaminated Land

Phil Crowcroft - Consultant ERM
Paul Nathanail - Professor of Engineering Geology at the University of Nottingham and Managing Director of Land Quality Management Ltd
Sarah Rea - Regeneration Manager, National Grid
Simon Cole - Technical Director, URS
Naomi Earl - Freelance Consultant
Seamus Lefroy-Brooks - Principal at LBH WEMBLEY Geotechnical and Environmental
Matt Whitehead - Environment Agency
Ann Barker - Lead Officer Contaminated Land; City of Bradford Metropolitan District Council
Chris Taylor - Enforcement Officer (Contaminated Land), Brent Council
Liz Hamer - Environmental Protection Officer North Lincolnshire Council
Steve Moreby - Contaminated Land Officer Gloucester City Council

The NAS frieze

The investigation of truth is in one way hard and in another way easy. An indication of this is found in the fact that no one is able to attain the truth entirely, while on the other hand no one fails entirely, but everyone says something true about the nature of things, and **by the union of all a considerable amount is amassed**.

Metaphysics a. 1. 993a30-993b4 (Quoting Aristotle)



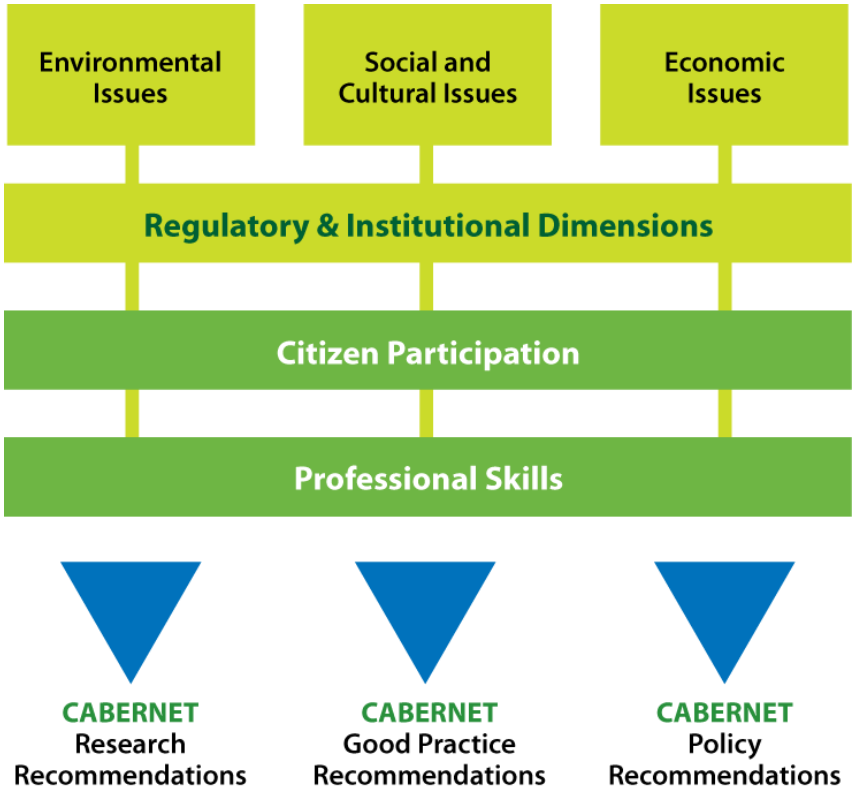
http://www.nasonline.org/about-nas/visiting-nas/nas-building/the-faade.html

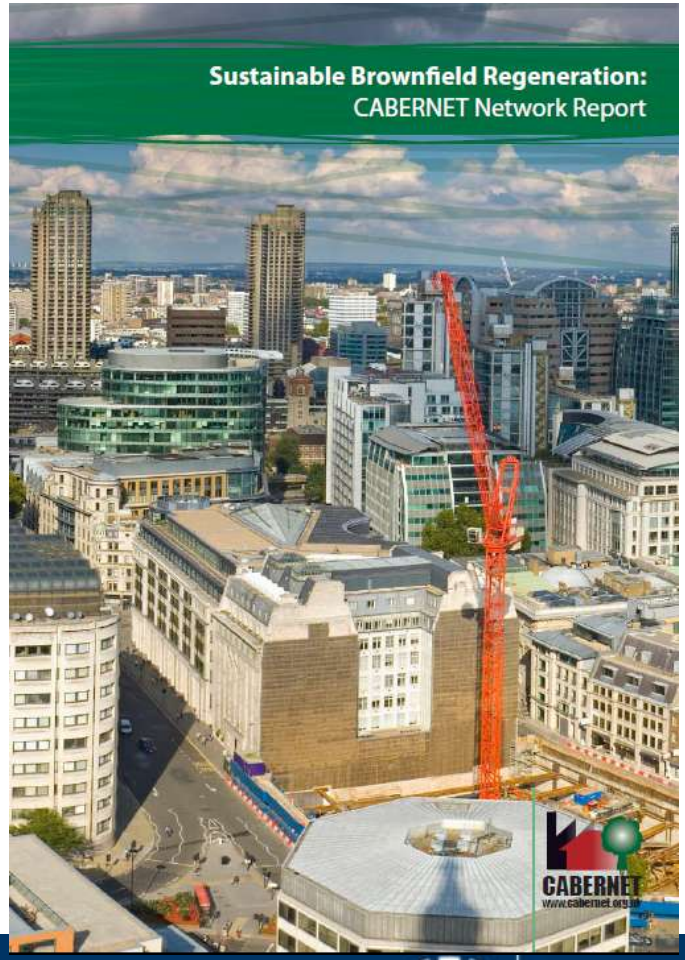
On sustainability

- The investigation of **sustainability** is in one way hard and in another way easy. An indication of this is found in the fact that no one is able to attain the **truth** entirely, while on the other hand no one fails entirely, but everyone says something true about the nature of **sustainability**, and by the union of all a considerable amount is amassed.
- After *Metaphysics a. 1. 993a30-993b4*

