



L.J. CHURCH
LABORATORY SERVICES LTD.

Lumley Street
Castleford, West Yorkshire WF10 5LB
Tel: (01977) 518908 • Fax: (01977) 553612
lab@ljchurch.co.uk

Report No: UK COAL/JAH/03/19
January 2004

CQA Compliance Report for:

Remediation of Land Contamination at Former Gas Purification Plant
Monckton Works, Royston

CAPPING WORKS

Prepared for:

UK Coal
Harworth Park
Blyth Road
Harworth
Doncaster
DN11 8BD



And

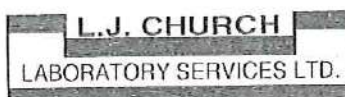
Monckton Coke & Chemical Company Ltd
PO Box 25
Royston
Barnsley
South Yorkshire
S71 4BE

Report prepared by:

J A Hardcastle, Laboratory Manager

of

L J Church Laboratory Services Ltd
Lumley Street
Castleford
West Yorkshire
WF10 5LB



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1.0 Introduction

- 1.1 This report relates to works conducted during the construction of a capping system which encapsulates contaminated soils at the former gas purification plant adjacent to Monckton Coke & Chemical Company, Royston Works. The works were conducted 20th October and 6th November 2003.
- 1.2 Prior to the commencement of the works, some accommodation and enabling works were conducted in the form of site clearance, minor demolition, excavation and recompaction of loose fill in former basements areas and the general re-profiling of the existing ground to give a level formation on which to construct the capping layer. The construction of a low permeability in-ground vertical wall around the perimeter of the contaminated soils was completed by Keller Ground Engineering.
- 1.3 The low permeability capping layer was constructed by blending Multi Roll Filter cake (MRF) with Colliery Shale insitu using a tractor towed rotovator. The raw materials were supplied by UK Coal plc from Kellingley Colliery, Knottingley, West Yorkshire.
- 1.4 This phase of works was conducted in accordance CQA Plan - Ref UK COAL/JAH/03/09 (Issue 2), July 2003, L J Church Laboratory Services Ltd. This report should be read in conjunction with the aforementioned document.

2.0 Engineering Works Supervision

- 2.1 The Site Operator, Monckton Coke and Chemical Works, subcontracted the earthworks operations for the capping works to Keller Ground Engineering. Day to day supervision of was provided by a 'walking' Foreman.
- 2.2 The Construction Quality Assurance (CQA) monitoring and compliance testing was managed by Mr J Hardcastle of L J Church Laboratory Services Ltd.
- 2.3 Daily CQA inspections, on-site compliance tests and sampling of all materials for laboratory testing was conducted by Mr M Randerson, CQA Engineer, from L J Church Laboratory Services Ltd. Inspection records compiled by the CQA Engineer are included in Appendix A. Photographs were taken during the course of the works and are enclosed in Appendix G.
- 2.4 Laboratory compliance testing was conducted by L J Church Laboratory Services Ltd at their UKAS accredited laboratory at Castleford. The laboratory's UKAS Accreditation Certificates and Schedules are enclosed in Appendix J.
- 2.5 Representatives from Enviros Consulting Ltd acted as CQA Auditor's during the construction period. Regular visits were made to check, inspect and audit as necessary the systems and procedures employed by all parties in order to validate that the completed works meet the requirements of the CQA Plan. The CQA Auditor's report will follow as a separate report.
- 2.6 The earthworks were constructed in accordance with the requirements of the CQA Plan.

3.0 Capping Layer

3.1 General

3.1.1 The capping was constructed by blending Multi Rolled Filtercake (MRF) with Colliery Shale insitu using a tractor towed rotovator. The raw materials were supplied by UK Coal plc from Kellingley Colliery. The raw materials were delivered by road haulage wagons as and when required. The methodologies used during the construction of the capping works were as those used during a small field trial conducted at Kellingley Colliery 2002.

3.1.2 Extensive laboratory trials were conducted by L J Church Laboratory Services Ltd during June and July of 2003. These trials confirmed that a blend (by volume) of 1 part MRF to 2 parts Colliery Shale produces a cohesive material which when compacted has low permeability characteristics.

3.2 Field Trial

3.2.1 Capping works commenced to the North of the site during the morning of 20th October 2003. This area was deemed to be the trial area and tested as such and as required by Clause B1.2 of the CQA plan. The trial area was completed by the end of 22nd October 2003.

3.2.2 The trial area was in excess of the 400m² as required by the CQA plan and was constructed in four layers. Each layer was constructed by first spreading an approximate 100mm layer of colliery shale using a Caterpillar D6 Dozer. This was followed by an approximate 100mm layer of MRF followed by a further approximate 100mm layer of colliery shale. The 'sandwiched' layers of raw material were then mixed insitu through the full 300mm uncompacted depth of material using a tractor mounted rotovator (DUTZI BSF Stabilising mixer). Compaction was carried out using 5 passes of a Bomag NW213 vibratory self propelled padfoot roller to give an approximate 250mm compacted layer.

3.2.3 Following the compaction of each layer of the trial area, insitu density and moisture tests were conducted using a nuclear density gauge (NDG) in accordance with BS 1377: Part 9: 1990 at a frequency of 5 per layer. In order to establish any corrections which may apply to readings obtained from the NDG, U100 cores were also taken in accordance with BS 1377: Part 9: 1990 at a frequency of 3 per layer to determine the insitu density and moisture. The data from these tests was used to establish calibration factors for the NDG in accordance with BS 1377: Part 9: Clause 2.5.

3.2.4 A representative sample of the end product material was taken from each layer and tested for the following in accordance with BS 1377:

- i) natural moisture content
- ii) plastic limit, liquid limit & plasticity index
- iii) particle size distribution (wet sieving method & hydrometer method)
- iv) moisture content/dry density relationship (2.5kg hammer)
- v) particle density

3.2.5 Undisturbed samples, 1 per layer, were taken and tested for constant head permeability in accordance with BS1377: Part 6: 1990.

3.2.6 From the results of the field trial it was apparent that the measured particle density of the end product material on average varied significantly from that measured in the laboratory during the June/July 2003 trials. On individual results, the particle densities of the end product material from the trial area ranged between 2.18 and 2.34 compared to 2.38 measured during the laboratory trials. It is considered that one or several reasons could have affected the particle density of the end product:

- i) Variation in the particle densities of the host materials
- ii) Significant difference in the particle densities of the host materials
- iii) Variation in the moisture content of the host materials (particularly MRF)
- iv) Accuracy of thickness of layers of placed host materials prior to mixing

3.2.7 Based on the results of the insitu density tests and particle density tests, a revised envelope of acceptance was compiled to encompass all of these results. A copy of the revised envelope is enclosed in Appendix B. All subsequent insitu density tests were compared to this revised envelope in assessing the suitability of the emplaced capping layer.

3.2.8 Although the 'as found' readings on the nuclear density gauge were significantly different to the core cutter density tests, a firm correlation was established, this is enclosed in Appendix C.

3.2.9 All completed test results from the trial area are included in Appendices C-F inclusive.

3.3 Earthworks following Field Trial

3.3.1 The remainder of the capping layer was constructed employing the same methodologies used during the field trial.

3.3.2 NDG readings were conducted on each layer of construction at a frequency in excess of the required 1/30m grid. In total 68 locations were tested by the NDG to determine the insitu moisture and dry density. The NDG test results are presented included in Appendix C in summary form and graphically compared to the revised acceptance envelope. Test certificates are also enclosed.

3.3.3 NDG readings were supplemented by 100mm core cutter density tests at a frequency of 1 per 5 NDT's. A total of 12 core cutter densities were conducted, these results are included in Appendix D in summary form and graphically compared to the revised acceptance envelope. Test certificates are also enclosed.

3.3.4 Undisturbed samples were taken for constant head permeability testing at a frequency of approximately 1/2500m². In total 11 permeability tests were conducted. The results are in summary form in Appendix E. The densities of the test specimens have been graphically compared to the revised acceptance envelope. Test certificates are also enclosed.

3.3.5 Representative bulk disturbed samples of the clay liner were taken at an approximate frequency of 1/2500m³ for the following tests:

- (i) particle size distribution
- (ii) moisture content
- (iii) plastic limit, liquid limit and plasticity index
- (iv) particle density
- (v) optimum moisture content/maximum dry density (2.5kg)

In total, 11No samples were tested for the classification tests, an additional four sample being tested for particle density only. These results are included in Appendix F.

4.0 Water Monitoring Wells

- 4.1 The five water monitoring wells required by Clause B2.0 of the CQA Plan have not been installed to date.

5.0 Conclusions

- 5.1 The CQA Laboratory visited site daily during the construction period to compile CQA inspections, conduct insitu testing and take representative bulk samples for laboratory testing in accordance with the Waste Management Licence and the CQA Plan.
- 5.2 Throughout, the CQA Laboratory has conveyed results verbally and in writing to UK Coal plc, indicating when and where results were outside the requirements of the limits specified. During the construction works, no major problems were encountered.
- 5.3 Throughout the progress of the works, all aspects of the construction have been completed to a consistently high standard. Work has progressed at a steady and careful pace with due care and account of the site conditions being taken at all times.
- 5.4 The inspections and completed test results confirm that the requirements of the CQA Plan have been achieved throughout.

