

Brofiscin Quarry: Securing Remediation through Part 2A

Trystan James & Peter Stanley



Brofiscin Quarry Remediation Scheme

Dealing with Land Contamination - NRW approach

Voluntary action	Town & Country Planning regime
<p>Regulatory approach:</p> <ul style="list-style-type: none"> ➤ S161 Water Resources Act 1991 (Anti Pollution Works Notices) ➤ Part 2A Environmental Protection Act 1990 <ul style="list-style-type: none"> • Appropriate Person/s • Natural Resources Wales (Special Sites) 	

Who we are

- On 1 April 2013 **Natural Resources Wales (NRW)** took over the functions of the Countryside Council for Wales (CCW), Environment Agency Wales (EAW) and Forestry Commission Wales (FCW), as well as some functions of Welsh Government.
- We are:
 - the principal adviser to the Welsh Government on the environment, enabling the sustainable development of Wales's natural resources for the benefit of people, the economy and wildlife.
- the largest sponsored body in Wales with over 2,000 staff; we will have an operating budget of £177 million and manage 7% of the land area of Wales.
- the biggest provider of outdoor recreation in Wales, with 550 kilometres of mountain bike trails, 135 kilometres of horse riding trails and 450 kilometres of walking trails including the Wales Coastal Path.
- a 24 hour emergency responder – we will deal with approximately 9,000 reported incidents a year that include flooded homes, polluted rivers and illegally dumped waste.

Brofiscin Quarry Remediation Scheme

Part 2A Objectives

- To provide an improved system for identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment
- To increase the consistency of approach taken by regulators
- To be consistent with the “polluter pays” principle
- To encourage voluntary action by polluters and/or landowners
- To compliment the Town & Country Planning system

What is a Special Site?

Regulation 2: Special sites will include:-

- Waste acid tar sites; Petroleum refining; IPC sites
- Explosives manufacture; Land currently owned by MoD
- Chemical/biological weapons manufacture, production and disposal

Regulation 3: Pollution of Controlled waters

- (a) Controlled waters used for the supply of drinking water for humans
- (b) Controlled waters do not meet the criterion for classification under WRA 1991
- (c) Controlled waters are affected by specified substances (e.g. mercury) AND the waters lie within specified rock formations (e.g. Lower Carboniferous Limestone)

Brofiscin Site History

- 1950s - Operated as a Limestone Quarry
- 1965 – Granted Planning Permission for Disposal of Industrial Waste.
- Chemical & Industrial waste including:-
- drummed waste, PCBs, Petroleum additives, filter cakes, Silicon esters, Phenol, Mercury.
- 1969 – site closed with minimal cover.
- DoE (1978), WRc (1983) Komex (2001) (Pre Part 2A) and Celtic (2003)
- RCT Part 2A Determination – March 2005 – 67 SPLs

Brofiscin Quarry

- Special Site
- Contaminated Land Regulations (Wales):
Regulation 3(c) Pollution of Controlled Waters:
(a) *listed* Scheduled Aquifer &
(b) is being affected by *hazardous substances*
(as defined by the Groundwater Directive
(2006/118/EEC))