CABERNET

Europe's Sustainable Brownfield Regeneration Network

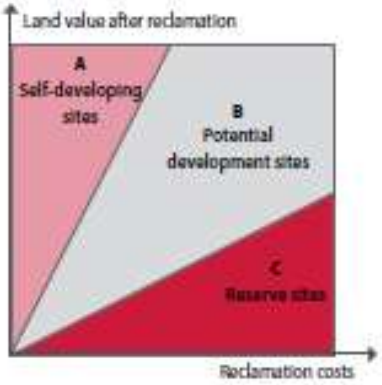




us on so-called
the CABERNET
was originally
redevelopment
figure 10).[9]

urban develop-
ıtflows (for the
sh inflows (sale
the land value)
d in a dynamic
. In this context,
dicators such as
net present values (NPV), future values
and internal rates of return (IRR) are gen-
erally used. The IRR (i_0) is the interest rate,
which balances out the sum (C_n) of future
values (or net present values) of all project
cash inflows (E_t) and outflows (A_t).

Figure 10: CABERNET classification of project types

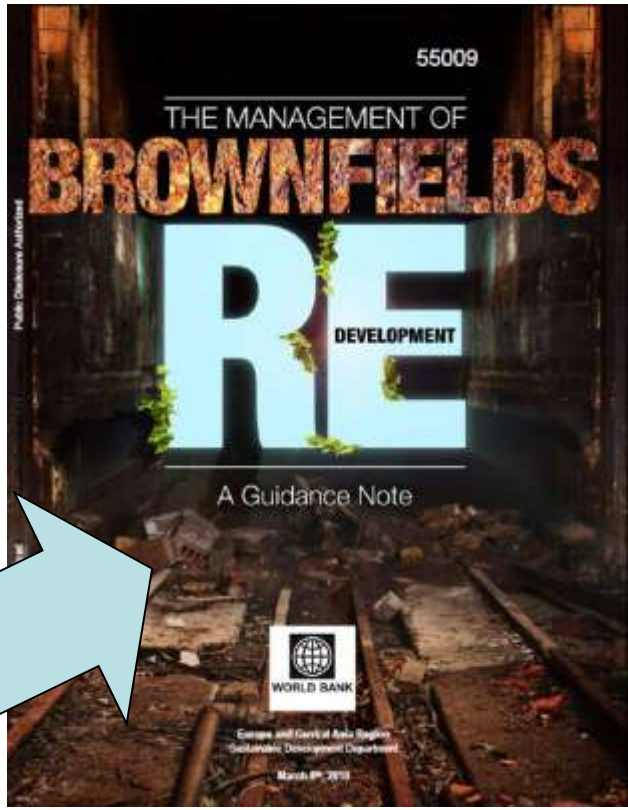


The internal rate of return measures the *yield of the capital invested* in a
project. To evaluate a specific project, the IRR has to be compared with t
capital (WACC) of the urban development project.[10]

$$C_n = \sum_{t=0}^{n} (E_t - A_t) \cdot (1+i_0)^{n-t}$$

$$\sum_{t=0}^{n} E_t \cdot (1+i_0)^{n-t} = \sum_{t=0}^{n} A_t \cdot (1+i_0)^{n-t}$$

2010: World Bank adopted the CABERNET definition



JESSICA Fund adopts Cabernet ABC Model

Remediation: paying for past sins

- Should *demonstrably* break the contaminant-pathway-receptor linkage by
  - Removing, destroying, modifying the source
  - Interrupting the pathway
  - Modifying the nature or behaviour of the receptor
- Can include
  - Long term monitoring
  - maintenance
- it is not sustainable *per se*
- It is usually not the main aim of a project