Appendix A

CQA Engineers Inspection Records

SITE INSPECTION FORM	
SITE LOCATION	UK Coal Plc Monckton Coke & Chemical Works CAPPING WORKS
DATE OF INSPECTION	20/10/03
SITE CONDITIONS	Good Dry
WEATHER CONDITIONS	Bright Sunny AM becoming Cloudy with Sunny Spells PM
AREAS UNDER CONSTRUCTION	Trial Area which is to remain part of permanent Works
PLANT ON SITE	1 No. CAT D6R Dozer 1 No. Bomag NW213 PD3 Sheepsfoot Propelled Roller 1 No. Tractor with scarifier (Bennett Soil Technology Ltd)
COMPACTION	Number of Passes 5 Compacted Layer Thickness 250 mm
PROBLEMS	
GENERAL OBSERVATIONS	Site Visit Martin Brumby Initial MRF material coming in drying than at initial trial pad. This beign due to MRF stockpiled over summer months. M Brumby explained it would become wetter later in week as stockpile runs out.

Inspection carried out by

M Randerson

SITE INSPECTION FORM

SITE LOCATION	UK Coal Plc Monckton Coke & Chemical Works CAPPING WORKS
DATE OF INSPECTION	21/10/03
SITE CONDITIONS	Good Dry
WEATHER CONDITIONS	Sunny Intervals Coal
AREAS UNDER CONSTRUCTION	Continuing with trial Area
PLANT ON SITE	1 No. CAT D6R Dozer 1 No. Bomag BW213 PD3 Sheepsfoot Self Propelled Roller 1 No. Tractor with scarifier (Bennett Soil Technology Ltd)
COMPACTION	Number of Passes 5 Compacted Layer Thickness 250 mm
PROBLEMS	None
GENERAL OBSERVATIONS	

Inspection carried out by

M Randerson

SITE INSPECTION FORM	
SITE LOCATION	UK Coal Plc Monckton Coke & Chemical Works CAPPING WORKS
DATE OF INSPECTION	22/10/03
SITE CONDITIONS	Good Dry
WEATHER CONDITIONS	Odd showers AM Clear PM
AREAS UNDER CONSTRUCTION	Finished Trial Area and begun first layer of capping works
PLANT ON SITE	1 No. CAT D6R Dozer 1 No. Bomag BW213 PD3 Sheepsfoot Self Propelled Roller 1 No. Tractor with scarifier (Bennett Soil Technology Ltd)
COMPACTION	Number of Passes 5 Compacted Layer Thickness 250 mm
PROBLEMS	None
GENERAL OBSERVATIONS	Site visit from Martin Brumby

Inspection carried out by

M Randerson

SITE INSPECTION FORM

SITE LOCATION

UK Coal Plc
 Monckton Coke & Chemical Works
 CAPPING WORKS

DATE OF INSPECTION

23/10/03

SITE CONDITIONS

Good Dry

WEATHER CONDITIONS

Sunny Intervals

AREAS UNDER CONSTRUCTION

Continuing Capping Works

PLANT ON SITE

1 No. CAT D6R Dozer
 1 No. Bomag BW213 PD3 Sheepsfoot Self Propelled Roller
 1 No. Tractor with scarifier (Bennett Soil Technology Ltd)

COMPACTION

Number of Passes 5
 Compacted Layer Thickness 250 mm

PROBLEMS

None

GENERAL OBSERVATIONS

Run out of screened shale mid morning. Begun running in shale with amounts of oversize material in though this appears to brake down very well after scarifying.

Inspection carried out by

M Randerson

SITE INSPECTION FORM

SITE LOCATION

UK Coal Plc
 Monckton Coke & Chemical Works
 CAPPING WORKS

DATE OF INSPECTION

24/10/03

SITE CONDITIONS

Good Dry

WEATHER CONDITIONS

Sunny Intervals

AREAS UNDER CONSTRUCTION

Continuing Capping Works

PLANT ON SITE

1 No. CAT D6R Dozer
 1 No. Bomag BW213 PD3 Sheepsfoot Self Propelled Roller
 1 No. Tractor with scarifier (Bennett Soil Technology Ltd)

COMPACTION

Number of Passes 5
 Compacted Layer Thickness 250 mm

PROBLEMS

None

GENERAL OBSERVATIONS

Inspection carried out by

M Randerson

SITE INSPECTION FORM	
SITE LOCATION	UK Coal Plc Monckton Coke & Chemical Works CAPPING WORKS
DATE OF INSPECTION	27/10/03
SITE CONDITIONS	Good Dry
WEATHER CONDITIONS	Sunny Intervals AM Clouding over PM
AREAS UNDER CONSTRUCTION	Capping Works
PLANT ON SITE	1 No. CAT D6R Dozer 1 No. Bomag BW213 PD3 Sheepsfoot Self Propelled Roller 1 No. Tractor with scarifier (Bennett Soil Technology Ltd)
COMPACTION	Number of Passes 5 Compacted Layer Thickness 250 mm
PROBLEMS	None
GENERAL OBSERVATIONS	Site Visit from Martin Brumby

Inspection carried out by

M Randerson

SITE INSPECTION FORM

SITE LOCATION

UK Coal Plc
 Monckton Coke & Chemical Works
 CAPPING WORKS

DATE OF INSPECTION

28/10/03

SITE CONDITIONS

Good Dry

WEATHER CONDITIONS

Cloudy

AREAS UNDER CONSTRUCTION

Capping Works

PLANT ON SITE

1 No. CAT D6R Dozer
 1 No. Bomag BW213 PD3 Sheepsfoot Self Propelled Roller
 1 No. Tractor with scarifier (Bennett Soil Technology Ltd)

COMPACTION

Number of Passes 5
 Compacted Layer Thickness 250 mm

PROBLEMS

None

GENERAL OBSERVATIONS

Site Visit from Martin Brumby

Inspection carried out by

M Randerson

SITE INSPECTION FORM

SITE LOCATION

UK Coal Plc
Monckton Coke & Chemical Works
CAPPING WORKS

DATE OF INSPECTION

29/10/03

SITE CONDITIONS

AM Quite Wet after overnight Rain. Becoming Drier through day

WEATHER CONDITIONS

Cloudy

AREAS UNDER CONSTRUCTION

Capping Works

PLANT ON SITE

1 No. CAT D6R Dozer
1 No. Bomag BW213 PD3 Sheepsfoot Self Propelled Roller
1 No. Tractor with scarifier (Bennett Soil Technology Ltd)

COMPACTION

Number of Passes 5
Compacted Layer Thickness 250 mm

PROBLEMS

None

GENERAL OBSERVATIONS

Inspection carried out by

M Randerson

SITE INSPECTION FORM

SITE LOCATION

UK Coal Plc
 Monckton Coke & Chemical Works
 CAPPING WORKS

DATE OF INSPECTION

30/10/03

SITE CONDITIONS

Damp mainly good

WEATHER CONDITIONS

Sunny Intervals

AREAS UNDER CONSTRUCTION

Capping Works

PLANT ON SITE

1 No. CAT D6R Dozer
 1 No. Bomag BW213 PD3 Sheepsfoot Self Propelled Roller
 1 No. Tractor with scarifier (Bennett Soil Technology Ltd)

COMPACTION

Number of Passes 5
 Compacted Layer Thickness 250 mm

PROBLEMS

None

GENERAL OBSERVATIONS

Inspection carried out by

M Randerson

SITE INSPECTION FORM

SITE LOCATION	UK Coal Plc Monckton Coke & Chemical Works CAPPING WORKS
DATE OF INSPECTION	31/10/03
SITE CONDITIONS	Very wet after overnight rain continuing wet through day
WEATHER CONDITIONS	Rain early AM easing off by mid morning starting again mid afternoon
AREAS UNDER CONSTRUCTION	Capping Works
PLANT ON SITE	1 No. CAT D6R Dozer 1 No. Bomag BW213 PD3 Sheepsfoot Self Propelled Roller 1 No. Tractor with scarifier (Bennett Soil Technology Ltd)
COMPACTION	Number of Passes 5 Compacted Layer Thickness 250 mm
PROBLEMS	None
GENERAL OBSERVATIONS	Continuing to lay both materials in wet conditions .MRF variable in moisture content.

Inspection carried out by

M Randerson

SITE INSPECTION FORM

SITE LOCATION

UK Coal Plc
 Monckton Coke & Chemical Works
 CAPPING WORKS

DATE OF INSPECTION

03/11/03

SITE CONDITIONS

Remaining wet after weekend Rain

WEATHER CONDITIONS

Cloudy with scattered showers AM. Sunny spells PM

AREAS UNDER CONSTRUCTION

Capping Works

PLANT ON SITE

1 No. CAT D6R Dozer
 1 No. Bomag BW213 PD3 Sheepsfoot Self Propelled Roller
 1 No. Tractor with scarifier (Bennett Soil Technology Ltd)

COMPACTION

Number of Passes 5
 Compacted Layer Thickness 250 mm

PROBLEMS

None

GENERAL OBSERVATIONS

MRF variable in moisture content due to inclement weather over weekend. Site visit from Martin Brumby

Inspection carried out by

M Randerson

SITE INSPECTION FORM

SITE LOCATION

UK Coal Plc
 Monckton Coke & Chemical Works
 CAPPING WORKS

DATE OF INSPECTION

04/11/03

SITE CONDITIONS

Drying On

WEATHER CONDITIONS

Mainly Fine & Sunny

AREAS UNDER CONSTRUCTION

Capping Works

PLANT ON SITE

1 No. CAT D6R Dozer
 1 No. Bomag BW213 PD3 Sheepsfoot Self Propelled Roller
 1 No. Tractor with scarifier (Bennett Soil Technology Ltd)

COMPACTION

Number of Passes 5
 Compacted Layer Thickness 250 mm

PROBLEMS

None

GENERAL OBSERVATIONS

Inspection carried out by

M Randerson

SITE INSPECTION FORM

SITE LOCATION

UK Coal Plc
 Monckton Coke & Chemical Works
 CAPPING WORKS

DATE OF INSPECTION

05/11/03

SITE CONDITIONS

Good, Dry

WEATHER CONDITIONS

Fine Dry

AREAS UNDER CONSTRUCTION

Capping Works

PLANT ON SITE

1 No. CAT D6R Dozer
 1 No. Bomag BW213 PD3 Sheepsfoot Self Propelled Roller
 1 No. Tractor with scarifier (Bennett Soil Technology Ltd)