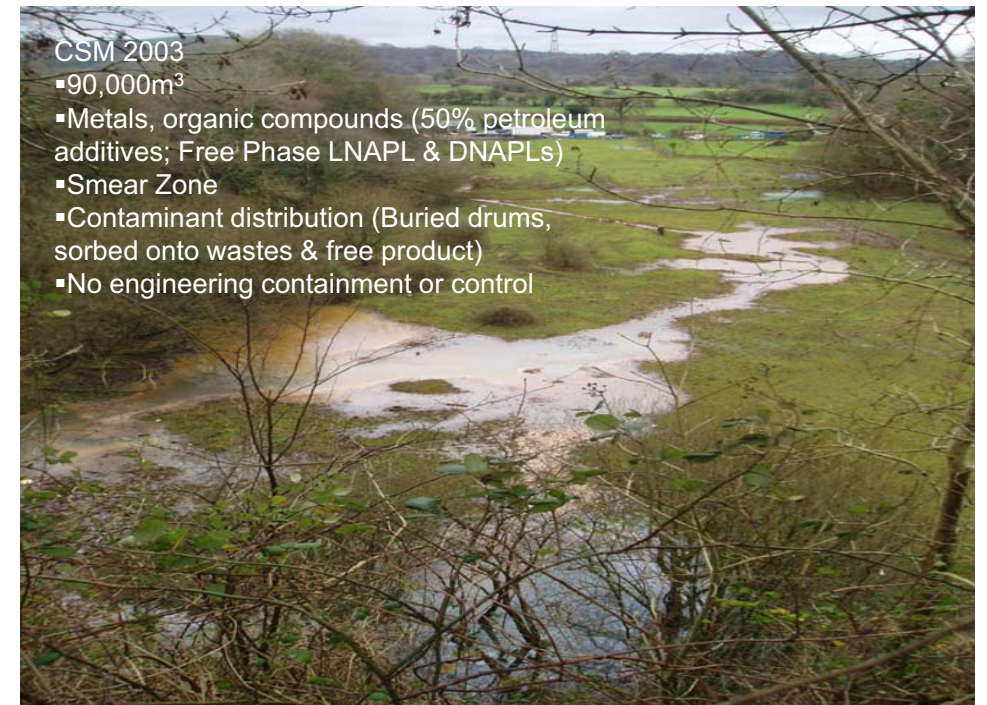
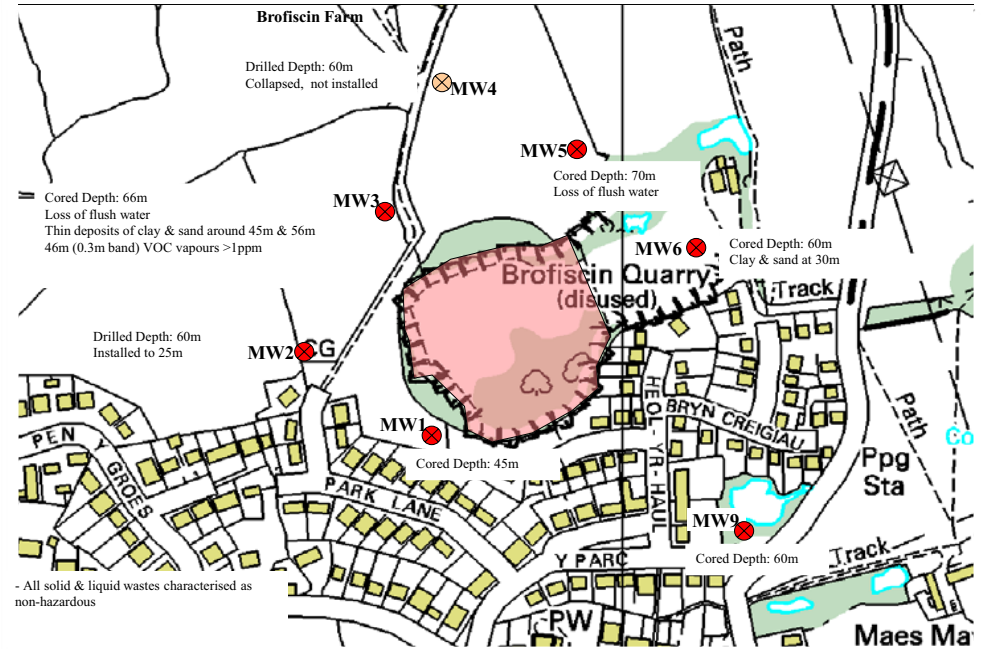




Investigations & Timeline

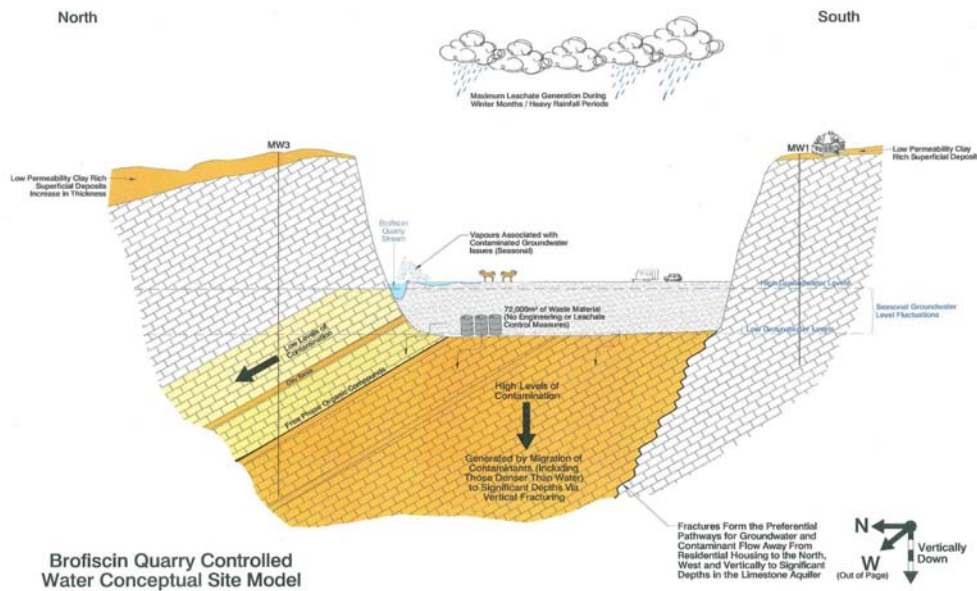
- EAW Draft ROA and Subsequent Objectives - 2005
- EAW Atkins Phase 1 Works (Stages 1 to 4) 05/06
 - Stage 1 & 2: Site Characterisation and Re-instatement
 - Stage 3: Site Monitoring (05-07)
 - Stage 4: Conceptual Site Model (06/07)
- Updated ROA in May 2008 (Enviros)
- Entec (Remedial Assessment Actions) 08/09
- Separate PB (RCT Investigation). (2009-2011)