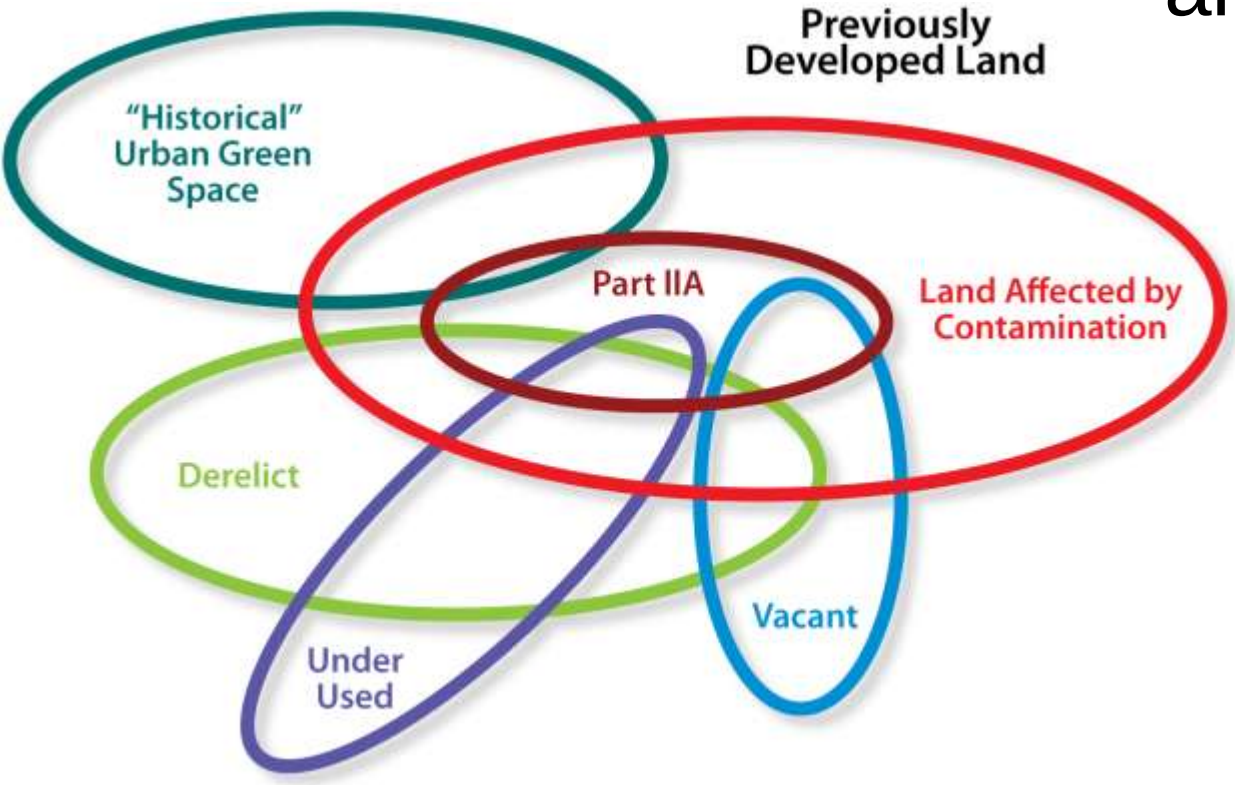
"The best solution is remediation that eliminates and/or controls unacceptable risks in a safe and timely manner, and which maximises the overall environmental, social and economic benefits of the remediation work. We call this sustainable remediation"

SURF-UK, 2010

Legal drivers for remediation

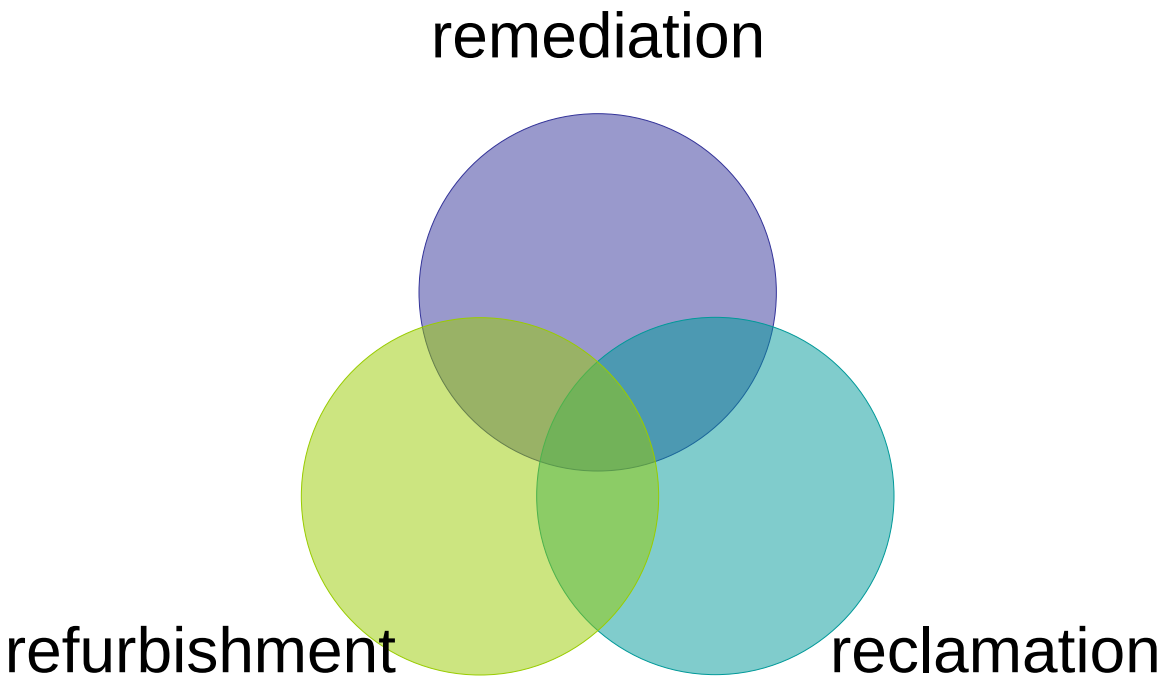
- Stop (significant) harm
- Stop (significant) pollution of surface or groundwater
- Removal of very high (?significant) levels of risk (Part 2A)
- Demonstration of suitability of new land use (Planning)
- Liability management
- Hazard removal – eg IPPC, IED