COMPACTION

Number of Passes 5
 Compacted Layer Thickness 250 mm

PROBLEMS

None

GENERAL OBSERVATIONS

Inspection carried out by

M Randerson

SITE INSPECTION FORM

SITE LOCATION	UK Coal Plc Monckton Coke & Chemical Works CAPPING WORKS
DATE OF INSPECTION	06/11/03
SITE CONDITIONS	Good, Dry
WEATHER CONDITIONS	Fine
AREAS UNDER CONSTRUCTION	Capping Works
PLANT ON SITE	1 No. CAT D6R Dozer 1 No. Bomag BW213 PD3 Sheepsfoot Self Propelled Roller 1 No. Tractor with scarifier (Bennett Soil Technology Ltd)
COMPACTION	Number of Passes 5 Compacted Layer Thickness 250 mm
PROBLEMS	None
GENERAL OBSERVATIONS	Capping to South West Corner of site temporarily left out to enable wagons access to site with subsoil/topsoil at future date

Inspection carried out by

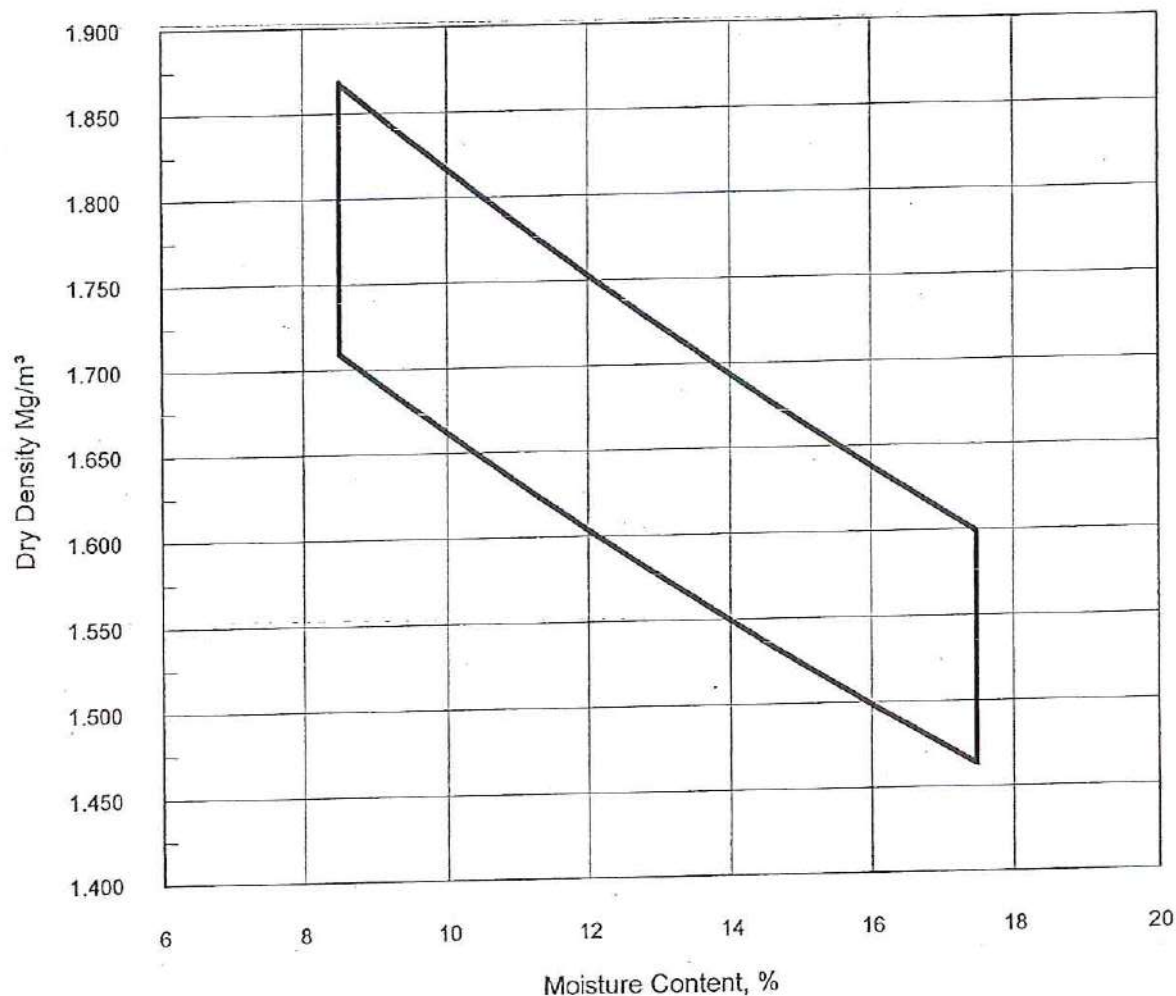
M Randerson

Appendix B

Revised Acceptance Envelope

U K Coal plc
Monckton Coke & Chemical Works
Capping Works

Revised Envelope of Acceptance
1 Part MRF : 2 Parts Processed Shale



— Target Requirements

Free

Appendix C

Results of Insitu Moisture and Density Tests (NDG Method)
[including calibration]

UK COAL
REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Summary of Nuclear Density Gauge Tests

Date	Lab Ref	Test No	Location	Wet Density Mg/m ³	Moisture Content %	Dry Density Mg/m ³	% of MDD	Air Voids %
20/10/03	1204	1	Field Trial Layer 1	1.76	15.6	1.52		
		2	Field Trial Layer 1	1.81	12.7	1.61		
		3	Field Trial Layer 1	1.92	9.5	1.75		
		4	Field Trial Layer 1	1.78	10.5	1.62		
		5	Field Trial Layer 1	1.76	15.1	1.53		
		6	Field Trial Layer 1	1.80	14.8	1.57		
		7	Field Trial Layer 1	1.94	11.5	1.74		
		8	Field Trial Layer 1	1.87	9.7	1.71		
		9	Field Trial Layer 1	1.87	10.3	1.69		
		10	Field Trial Layer 1	1.83	11.4	1.64		
		11	Field Trial Layer 2	1.91	10.6	1.73		
		12	Field Trial Layer 2	1.84	15.0	1.60		
		13	Field Trial Layer 2	1.84	15.8	1.59		
22/10/03	1208	1	Field Trial Layer 2	1.90	12.1	1.70		
		2	Field Trial Layer 2	1.83	13.5	1.61		
		3	Field Trial Layer 3	1.78	15.0	1.55		
		4	Field Trial Layer 3	1.85	13.5	1.63		
		5	Field Trial Layer 3	1.90	12.0	1.70		
		6	Field Trial Layer 3	1.82	14.8	1.59		
		7	Field Trial Layer 3	1.92	12.0	1.71		
22/10/03	1213	1	Field Trial Layer 4	1.95	9.7	1.78		
		2	Field Trial Layer 4	1.94	10.3	1.76		
		3	Field Trial Layer 4	1.96	10.0	1.79		
		4	Field Trial Layer 4	1.89	11.9	1.69		
		5	Field Trial Layer 4	1.86	15.6	1.61		
		6	Field Trial Layer 4	1.89	13.0	1.67		
23/10/03	1218	1	Capping Layer 1	1.88	12.3	1.67		
		2	Capping Layer 1	1.89	11.9	1.69		
		3	Capping Layer 1	1.88	13.5	1.66		
		4	Capping Layer 2	1.93	11.4	1.73		
24/10/03	1224	1	Capping Layer 2	1.87	13.0	1.66		
		2	Capping Layer 3 SE 37289E 11826N	1.92	12.4	1.71		
		3	Capping Layer 3 SE 37312E 11824N	1.92	9.6	1.75		
24/10/03	1236	1	Capping Layer 4 SE 37294E 11823N	1.93	9.8	1.75		
		2	Capping Layer 4 SE 37315E 11841N	1.92	9.9	1.75		
24/10/03	1243	1	Capping Layer 4 SE 37291E 11824N	1.88	11.6	1.69		
		2	Capping Layer 1 SE 37323E 11814N	1.86	11.2	1.68		
29/10/03	1246	1	Capping Layer 1 SE 37314E 11802N	1.82	11.1	1.63		
		2	Capping Layer 1 SE 37302E 11802N	1.82	13.0	1.61		
30/10/03	1254	1	Capping Layer 2 SE 37324E 11795N	1.90	12.1	1.69		
		2	Capping Layer 2 SE 37307E 11806N	1.93	10.7	1.74		
03/11/03	1256	1	Capping Layer 3 SE 37319E 11809N	1.95	11.0	1.76		
		2	Capping Layer 1 SE 37333E 11783N	1.87	9.1	1.71		
03/11/03	1259	1	Capping Layer 1 SE 37319E 11782N	1.88	12.1	1.68		
		2	Capping Layer 3 SE 37306E 11809N	1.96	9.2	1.79		
03/11/03	1259	1	Capping Layer 1 SE 37298E 11775N	1.93	9.9	1.76		
		2	Capping Layer 1 SE 37311E 11755N	1.87	11.9	1.67		
03/11/03	1259	1	Capping Layer 2 SE 37333E 11784N	1.88	14.3	1.65		
		2	Capping Layer 4 SE 37322E 11803N	1.92	12.0	1.71		
03/11/03	1259	1	Capping Layer 2 SE 37315E 11774N	1.93	11.8	1.73		
		2	Capping Layer 4 SE 37306E 11799N	1.91	10.4	1.73		
03/11/03	1259	1	Capping Layer 2 SE 37295E 11787N	1.96	10.4	1.77		
		2	Capping Layer 2 SE 37296E 11768N	1.86	11.8	1.67		
03/11/03	1259	1	Capping Layer 3 SE 37337E 11781N	1.93	10.8	1.74		
		2	Capping Layer 1 SE 37348E 11757N	1.85	12.0	1.65		
03/11/03	1259	1	Capping Layer 3 SE 37315E 11776N	1.89	13.0	1.68		
		2	Capping Layer 1 SE 37327E 11753N	1.88	11.3	1.69		
03/11/03	1259	1	Capping Layer 4 SE 37339E 11783N	1.93	11.2	1.74		
		2	Capping Layer 4 SE 37318E 11777N	1.91	9.8	1.74		
03/11/03	1259	1	Capping Layer 2 SE 37349E 11751N					
		2	Capping Layer 2 SE 37349E 11751N					