Investigation



- CSM 2003
- 90,000m³
 - Metals, organic compounds (50% petroleum additives; Free Phase LNAPL & DNAPLs)
 - Smear Zone
 - Contaminant distribution (Buried drums, sorbed onto wastes & free product)
 - No engineering containment or control

Conceptual Site Model (2007)



Review of Options

Water Balance work as part of RAA indicated large influence of rainfall on leachate discharge to ditch.

Aquifer Management & Long Term Monitoring Plan

Human Health findings needed to be taken into account (RCT work 2009-2011)

NRW and RCT data analysed and feasibility of capping scheme progressed.

Capping addresses more risks than treatment at a lesser cost.

Outline Capping Design.

Updated Options Appraisal (May 2008)



- Remedial Objectives for S-P-Ls
- Assess treatment options for all S-P-Ls:
- Effectiveness
- Durability
- Practicability
- Cost-Benefit
- RP1 – Excavation and Disposal >40 million
- RP2 – Surface Water Treatment & MNA >2.1 million
- RP3 – Monitored Natural Attenuation >0.9 million

Appropriate Persons – who pays?

- ‘Class A person’ - person who caused or knowingly permitted a pollutant to be in, on or under the land. 2 or more would form ‘Class A liability Group’
- Class B person - owner or occupier of the land in circumstances where no class A person can be found.
- No Class A or Class B persons in respect of SPL, no liability group, therefore ‘orphan linkage’
- Currently progressing a Voluntary agreement.