Remediation is usually an objective not the aim of a project



"Buy land – they're not making it any more" Mark Twain

Remediation is not the only result

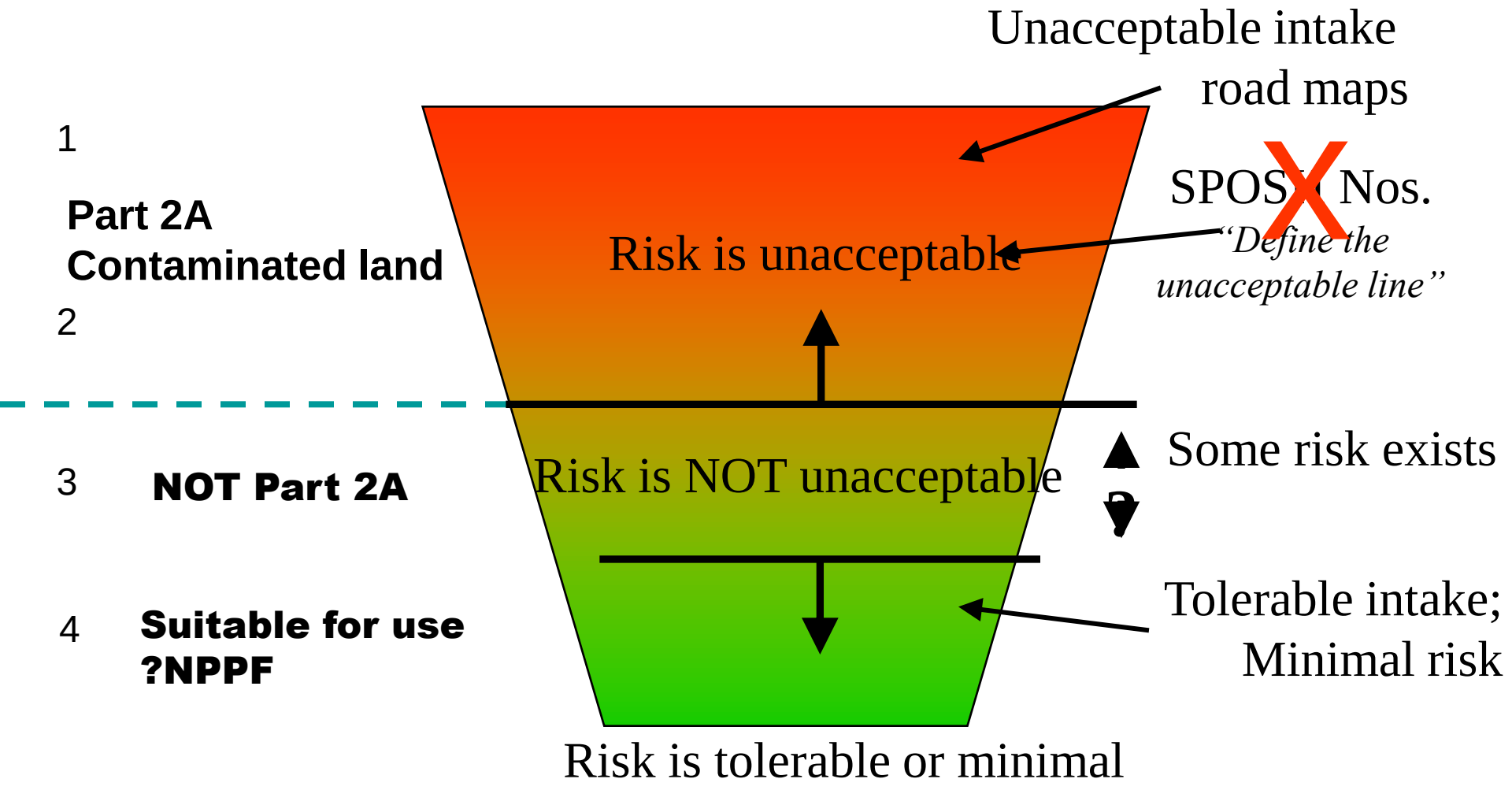


Embedding remediation into regeneration

"The best ***site specific*** solution is remediation that eliminates and/or controls unacceptable risks in a***n integrated***, safe and timely manner, and which maximises the overall environmental, social and economic benefits of the ***regeneration*** work. We call this ***smart regeneration***..."

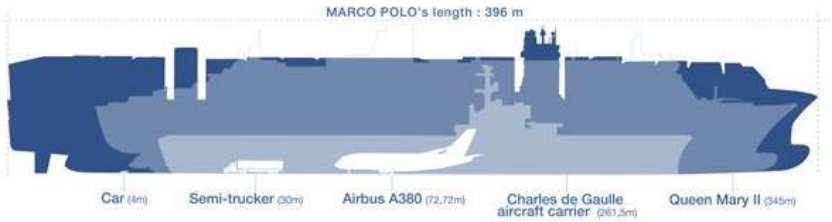
(**After** SURF-UK, 2010)

Levels of risk: ‘human’ world



What has ISO ever done for me?

CMA CGM Marco Polo



"Much of the cargo was consumer goods destined for businesses and shops in time for Christmas".

"The great thing about standards is that there are so many to choose from." - Anon.