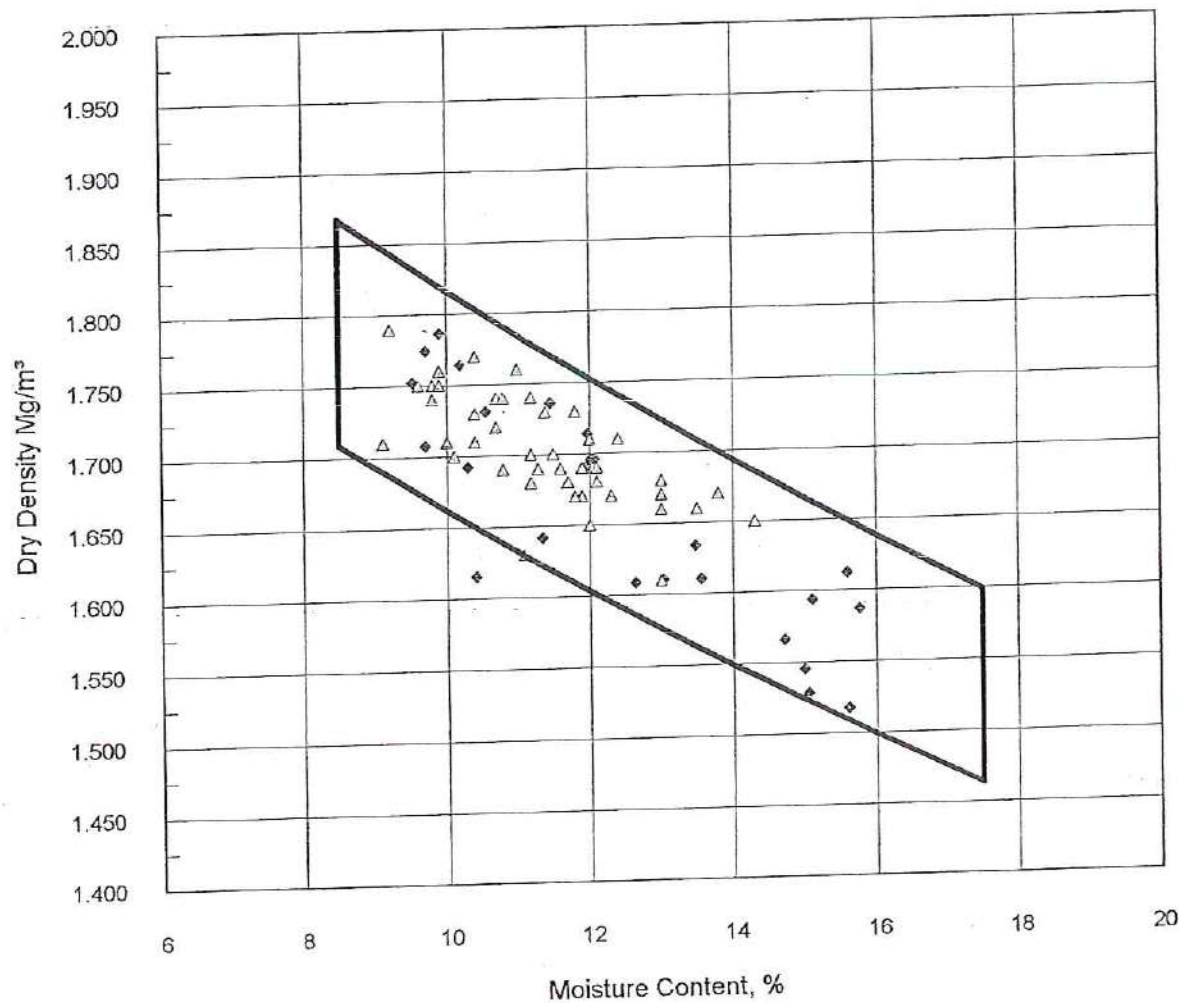
UK COAL
REMEDIATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Summary of Nuclear Density Gauge Tests

Date	Lab Ref	Test No	Location	Wet Density	Moisture Content	Dry Density	% of MDD	Air Voids
05/11/03	1264	4	Capping Layer 2 SE 37330E 11739N	1.90	13.8	1.67		
		1	Capping Layer 3 SE 37329E 11752N	1.90	10.7	1.72		
		2	Capping Layer 3 SE 37346E 11758N	1.89	10.0	1.71		
		3	Capping Layer 4 SE 37330E 11754N	1.88	10.4	1.71		
06/11/03	1269	4	Capping Layer 4 SE 37344E 11759N	1.87	10.1	1.70		
		1	Capping Layer 1 SE 37355E 11738N	1.87	10.8	1.69		
		2	Capping Layer 2 SE 37353E 11737N	1.89	11.5	1.70		
		3	Capping Layer 3 SE 37353E 11736N	1.88	11.7	1.68		
		4	Capping Layer 4 SE 37355E 11736N	1.89	11.2	1.70		
Average				1.88	11.8	1.69		
Standard Deviation				0.05	1.7	0.06		
No of Tests				68				

U K Coal plc
Monckton Coke & Chemical Works
Capping Works

Revised Envelope of Acceptance vs. NDT Densities
1 Part MRF : 2 Parts Processed Shale



◆ Corrected NGD's (Trial) △ NDG's after trials — Target Requirements

UK Coal plc
Monkton Coke & Chemical Works

Calibration of Nuclear Density Gauge
BS 1377: Part 9: 1990, Clause 2.5

NDTS								CORE'S PERM SMC'S							
Lab Ref	Test	Location	Bulk Density Mg/m³	D.R.	Moisture Density Mg/m³	D.R.	Moisture Content %	Lab Ref	Test No	Bulk Density Mg/m³	Moisture Density Mg/m³	Moisture Content %			
	No														
ND03/1204	NDT1	Trial Pad, Layer 1	1.78	0.02	0.44	0.18	32.9	SA03/213A	Core 1	1.76	0.26	17.0			
ND03/1204	NDT3	Trial Pad, Layer 1	1.55	0.01	0.33	0.17	20.5	SA03/213B	Core 2	1.84	0.17	9.4			
ND03/1204	NDT6	Trial Pad, Layer 1	1.78	-0.00	0.43	0.15	31.8	SA03/213C	Core 3	1.78	0.24	15.6			
ND03/1204	NDT11	Trial Pad, Layer 2	1.95	0.01	0.39	0.18	22.4	SA03/213D	Core 4	1.93	0.18	10.0			
ND03/1204	NDT12	Trial Pad, Layer 2	1.85	0.01	0.44	0.23	31.4	SA03/213E	Core 5	1.85	0.21	12.8			
ND03/1204	NDT13	Trial Pad, Layer 2	1.88	0.04	0.46	0.22	32.8	SA03/213F	Core 6	1.83	0.24	14.8			
ND03/1208	NDT2	Trial Pad, Layer 3	1.88	0.01	0.41	0.19	26.5	SA03/247A	Core 7	1.65	0.22	13.6			
ND03/1208	NDT3	Trial Pad, Layer 3	1.80	0.05	0.43	0.18	31.6	SA03/247B	Core 8	1.74	0.26	17.2			
ND03/1208	NDT4	Trial Pad, Layer 3	1.88	0.05	0.41	0.19	28.2	SA03/247C	Core 9	1.83	0.22	15.7			
ND03/1208	NDT7	Trial Pad, Layer 3	1.95	0.05	0.39	0.18	25.0	SA03/247D	Core 10	1.69	0.20	12.0			
ND03/1213	NDT1	Trial Pad, Layer 4	1.98	0.02	0.34	0.16	20.7	SA03/302A	Core 11	1.98	0.16	8.9			
ND03/1213	NDT2	Trial Pad, Layer 4	1.98	0.02	0.35	0.17	21.7	SA03/302B	Core 12	1.98	0.18	10.2			
ND03/1213	NDT3	Trial Pad, Layer 4	2.00	0.01	0.35	0.18	21.1	SA03/302C	Core 13	1.99	0.17	9.5			
Average			1.89		0.40		26.8								

UK COAL
REMEDICATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report: ND/03/1204
Date: 19-Jan-04
Date Tested: 20-Oct-03

Maximum Dry Density* Mg/m³
Optimum Moisture Content* %
Particle Density* Mg/m³
Source certificate number

Material: 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source: Kellingley Colliery
Supplier: UK Coal

Operator: M Randerson
Gauge model: Troxler 3440
Gauge S/N: T4 - SN 24963
Mode: Direct transmission

Nuclear Density Gauge Tests BS 1377 1990 Part 9
Compliance tests on compacted material