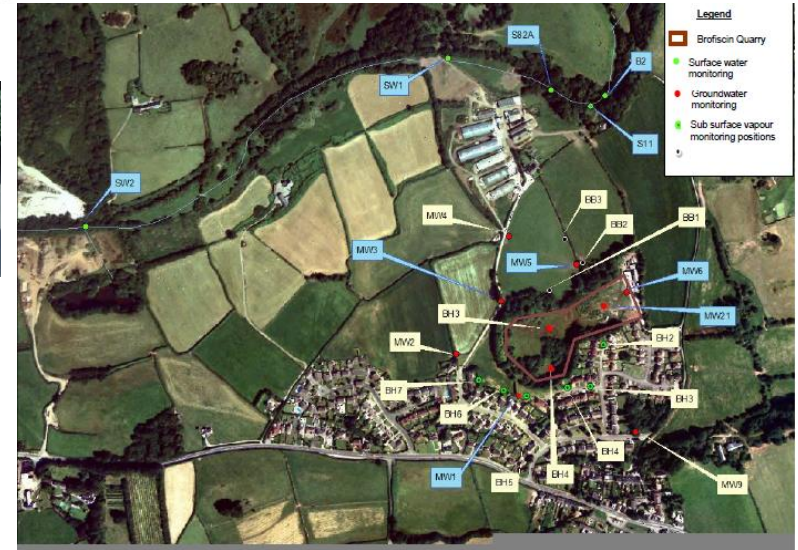
Preparatory Work & Documentation

- Design & Specification
- Tenders & Contracts

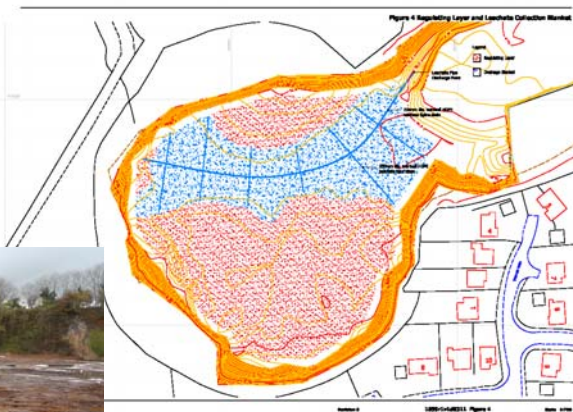


- TMP
- EMP
- PEMP
- DMP
- MMP

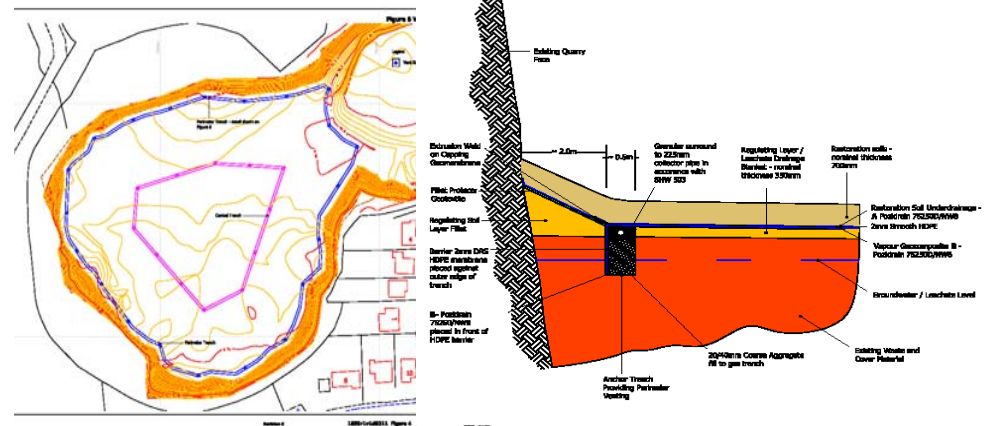
Monitoring Infrastructure



Under Cap Drainage



Pressure Relief System & Cap Design





Site Preparation & Biodiversity Management Plan



Access to the SSSI



Protecting fauna

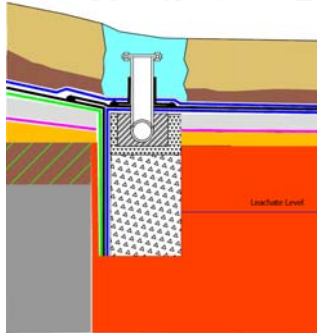


Regulating Final Layer



Cap Redesign

CSM ~72,000m³
(1.26ha & 5.7m)