ISO/TC 190/SC 7

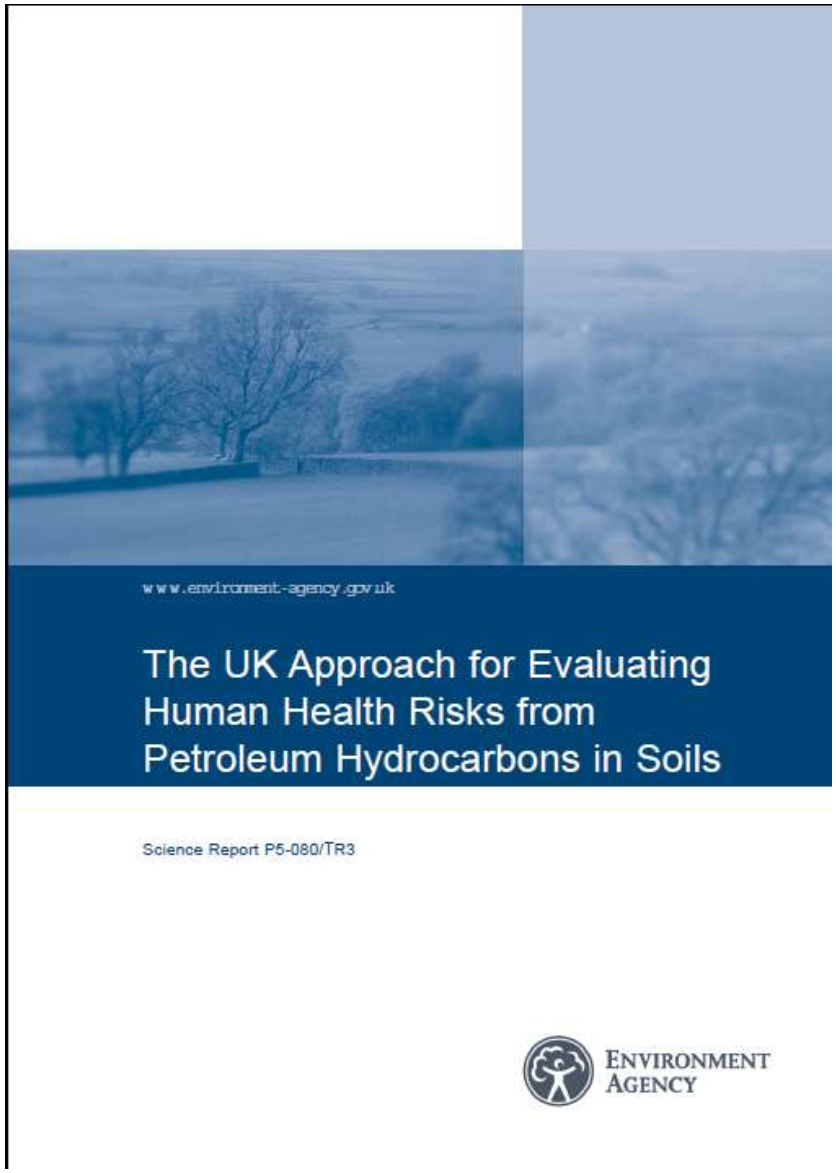
Secretariat: DIN

Voting begins on:
2012-03-07

Voting terminates on:
2012-05-07

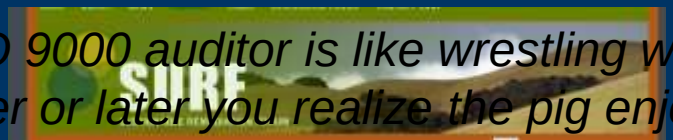
Soil quality — Assessment of impact from soil contaminated with petroleum hydrocarbons

Qualité du sol — Évaluation de l'impact du sol contaminé avec des hydrocarbures pétroliers


www.environment-agency.gov.uk
The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils
Science Report P5-080/TR3
Environment Agency

(CPN email to DE 6/3/2012)

- My vision for the ISO document is for it to be an informative rather than normative document that establishes a common baseline in terminology, concepts and contexts from which either national or further ISO documents could hang.
- We have seen in the UK and elsewhere (eg some local laws in the USA as presented in SuRF19) legal requirements for sustainability appraisal yet in most cases the skills, tools and consensus on how to go about this are lacking.



Arguing with an ISO 9000 auditor is like wrestling with a pig in mud… Sooner or later you realize the pig enjoys it!

Who develops standards?

"ISO standards are developed by groups of experts, within technical committees (TCs). TCs are made up of representatives of industry, NGOs, governments and other stakeholders, who are **put forward by ISO's members**. Each TC deals with a different subject, for example there are TCs focusing on screw threads, shipping technology, food products and many, many more."

ISO

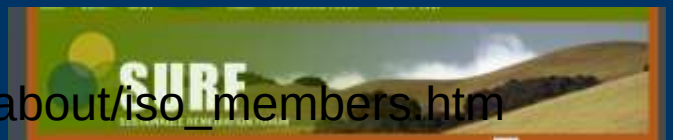
The ISO way…

Key principles in standard development

1. ISO standards respond to a need in the market
2. ISO standards are based on global expert opinion
3. ISO standards are developed through a multi-stakeholder process
4. ISO standards are based on a consensus