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
1. Field Trial Layer 1		1.775	0.426	31.6	1.349			
		1.777	0.453	34.2	1.324			
Average		1.776	0.440	32.9	1.336			
Corrected Average		1.76	0.24	15.6	1.52			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
2. Field Trial Layer 1		1.841	0.372	25.3	1.469			
		1.832	0.403	28.2	1.429			
Average		1.837	0.388	26.8	1.449			
Corrected Average		1.81	0.20	12.7	1.61			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
3. Field Trial Layer 1		1.959	0.320	19.5	1.639			
		1.942	0.342	21.4	1.600			
Average		1.951	0.332	20.5	1.619			
Corrected Average		1.92	0.17	9.5	1.75			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density outside of acceptance envelope
4. Field Trial Layer 1		1.812	0.323	21.7	1.489			
		1.801	0.344	23.6	1.457			
Average		1.807	0.334	22.7	1.473			
Corrected Average		1.78	0.17	10.5	1.62			Complies No

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
5. Field Trial Layer 1		1.789	0.410	29.7	1.379			
		1.771	0.448	33.9	1.323			
Average		1.780	0.429	31.8	1.351			
Corrected Average		1.76	0.23	15.1	1.53			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
6. Field Trial Layer 1		1.815	0.444	32.4	1.371			
		1.827	0.415	29.4	1.412			
Average		1.821	0.430	30.9	1.391			
Corrected Average		1.80	0.23	14.8	1.57			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
7. Field Trial Layer 1		1.969	0.371	23.2	1.598			
		1.966	0.392	24.9	1.574			
Average		1.968	0.382	24.1	1.586			
Corrected Average		1.94	0.20	11.5	1.74			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
8. Field Trial Layer 1		1.901	0.318	20.1	1.583			
		1.903	0.342	21.9	1.561			
Average		1.902	0.330	21.0	1.572			
Corrected Average		1.87	0.17	9.7	1.71			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
9. Field Trial Layer 1		1.89	0.334	21.5	1.556			
		1.9	0.352	22.7	1.548			
Average		1.895	0.343	22.1	1.552			
Corrected Average		1.87	0.17	10.3	1.69			Complies Yes

Laboratory Report: ND/03/1204
Date: 19-Jan-04
Date Tested: 20-Oct-03

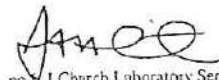
Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
10. Field Trial Layer 1		1.851	0.361	24.2	1.490			Density within acceptance envelope
		1.856	0.363	24.3	1.493			
Average		1.854	0.362	24.3	1.492			
Corrected Average		1.83	0.19	11.4	1.64			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
11. Field Trial Layer 2		1.947	0.346	21.6	1.601			Density within acceptance envelope
		1.942	0.366	23.2	1.576			
Average		1.945	0.356	22.4	1.589			
Corrected Average		1.91	0.18	10.6	1.73			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
12. Field Trial Layer 2		1.877	0.444	31.0	1.433			Density within acceptance envelope
		1.85	0.446	31.8	1.404			
Average		1.864	0.445	31.4	1.419			
Corrected Average		1.84	0.24	15.0	1.60			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
13. Field Trial Layer 2		1.869	0.450	31.7	1.419			Density within acceptance envelope
		1.858	0.470	33.9	1.388			
Average		1.864	0.460	32.8	1.404			
Corrected Average		1.84	0.25	15.8	1.59			Complies Yes

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UK COAL
REMEDICATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report: ND/03/1208
Date: 19-Jan-04
Date Tested: 21-Oct-03

Maximum Dry Density* Mg/m³
Optimum Moisture Content* %
Particle Density* Mg/m³
Source certificate number

Material: 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source: Kellingley Colliery
Supplier: UK Coal

Operator: M Randerson
Gauge model: Troxler 3440
Gauge S/N: T4 - SN 24963
Mode: Direct transmission

Nuclear Density Gauge Tests BS 1377 1990 Part 9
Compliance tests on compacted material

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
1. Field Trial Layer 2		1.939	0.382	24.5	1.557			
		1.923	0.398	26.1	1.525			
Average		1.931	0.390	25.3	1.541			
Corrected Average		1.90	0.21	12.1	1.70			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
2. Field Trial Layer 2		1.85	0.397	27.3	1.453			
		1.859	0.426	29.7	1.433			
Average		1.855	0.411	28.5	1.444			
Corrected Average		1.83	0.22	13.5	1.61			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
3. Field Trial Layer 3		1.801	0.438	32.1	1.363			
		1.799	0.426	31.0	1.373			
Average		1.800	0.432	31.6	1.368			
Corrected Average		1.78	0.23	15.0	1.55			Complies Yes

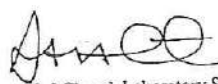
Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
4. Field Trial Layer 3		1.875	0.408	27.8	1.467			
		1.888	0.420	28.6	1.468			
Average		1.882	0.414	28.2	1.468			
Corrected Average		1.85	0.22	13.5	1.63			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
5. Field Trial Layer 3		1.933	0.372	23.8	1.561			
		1.927	0.405	26.6	1.522			
Average		1.930	0.388	25.2	1.542			
Corrected Average		1.90	0.20	12.0	1.70			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
6. Field Trial Layer 3		1.855	0.454	32.4	1.401			
		1.837	0.417	29.4	1.420			
Average		1.846	0.436	30.9	1.410			
Corrected Average		1.82	0.24	14.8	1.59			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
7. Field Trial Layer 1		1.942	0.402	26.1	1.540			
		1.959	0.379	24.0	1.580			
Average		1.951	0.391	25.1	1.560			
Corrected Average		1.92	0.21	12.0	1.71			Complies Yes

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UK COAL
REMEDICATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report: ND/03/1213
Date: 19-Jan-04
Date Tested: 22-Oct-03

Maximum Dry Density* Mg/m³
Optimum Moisture Content* %
Particle Density* Mg/m³
Source certificate number

Material 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source Kellingley Colliery
Supplier UK Coal

Operator M Randerson
Gauge model Troxler 3440
Gauge S/N T4 - SN 24963
Mode Direct transmission

Nuclear Density Gauge Tests BS 1377 1990 Part 9
Compliance tests on compacted material

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
1. Field Trial Layer 4		1.978	0.338	20.6	1.640			
		1.981	0.341	20.8	1.640			
Average		1.980	0.340	20.7	1.640			
Corrected Average		1.95	0.17	9.7	1.78			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
2. Field Trial Layer 4		1.986	0.334	20.2	1.652			
		1.968	0.369	23.1	1.599			
Average		1.977	0.353	21.7	1.624			
Corrected Average		1.94	0.18	10.3	1.76			Complies Yes

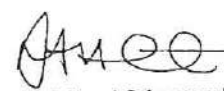
Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
3. Field Trial Layer 4		2.001	0.365	22.3	1.636			
		1.995	0.330	19.8	1.665			
Average		1.998	0.348	21.1	1.650			
Corrected Average		1.96	0.18	10.0	1.79			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
4. Field Trial Layer 4		1.923	0.385	25.0	1.538			
		1.922	0.387	25.2	1.535			
Average		1.923	0.386	25.1	1.537			
Corrected Average		1.89	0.20	11.9	1.69			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
5. Field Trial Layer 4		1.894	0.462	32.3	1.432			
		1.89	0.461	32.3	1.429			
Average		1.892	0.462	32.3	1.430			
Corrected Average		1.86	0.25	15.6	1.61			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
6. Layer 1 Capping		1.919	0.406	26.8	1.513			
		1.92	0.412	27.3	1.508			
Average		1.920	0.409	27.1	1.511			
Corrected Average		1.89	0.22	13.0	1.67			Complies Yes

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UK COAL
REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report: ND/03/1218
Date: 19-Jan-04
Date Tested: 23-Oct-03

Maximum Dry Density* Mg/m³
Optimum Moisture Content* %
Particle Density* Mg/m³
Source certificate number

Material 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source Kellingley Colliery
Supplier UK Coal

Operator M Randerson
Gauge model Troxler 3440
Gauge S/N T4 - SN 24963
Mode Direct transmission

Nuclear Density Gauge Tests BS 1377 1990 Part 9
Compliance tests on compacted material

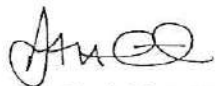
Probe Depth (mm)	200	Bulk Den.	MC Den.	MC	Dry Den.	% MDD**	Air Voids**	Remarks
Test Location		Mg/m ³	Mg/m ³	%	Mg/m ³		%	
1. 1st Layer Capping		1.907	0.386	25.4	1.521			Density within acceptance envelope
		1.901	0.397	26.4	1.504			
Average		1.904	0.392	25.9	1.512			
Corrected Average		1.88	0.21	12.3	1.67			Complies Yes

Probe Depth (mm)	200	Bulk Den.	MC Den.	MC	Dry Den.	% MDD**	Air Voids**	Remarks
Test Location		Mg/m ³	Mg/m ³	%	Mg/m ³		%	
2. 1st Layer Capping		1.923	0.396	25.9	1.527			Density within acceptance envelope
		1.925	0.373	24.0	1.552			
Average		1.924	0.385	25.0	1.539			
Corrected Average		1.89	0.20	11.9	1.69			Complies Yes

Probe Depth (mm)	200	Bulk Den.	MC Den.	MC	Dry Den.	% MDD**	Air Voids**	Remarks
Test Location		Mg/m ³	Mg/m ³	%	Mg/m ³		%	
3. 2nd Layer Capping		1.916	0.409	27.1	1.507			Density within acceptance envelope
		1.906	0.431	29.2	1.475			
Average		1.911	0.420	28.2	1.491			
Corrected Average		1.88	0.22	13.5	1.66			Complies Yes

Probe Depth (mm)	200	Bulk Den.	MC Den.	MC	Dry Den.	% MDD**	Air Voids**	Remarks
Test Location		Mg/m ³	Mg/m ³	%	Mg/m ³		%	
4. 2nd Layer Capping		1.962	0.371	23.3	1.591			Density within acceptance envelope
		1.965	0.385	24.4	1.580			
Average		1.964	0.379	23.9	1.585			
Corrected Average		1.93	0.20	11.4	1.73			Complies Yes