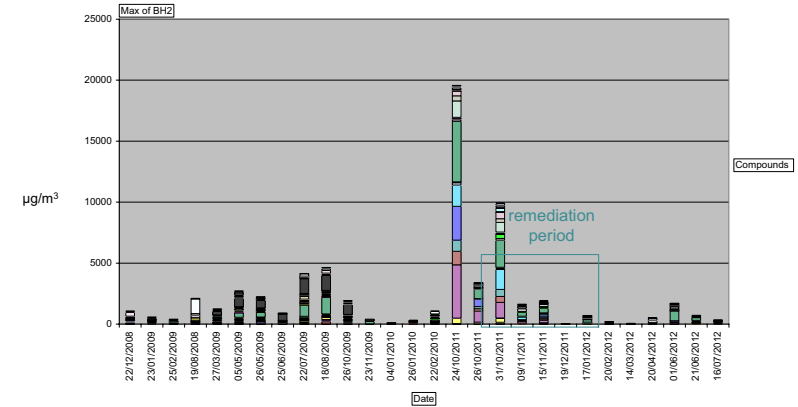
Perimeter Trench & Vapour Relief



Brofiscin Quarry Remediation Scheme



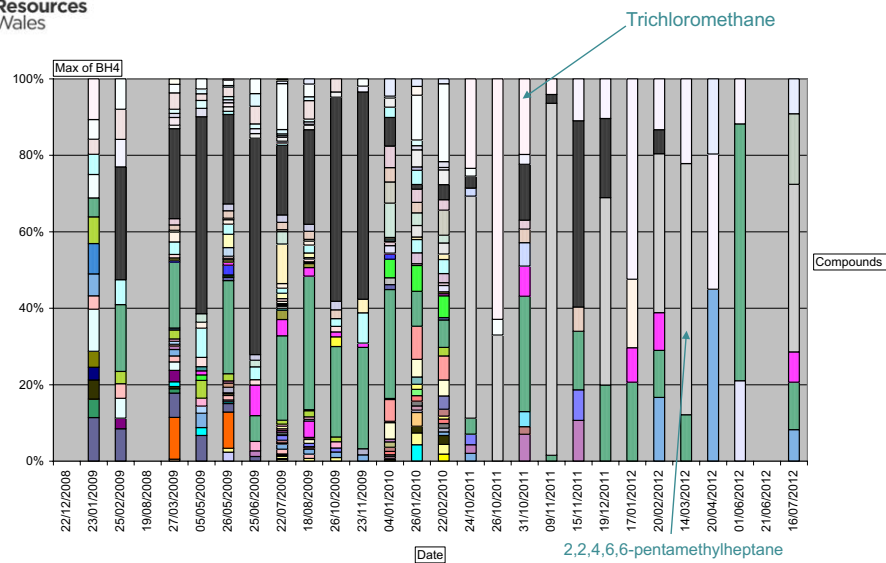
Borehole Vapour (VOC) Data



Brofiscin Quarry Remediation Scheme



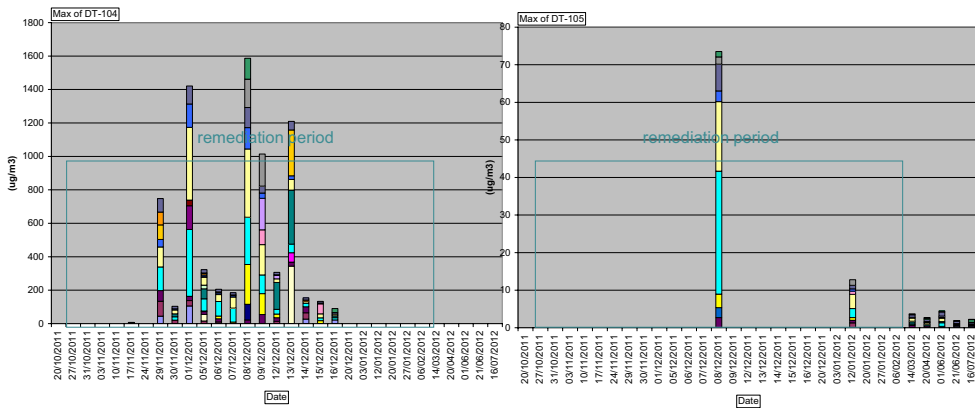
Borehole Vapour Composition



Bedrock Vapour Trend Analysis



Ambient Air Vapour Data (on site)



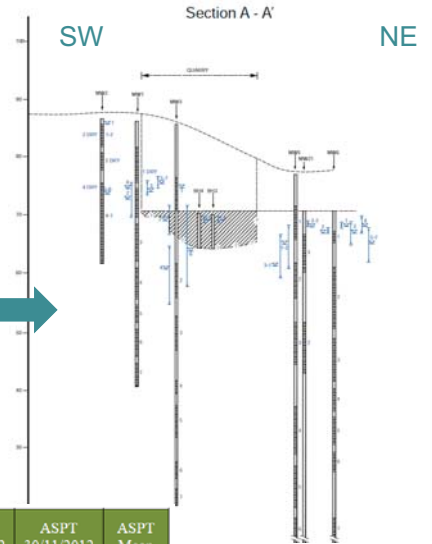
Conclusions

- Water quality LTMP continues
- Water quality in downstream Mwyndy Brook not adversely affected as demonstrated by ecological indicators
- Bedrock vapour & ambient air not adversely affected by construction nor above alert levels
- Temporary increase in vapour ambient air concentrations in quarry during remediation
- Air quality standards met within and outside quarry post remediation
- Use of summary site condition documents through ~12 years assessment, may have helped reveal site features such as rock benches, prior to the cap design

Controlled Waters Long Term Monitoring Plan

Groundwater Levels →

↓
Biological Monitoring 2009 -2012



Site	Location	BMWP 20/08/2009	Taxa N° 20/08/2009	ASPT 20/08/2009	BMWP 30/11/2012	Taxa N° 30/11/2012	ASPT 30/11/2012	ASPT Mean
1	250m u/s	66	14	4.7	88	14	6.3	5.4
2	25m u/s	48	10	4.8	61	11	5.5	5.1
3	55m d/s	70	14	5	95	17	5.6	5.8
4	310m d/s	87	17	5.1	86	16	5.4	5.3
5	900m d/s	-	-	-	95	16	5.9	5.8