ISO: a network of 164 national standards bodies

Australia	SA	France	AFNOR
Austria	ASI	Germany	DIN
Brazil	ABNT	Japan	JISC
Burundi	BBN	New Zealand	SNZ
Canada	SCC	South Africa	SABS
China	SAC	USA	ANSI
Cyprus	CYS	United Kingdom	BSI
Eritrea	ESI		



http://www.iso.org/iso/home/about/iso_members.htm

ISO Technical Committees

TC 1	Screw threads
TC 20	Aircraft and space vehicles
TC 29	Small tools
TC 41	Pulleys and belts (including veebelts)
TC 174	Jewellery
TC 190	**Soil Quality**
PC 273	Customer contact centres

http://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees.htm

ISO TC 190 Soil Quality Working Groups

ISO/TC 190/SC 01 "Evaluation of criteria, terminology and codification“

ISO/TC 190/SC 02 "Sampling"

ISO/TC 190/SC 03 "Chemical methods and soil characteristics“

ISO/TC 190/SC 04 "Biological methods“

ISO/TC 190/SC 05 "Physical methods“

ISO/TC 190/SC 07 "Soil and site assessment“

- ISO/TC 190/SC 07/WG 06 "Leaching tests"
- ISO/TC 190/SC 07/WG 08 "Bio-availability“
- ISO/TC 190/SC 07/WG 10 "Soil impact on groundwater“
- ISO/TC 190/SC 07/WG 11 "Soil functions“
- **ISO/TC 190/SC 07/WG 12 “Sustainable remediation"**

TC190 Participating Countries

Secretariat: Netherlands (NEN)

participate actively in the work and obliged to vote on all questions submitted to vote

- **Australia (SA)**
- Austria (ASI)
- Belgium (NBN)
- Czech Republic (UNMZ)
- Denmark (DS)
- Egypt (EOS)
- Finland (SFS)
- **France (AFNOR)**
- Germany (DIN)
- India (BIS)
- **Italy (UNI)**
- Jamaica (BSJ)

☹ *NO Brazil, USA, New Zealand*

- **Japan (JISC)**
- Kenya (KEBS)
- Korea, Republic of (KATS)
- Libya (LNCSM)
- Mongolia (MASM)
- Norway (SN)
- Poland (PKN)
- Russian Federation (GOST R)
- Sri Lanka (SLSI)
- Sweden (SIS)
- Turkey (TSE)
- Ukraine (DSSU)
- **United Kingdom (BSI)**

TC190 Observing Countries

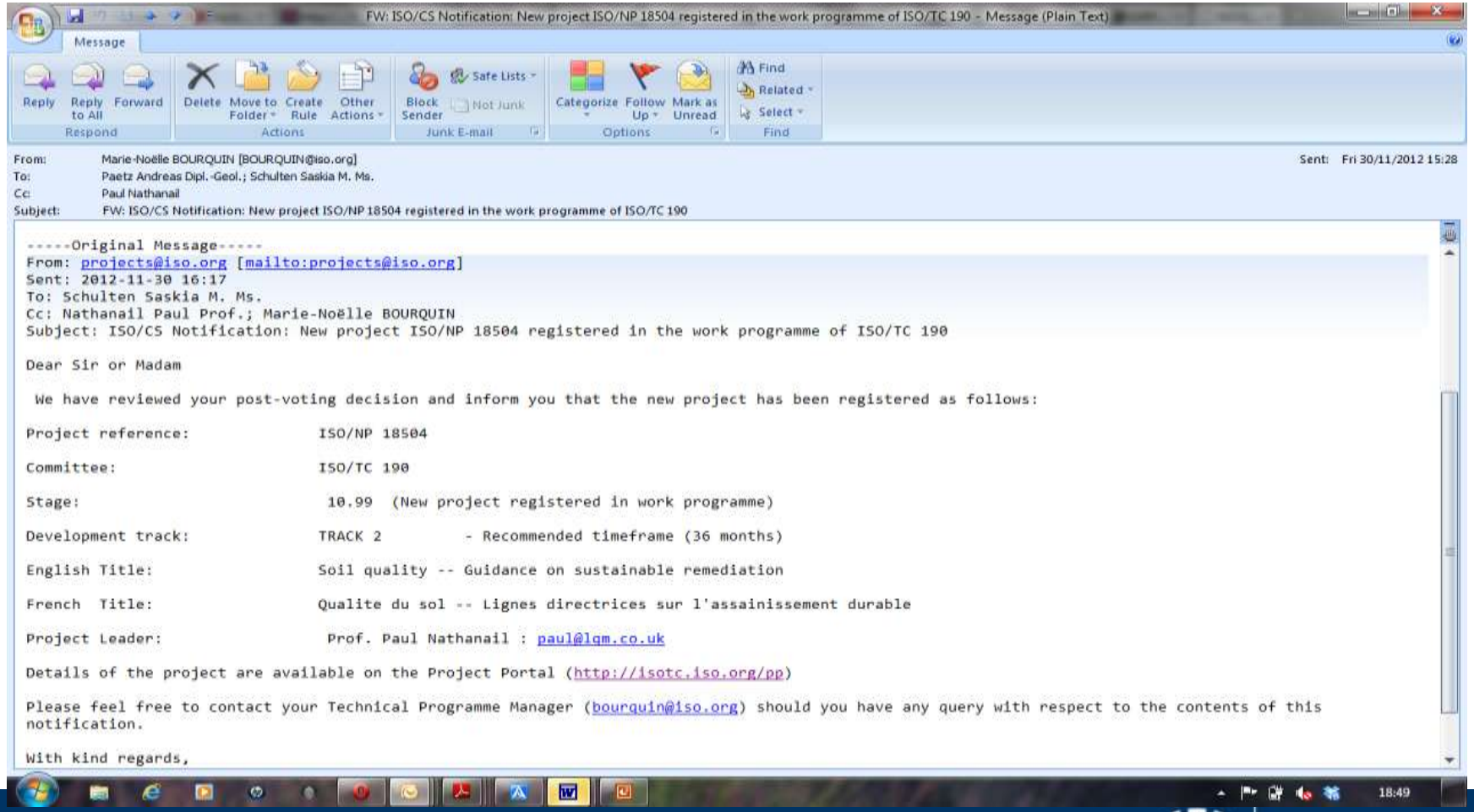
- Argentina (IRAM)
- Bosnia & Herzegovina (BAS)
- Botswana (BOBS)
- **Canada (SCC)**
- **China (SAC)**
- Colombia (ICONTEC)
- Croatia (HZN)
- Cuba (NC)
- Côte d'Ivoire (CODINORM)
- Ecuador (INEN)
- Estonia (EVS)
- Greece (ELOT)
- Hungary (MSZT)
- Iran, Islamic Republic of (ISIRI)
- Iraq (COSQC)
- Ireland (NSAI)
- Lithuania (LST)
- Portugal (IPQ)
- Romania (ASRO)
- Saudi Arabia (SASO)
- Serbia (ISS)
- Singapore (SPRING SG)
- Slovakia (SUTN)
- Slovenia (SIST)
- Spain (AENOR)
- Switzerland (SNV)
- Syrian Arab Republic (SASMO)
- Thailand (TISI)
- Tunisia (INNORPI)
- Viet Nam (STAMEQ)