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UK COAL
REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report: ND/03/1224
Date: 19-Jan-04
Date Tested: 24-Oct-03

Maximum Dry Density* Mg/m³
Optimum Moisture Content* %
Particle Density* Mg/m³
Source certificate number

Material 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source Kellingley Colliery
Supplier UK Coal

Operator M Randerson
Gauge model Troxler 3440
Gauge S/N T4 - SN 24963
Mode Direct transmission

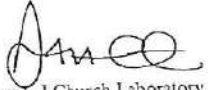
Nuclear Density Gauge Tests BS 1377 1990 Part 9
Compliance tests on compacted material

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
1. Layer 3		1.903	0.408	27.3	1.495			
SE 37289E 11826N		1.903	0.400	26.6	1.503			
Average		1.903	0.405	27.0	1.498			
Corrected Average		1.87	0.22	13.0	1.66			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
2. Layer 3		1.949	0.391	25.1	1.558			
SE 37312E 11824N		1.949	0.410	26.6	1.539			
Average		1.949	0.401	25.9	1.548			
Corrected Average		1.92	0.21	12.4	1.71			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
3. Layer 4		1.959	0.317	19.3	1.642			
SE 37294E 11823N		1.945	0.348	21.8	1.597			
Average		1.952	0.333	20.6	1.619			
Corrected Average		1.92	0.17	9.6	1.75			Complies Yes

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UK COAL
REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report: ND/03/1236
Date: 19-Jan-04
Date Tested: 27-Oct-03

Maximum Dry Density* Mg/m³
Optimum Moisture Content* %
Particle Density* Mg/m³
Source certificate number

Material 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source Kellingley Colliery
Supplier UK Coal

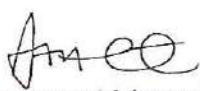
Operator M Randerson
Gauge model Troxler 3440
Gauge S/N T4 - SN 24963
Mode Direct transmission

Nuclear Density Gauge Tests BS 1377 1990 Part 9
Compliance tests on compacted material

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
1. Layer 4 Capping		1.956	0.345	21.4	1.611			
37315E 11841N		1.937	0.334	20.6	1.623			
Average		1.957	0.340	21.0	1.617			
Corrected Average		1.93	0.17	9.8	1.75			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
2. Layer 4 Capping		1.95	0.340	21.1	1.610			
37291E 11824N		1.947	0.338	21.0	1.609			
Average		1.949	0.340	21.1	1.609			
Corrected Average		1.92	0.17	9.9	1.75			Complies Yes

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UK COAL
REMEDIAION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report: ND/03/1243
Date: 19-Jan-04
Date Tested: 28-Oct-03

Maximum Dry Density* Mg/m³
Optimum Moisture Content* %
Particle Density* Mg/m³
Source certificate number

Material 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source Kellingley Colliery
Supplier UK Coal

Operator M Randerson
Gauge model Troxler 3440
Gauge S/N T4 - SN 24963
Mode Direct transmission

Nuclear Density Gauge Tests BS 1377 1990 Part 9
Compliance tests on compacted material

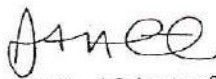
Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
1. Capping Layer 1		1.911	0.366	23.7	1.545			Density within acceptance envelope
SE 37323E 11814N		1.91	0.382	25.0	1.528			
Average		1.911	0.375	24.4	1.536			
Corrected Average		1.88	0.20	11.6	1.69			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
2. Capping Layer 1		1.891	0.365	23.9	1.526			Density within acceptance envelope
SE 37314E 1802N		1.892	0.359	23.4	1.533			
Average		1.892	0.362	23.7	1.530			
Corrected Average		1.86	0.19	11.2	1.68			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
3. Capping Layer 1		1.838	0.355	23.9	1.483			Density within acceptance envelope
SE 37302E 11802N		1.842	0.349	23.4	1.493			
Average		1.840	0.353	23.7	1.487			
Corrected Average		1.82	0.18	11.1	1.63			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
4. Capping Layer 2		1.853	0.390	26.7	1.463			Density within acceptance envelope
SE 37324E 11795N		1.828	0.400	28.0	1.428			
Average		1.841	0.396	27.4	1.445			
Corrected Average		1.82	0.21	13.0	1.61			Complies Yes

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UK COAL
REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report: ND/03/1246
Date: 19-Jan-04
Date Tested: 29-Oct-03

Maximum Dry Density* Mg/m³
Optimum Moisture Content* %
Particle Density* Mg/m³
Source certificate number

Material 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source Kellingley Colliery
Supplier UK Coal

Operator M Randerson
Gauge model Troxler 3440
Gauge S/N T4 - SN 24963
Mode Direct transmission

Nuclear Density Gauge Tests BS 1377 1990 Part 9
Compliance tests on compacted material

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								
1. Layer 2 Capping		1.934	0.372	23.8	1.562			Density within acceptance envelope
SE 37307E 11806N		1.917	0.405	26.8	1.512			
Average		1.926	0.389	25.3	1.537			
Corrected Average		1.90	0.20	12.1	1.69			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								
2. Layer 3 Capping		1.96	0.351	21.8	1.609			Density within acceptance envelope
SE 37319E 11809N		1.955	0.371	23.4	1.584			
Average		1.958	0.361	22.6	1.597			
Corrected Average		1.93	0.19	10.7	1.74			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								
3. Layer 1 Capping		1.982	0.357	22.0	1.625			Density within acceptance envelope
SE 37333E 11783N		1.984	0.388	24.3	1.596			
Average		1.983	0.373	23.2	1.610			
Corrected Average		1.95	0.19	11.0	1.76			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								
4. Layer 1 Capping		1.898	0.306	19.2	1.592			Density within acceptance envelope
SE 37319E 11782N		1.891	0.322	20.5	1.569			
Average		1.895	0.315	19.9	1.580			
Corrected Average		1.87	0.16	9.1	1.71			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								
5. Layer 3 Capping		1.900	0.380	25.0	1.520			Density within acceptance envelope
SE 37306E 11809N		1.918	0.392	25.7	1.526			
Average		1.909	0.387	25.4	1.522			
Corrected Average		1.88	0.20	12.1	1.68			Complies Yes

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UK COAL
REMEDIATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report: ND/03/1254
Date: 19-Jan-04
Date Tested: 30-Oct-03

Maximum Dry Density* Mg/m³
Optimum Moisture Content* %
Particle Density* Mg/m³
Source certificate number

Material 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source Kellingley Colliery
Supplier UK Coal

Operator M Randerson
Gauge model Troxler 3440
Gauge S/N T4 - SN 24963
Mode Direct transmission

Nuclear Density Gauge Tests BS 1377 1990 Part 9
Compliance tests on compacted material

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
1. Capping Layer 1		1.994	0.316	18.8	1.678			
SE 37298E 11775N		1.992	0.342	20.7	1.650			
Average		1.993	0.329	19.8	1.664			
Corrected Average		1.96	0.17	9.2	1.79			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
2. Capping Layer 1		1.961	0.339	20.9	1.622			
SE 37311E 11755N		1.969	0.346	21.3	1.623			
Average		1.965	0.342	21.1	1.623			
Corrected Average		1.93	0.17	9.9	1.76			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
3. Capping Layer 2		1.899	0.387	25.6	1.512			
SE 37333E 11784N		1.907	0.377	24.6	1.530			
Average		1.903	0.382	25.1	1.521			
Corrected Average		1.87	0.20	11.9	1.67			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
4. Capping Layer 4		1.913	0.459	31.6	1.454			
SE 37322E 11803N		1.913	0.414	27.6	1.499			
Average		1.913	0.437	29.6	1.476			
Corrected Average		1.88	0.24	14.3	1.65			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
5. Capping Layer 2		1.952	0.388	24.8	1.564			
SE 37315E 11774N		1.95	0.395	25.4	1.555			
Average		1.951	0.391	25.1	1.560			
Corrected Average		1.92	0.21	12.0	1.71			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
6. Capping Layer 4		1.959	0.387	24.6	1.572			
SE 37306E 11799N		1.972	0.388	24.5	1.584			
Average		1.966	0.388	24.6	1.578			
Corrected Average		1.93	0.20	11.8	1.73			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
7. Capping Layer 2		1.938	0.361	22.9	1.577			
SE 37295E 11787N		1.945	0.342	21.3	1.603			
Average		1.942	0.352	22.1	1.590			
Corrected Average		1.91	0.18	10.4	1.73			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m³	MC Den. Mg/m³	MC %	Dry Den. Mg/m³	% MDD**	Air Voids** %	Remarks
Test Location								Density within acceptance envelope
8. Capping Layer 2		1.989	0.373	23.1	1.616			
SE 37296E 11768N		1.992	0.346	21.0	1.646			
Average		1.991	0.360	22.1	1.631			
Corrected Average		1.96	0.19	10.4	1.77			Complies Yes

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UK COAL
REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report: ND/03/1256
Date: 19-Jan-04
Date Tested: 03-Nov-03

Maximum Dry Density* Mg/m³
Optimum Moisture Content* %
Particle Density* Mg/m³
Source certificate number

Material 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source Kellingley Colliery
Supplier UK Coal

Operator M Randerson
Gauge model Troxler 3440
Gauge S/N T4 - SN 24963
Mode Direct transmission

Nuclear Density Gauge Tests BS 1377 1990 Part 9
Compliance tests on compacted material

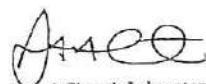
Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
1. Capping Layer 3		1.893	0.375	24.7	1.518			Density within acceptance envelope
SE 37337E 11781N		1.886	0.375	24.8	1.511			
Average		1.890	0.376	24.8	1.514			
Corrected Average		1.86	0.20	11.8	1.67			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
2. Capping Layer 1		1.958	0.382	24.2	1.576			Density within acceptance envelope
SE 37348E 11757N		1.958	0.344	21.3	1.614			
Average		1.958	0.364	22.8	1.594			
Corrected Average		1.93	0.19	10.8	1.74			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
3. Capping Layer 3		1.878	0.390	26.2	1.488			Density within acceptance envelope
SE 37315E 11776N		1.881	0.370	24.5	1.511			
Average		1.880	0.381	25.4	1.499			
Corrected Average		1.85	0.20	12.0	1.65			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
4. Capping Layer 1		1.923	0.392	25.6	1.531			Density within acceptance envelope
SE 37327E 11753N		1.924	0.427	28.5	1.497			
Average		1.924	0.410	27.1	1.514			
Corrected Average		1.89	0.22	13.0	1.68			Complies Yes

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UK COAL
REMEDIATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report: ND/03/1259
Date: 19-Jan-04
Date Tested: 04-Nov-03

Maximum Dry Density* Mg/m³
Optimum Moisture Content* %
Particle Density* Mg/m³
Source certificate number

Material 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source Kellingley Colliery
Supplier UK Coal

Operator M Randerson
Gauge model Troxler 3440
Gauge S/N T4 - SN 24963
Mode Direct transmission

Nuclear Density Gauge Tests BS 1377 1990 Part 9
Compliance tests on compacted material

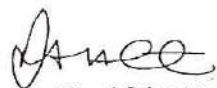
Probe Depth (mm)	200	Bulk Den.	MC Den.	MC	Dry Den.	% MDD**	Air Voids**	Remarks
Test Location		Mg/m ³	Mg/m ³	%	Mg/m ³		%	
1. Capping Layer 4		1.917	0.364	23.4	1.553			Density within acceptance envelope
SE 37339E 11783N		1.908	0.375	24.5	1.533			
Average		1.913	0.370	24.0	1.543			
Corrected Average		1.88	0.19	11.3	1.69			Complies Yes

Probe Depth (mm)	200	Bulk Den.	MC Den.	MC	Dry Den.	% MDD**	Air Voids**	Remarks
Test Location		Mg/m ³	Mg/m ³	%	Mg/m ³		%	
2. Capping Layer 4		1.961	0.367	23.0	1.594			Density within acceptance envelope
SE 37318E 11777N		1.963	0.381	24.1	1.582			
Average		1.962	0.375	23.6	1.587			
Corrected Average		1.93	0.20	11.2	1.74			Complies Yes

Probe Depth (mm)	200	Bulk Den.	MC Den.	MC	Dry Den.	% MDD**	Air Voids**	Remarks
Test Location		Mg/m ³	Mg/m ³	%	Mg/m ³		%	
3. Capping Layer 2		1.941	0.332	20.6	1.609			Density within acceptance envelope
SE 37349E 11751N		1.936	0.344	21.6	1.592			
Average		1.939	0.338	21.1	1.601			
Corrected Average		1.91	0.17	9.8	1.74			Complies Yes

Probe Depth (mm)	200	Bulk Den.	MC Den.	MC	Dry Den.	% MDD**	Air Voids**	Remarks
Test Location		Mg/m ³	Mg/m ³	%	Mg/m ³		%	
4. Capping Layer 2		1.94	0.415	27.2	1.525			Density within acceptance envelope
SE 37330E 11739N		1.928	0.445	30.0	1.483			
Average		1.934	0.430	28.6	1.504			
Corrected Average		1.90	0.23	13.8	1.67			Complies Yes

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UK COAL
REMEDICATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report: ND/03/1264
Date: 19-Jan-04
Date Tested: 05-Nov-03

Maximum Dry Density* Mg/m³
Optimum Moisture Content* %
Particle Density* Mg/m³
Source certificate number

Material 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source Kellingley Colliery
Supplier UK Coal

Operator M Randerson
Gauge model Troxler 3440
Gauge S/N T4 - SN 24963
Mode Direct transmission

Nuclear Density Gauge Tests BS 1377 1990 Part 9
Compliance tests on compacted material

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
1. Capping Layer 3		1.927	0.347	22.0	1.580			Density within acceptance envelope
SE 37329E 11752N		1.934	0.365	23.3	1.569			
Average		1.931	0.357	22.7	1.574			
Corrected Average		1.90	0.18	10.7	1.72			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
2. Capping Layer 3		1.922	0.327	20.5	1.595			Density within acceptance envelope
SE 37346E 11758N		1.908	0.353	22.7	1.555			
Average		1.915	0.340	21.6	1.575			
Corrected Average		1.89	0.17	10.0	1.71			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
3. Capping Layer 4		1.914	0.352	22.5	1.562			Density within acceptance envelope
SE 37330E 11754N		1.911	0.345	22.0	1.566			
Average		1.913	0.349	22.3	1.564			
Corrected Average		1.88	0.18	10.4	1.71			Complies Yes

Probe Depth (mm)	200	Bulk Den. Mg/m ³	MC Den. Mg/m ³	MC %	Dry Den. Mg/m ³	% MDD**	Air Voids** %	Remarks
Test Location								
4. Capping Layer 4		1.905	0.332	21.1	1.573			Density within acceptance envelope
SE 37344E 11759N		1.896	0.344	22.2	1.552			
Average		1.901	0.339	21.7	1.562			
Corrected Average		1.87	0.17	10.1	1.70			Complies Yes

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** Indicates quantities derived in our interpretations of results found on this certificate, using data obtained in OMC/MDD tests conducted on material assumed to be comparable, so is not part of the UKAS accreditation scheme for this laboratory.



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UK COAL
REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report: ND/03/1269
Date: 19-Jan-04
Date Tested: 05-Nov-03

Maximum Dry Density* Mg/m³
Optimum Moisture Content* %
Particle Density* Mg/m³
Source certificate number

Material 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source Kellingley Colliery
Supplier UK Coal

Operator M Randerson
Gauge model Troxler 3440
Gauge S/N T4 - SN 24963
Mode Direct transmission

Nuclear Density Gauge Tests BS 1377 1990 Part 9
Compliance tests on compacted material

Probe Depth (mm)	200	Bulk Den.	MC Den.	MC	Dry Den.	% MDD**	Air Voids**	Remarks
Test Location		Mg/m ³	Mg/m ³	%	Mg/m ³		%	
1. Capping Layer 1		1.899	0.342	22.0	1.557			Density within acceptance envelope
SE 37355E 11738N		1.897	0.366	23.9	1.531			
Average		1.898	0.355	23.0	1.543			
Corrected Average		1.87	0.18	10.8	1.69			Complies Yes

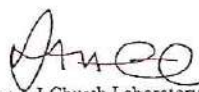
Probe Depth (mm)	200	Bulk Den.	MC Den.	MC	Dry Den.	% MDD**	Air Voids**	Remarks
Test Location		Mg/m ³	Mg/m ³	%	Mg/m ³		%	
2. Capping Layer 2		1.912	0.381	24.9	1.531			Density within acceptance envelope
SE 37353E 11737N		1.933	0.368	23.5	1.565			
Average		1.923	0.375	24.2	1.548			
Corrected Average		1.89	0.20	11.5	1.70			Complies Yes

Probe Depth (mm)	200	Bulk Den.	MC Den.	MC	Dry Den.	% MDD**	Air Voids**	Remarks
Test Location		Mg/m ³	Mg/m ³	%	Mg/m ³		%	
3. Capping Layer 3		1.899	0.368	24.0	1.531			Density within acceptance envelope
SE 37353E 11736N		1.91	0.383	25.1	1.527			
Average		1.905	0.376	24.6	1.529			
Corrected Average		1.88	0.20	11.7	1.68			Complies Yes

Probe Depth (mm)	200	Bulk Den.	MC Den.	MC	Dry Den.	% MDD**	Air Voids**	Remarks
Test Location		Mg/m ³	Mg/m ³	%	Mg/m ³		%	
4. Capping Layer 4		1.92	0.369	23.8	1.551			Density within acceptance envelope
SE 37355E 11736N		1.919	0.364	23.4	1.555			
Average		1.920	0.367	23.6	1.553			
Corrected Average		1.89	0.19	11.2	1.70			Complies Yes

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Appendix D

Insitu Moisture and Density Tests (Core Cutter Method)

UK COAL
REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Summary of Core Cutter Density Tests