The ISO way…

Key principles in standard development

1. ISO standards respond to a need in the market
2. ISO standards are based on global expert opinion
3. ISO standards are developed through a multi-stakeholder process
4. ISO standards are based on a consensus

Green light….



FW: ISO/CS Notification: New project ISO/NP 18504 registered in the work programme of ISO/TC 190 - Message (Plain Text)

Message

Reply | Reply to All | Forward | Delete | Move to Folder | Create Rule | Other Actions | Block Sender | Safe Lists | Not Junk | Categorize | Follow Up | Mark as Unread | Find | Related | Select

Respond | Actions | Junk E-mail | Options | Find

From: Marie-Noëlle BOURQUIN [BOURQUIN@iso.org]
To: Paetz Andreas Dipl.-Geol.; Schulten Saskia M. Ms.
Cc: Paul Nathanail
Subject: FW: ISO/CS Notification: New project ISO/NP 18504 registered in the work programme of ISO/TC 190
Sent: Fri 30/11/2012 15:28

-----Original Message-----
From: projects@iso.org [mailto:projects@iso.org]
Sent: 2012-11-30 16:17
To: Schulten Saskia M. Ms.
Cc: Nathanail Paul Prof.; Marie-Noëlle BOURQUIN
Subject: ISO/CS Notification: New project ISO/NP 18504 registered in the work programme of ISO/TC 190

Dear Sir or Madam

We have reviewed your post-voting decision and inform you that the new project has been registered as follows:

Project reference: ISO/NP 18504

Committee: ISO/TC 190

Stage: 10.99 (New project registered in work programme)

Development track: TRACK 2 - Recommended timeframe (36 months)

English Title: Soil quality -- Guidance on sustainable remediation

French Title: Qualite du sol -- Lignes directrices sur l'assainissement durable

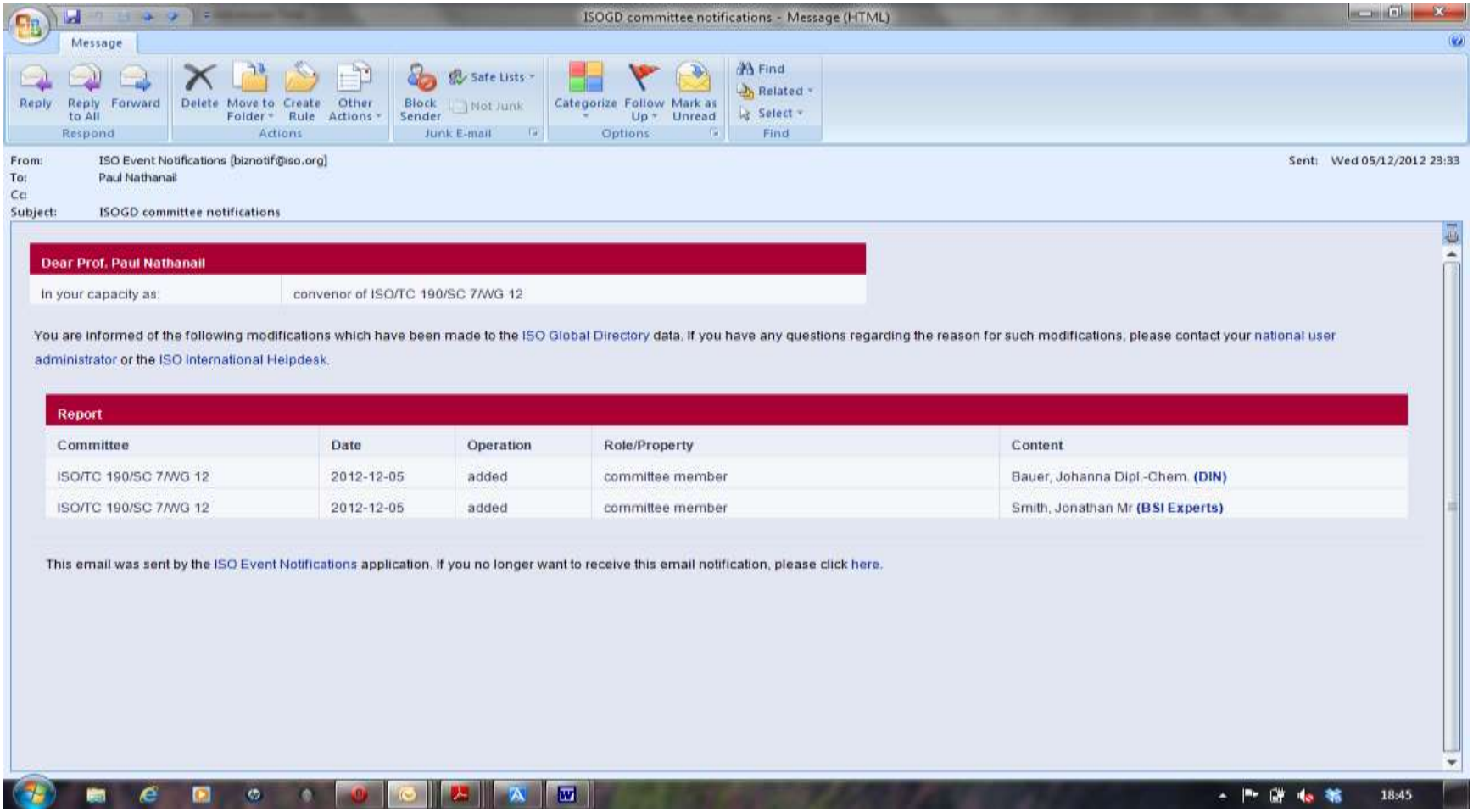
Project Leader: Prof. Paul Nathanail : paul@lqm.co.uk

Details of the project are available on the Project Portal (http://isotc.iso.org/pp)

Please feel free to contact your Technical Programme Manager (bourquin@iso.org) should you have any query with respect to the contents of this notification.

With kind regards,

Ask not for what …



Modus operandi

- WGs work among the members on informal drafts until ready to submit a **Committee Draft** for formal circulation by the member bodies. This is followed in due course by a **Draft International Standard** and then by a **Final DIS** – which is essentially the version to be published.

Title	Pp.
Sustainable development	1
Sustainable remediation	2
Related concepts: Green remediation; sustainable redevelopment; sustainable regeneration	4
Integrated appraisals, metrics and evaluations	8
Economic dimension	4
Social dimension	4
Environmental dimension	4
The role of Governance and institutional structures	4
Metrics and indicators	8
Trends and thresholds	4
The role of tools	4
GLOSSARY	
REFERENCES	
APPENDICES	TBD

Title	Contents
Sustainable development	Summary of the concept and how it has been adopted around the world
Sustainable remediation	Summary of risk based and other approached to contaminated land management; the role of remediation and the scope of such remediation to be sustainable
Related concepts:	Clear summaries on the related concepts (Green remediation; sustainable redevelopment; sustainable regeneration and how they are similar to and distinct from sustainable remediation
Integrated appraisals, metrics and evaluations	Summary of ways to integrate the various dimensions to provide an holistic measure to benchmark against the definition of SR
Economic dimension	Economic aspects of sustainability –generic and remediation specific
Social dimension	Social aspects of sustainability –generic and remediation specific
Environmental dimension	Environmental aspects of sustainability –generic and remediation specific
The role of Governance and institutional structures	The influence of legislative, policy and institutional controls on achieving SR; illustrated with explicit or implicit examples
Metrics and indicators	How can individual elements be measured and monitored
Trends and thresholds	What trends or thresholds indicate SR OR unsustainable remediation
The role of tools	The strengths and weaknesses of different types of sustainability appraisal tool; what they can and cannot do; ways of evaluating such tools to ascertain on a project specific basis their suitability for use

Next steps

- Kick off meeting: week of 21 January 2013
  - Agree scope and structure of document
  - Agree lead authors & reviewers
  - Agree schedule (See right)
- Bimonthly online progress meetings
- Face to face opportunities in 2013
  - EU Aqua Consoil,
  - USA US EPA Brownfields, Battelle
  - ANZ CleanUp

Thank you!

Copies of slides or to continue the conversation:
paul.nathanail@nottingham.ac.uk

Keep in touch:
@cpnathanail

www.jiscmail.ac.uk
(sustainableremediation forum)

www.linkedin.com (contaminated land management group)

- The investigation of **sustainability** is in one way hard and in another way easy. An indication of this is found in the fact that no one is able to attain the **truth** entirely, while on the other hand no one fails entirely, but everyone says something true about the nature of **sustainability**, and by the union of all a considerable amount is amassed.

Thank you!

Copies of slides or to continue the conversation:

paul.nathanail@nottingham.ac.uk

Keep in touch:

@cpnathanail

www.jiscmail.ac.uk
(sustainableremediation forum)

www.linkedin.com (contaminated land management group)

"A warming planet needs remediation solutions that reduce greenhouse gases. Our goal is to deliver them to people when they need them and before they demand them."

Dave Ellis, DuPont