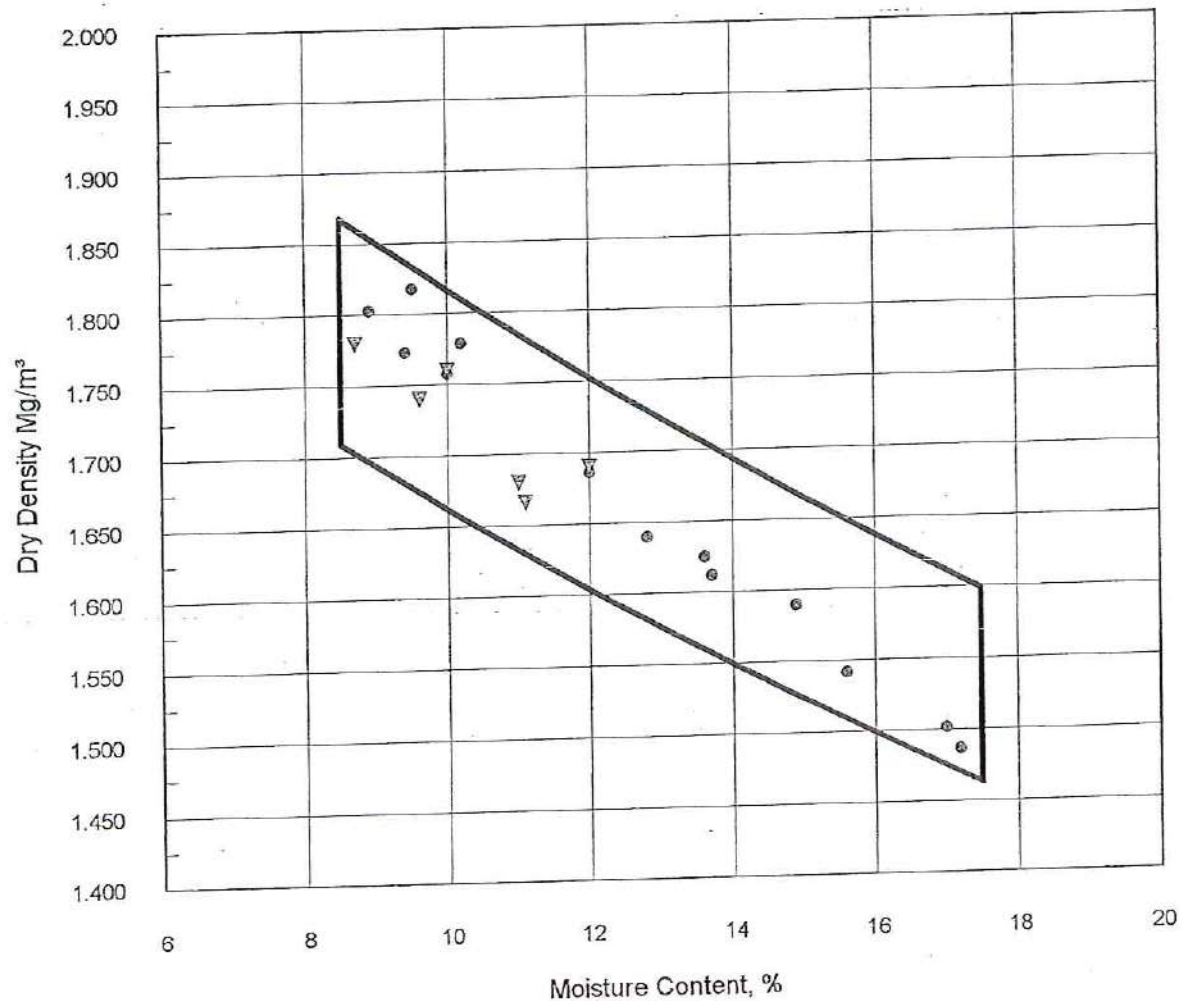
Date	Lab Ref	Location	Wet Density Mg/m³	Moisture Content %	Dry Density Mg/m³	% of MDD	Air Voic %
20/10/03	7213A	Field Trial Layer 1	1.76	17	1.5		
	7213B	Field Trial Layer 1	1.94	9.4	1.77		
	7213C	Field Trial Layer 1	1.78	16	1.54		
	7213D	Field Trial Layer 2	1.93	10	1.76		
	7213E	Field Trial Layer 2	1.85	13	1.64		
	7213F	Field Trial Layer 2	1.83	15	1.59		
21/10/03	7247A	Field Trial Layer 2	1.85	14	1.63		
	7247B	Field Trial Layer 3	1.74	17	1.49		
	7247C	Field Trial Layer 3	1.83	14	1.61		
	7247D	Field Trial Layer 3	1.89	12	1.69		
22/10/03	7302A	Field Trial Layer 4	1.96	8.9	1.80		
	7302B	Field Trial Layer 4	1.96	10	1.78		
	7302C	Field Trial Layer 4	1.99	9.5	1.82		
23/10/03	7336A	Field Trial Layer 4	1.87	13	1.65		
	7336B	Field Trial Layer 4	1.96	10	1.78		
24/10/03	7387	Capping Layer 4 SE 37294E 11823N	1.94	8.7	1.78		
28/10/03	7516	Capping Layer 1 SE 37314E 11802N	1.89	12	1.69		
29/10/03	7535	Capping Layer 3 SE 37306E 11809N	1.87	11	1.68		
30/10/03	7576	Capping Layer 2 SE 37315E 11774N	1.95	10	1.76		
03/11/03	7625	Capping Layer 3 SE 37337E 11781N	1.85	11	1.67		
05/11/03	7702	Capping Layer 4 SE 37344E 11759N	1.91	9.6	1.74		
Average			1.88	12.0	1.68		
Standard Deviation			0.07	2.6	0.10		

No of Tests

21

U K Coal plc
Monckton Coke & Chemical Works
Capping Works

Revised Envelope of Acceptance vs. Core Cutter Densities
1 Part MRF : 2 Parts Processed Shale



● Core Densities (Trial) — Target Requirements ▼ Cores After Trials

UK COAL

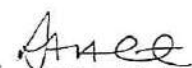
**REMEDIAION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS**

Laboratory Report:	SA/03/IDC/7213	Maximum Dry Density*	Mg/m ³
Sample Number:	SA/03/IDC/7213	Optimum Moisture Content*	%
Date	19/01/04	Particle Density*	Mg/m ³
Date Sampled:	20/10/03	Source certificate number	
Source:	Keilingley Colliery		
Supplier:	UK Coal		

Determination of Insitu Density (Core Cutter Method) - BS 1377 Part 9 1990 Clause 2.4

Test Num	Location	Level	Soil description	Bulk Density Mg/m ³	Moisture Content %	Dry Density Mg/m ³	dens rel. to MDD ** %	Air voids ** %
			1 Part MRF - 2 Parts Colliery Shale (Processed)					
7213A	Field Trial Layer 1			1.76	17	1.50		
7213B	Field Trial Layer 1			1.94	9.4	1.77		
7213C	Field Trial Layer 1			1.78	16	1.54		
7213D	Field Trial Layer 2			1.93	10	1.76		
7213E	Field Trial Layer 2			1.85	13	1.64		
7213F	Field Trial Layer 2			1.83	15	1.59		

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**REMEDICATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS**

Laboratory Report:	SA/03/IDC/7247	Maximum Dry Density*	Mg.m ³
Sample Number:	SA/03/IDC/7247	Optimum Moisture Content*	%
Date	19/01/04	Particle Density*	Mg/m ³
Date Sampled:	21/10/03	Source certificate number	
Source:	Kellinglley Colliery		
Supplier:	UK Coal		

Determination of Insitu Density (Core Cutter Method) - BS 1377 Part 9 1990 Clause 2.4

Test Num	Location	Level	Soil description	Bulk Density Mg/m ³	Moisture Content %	Dry Density Mg/m ³	dens rel. to MDD ** %	Air voids ** %
			1 Part MRF - 2 Parts Colliery Shale (Processed)					
7247A	Layer 2			1.85	14	1.63		
7247B	Layer 3			1.74	17	1.49		
7247C	Layer 3			1.83	14	1.61		
7247D	Layer 3			1.89	12	1.69		

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Signature

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REMEDIAION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Laboratory Report:	SA/03/IDC/7302	Maximum Dry Density*	Mg.m ³
Sample Number:	SA/03/IDC/7302	Optimum Moisture Content*	%
Date:	19/01/04	Particle Density*	Mg/m ³
Date Sampled:	22/10/03	Source certificate number	
Source:	Kellingley Colliery		
Supplier:	UK Coal		

Determination of Insitu Density (Core Cutter Method) - BS 1377 Part 9 1990 Clause 2.4

Test Num	Location	Level	Soil description	Bulk Density Mg/m ³	Moisture Content %	Dry Density Mg/m ³	dens rel. to MDD **	Air voids **
			1 Part MRF - 2 Parts Colliery Shale (Processed)					
7302A	Field Trial Layer 4			1.96	8.9	1.80		
7302B	Field Trial Layer 4			1.96	10	1.78		
7302C	Field Trial Layer 4			1.99	9.5	1.82		

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**REMEDIAION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS**

Laboratory Report:	SA/03/IDC/7336	Maximum Dry Density*	Mg/m ³
Sample Number:	SA/03/IDC/7336	Optimum Moisture Content*	%
Date:	19/01/04	Particle Density*	Mg/m ³
Date Sampled:	23/10/03	Source certificate number	
Source:	Kellingley Colliery		
Supplier:	UK Coal		

Determination of Insitu Density (Core Cutter Method) - BS 1377 Part 9 1990 Clause 2.4

Test Num	Location	Level	Soil description	Bulk Density Mg/m ³	Moisture Content %	Dry Density Mg/m ³	dens rel. to MDD ** %	Air voids ** %
			1 Part MRF - 2 Parts Colliery Shale (Processed)					
7336A	Field Trial Layer 4			1.87	13	1.65		
7336B	Field Trial Layer 4			1.96	10	1.78		

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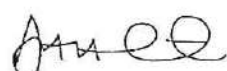
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MONCKTON WORKS, ROYSTON - CAPPING WORKS**

Laboratory Report:	SA/03/IDC/7625	Maximum Dry Density*	Mg/m ³
Sample Number:	SA/03/IDC/7625	Optimum Moisture Content*	%
Date	19/01/04	Particle Density*	Mg/m ³
Date Sampled:	03/11/03	Source certificate number	
Source:	Kellingley Colliery		
Supplier:	UK Coal		

Determination of Insitu Density (Core Cutter Method) - BS 1377 Part 9 1990 Clause 2.4

Test Num	Location	Level	Soil description	Bulk Density Mg/m ³	Moisture Content %	Dry Density Mg/m ³	dens rel. to MDD ** %	Air voids ** %
			1 Part MRF - 2 Parts Colliery Shale (Processed)					
7625	Capping Layer 3 SE 37337E 11781N			1.85	11	1.67		

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Appendix E

Undisturbed Constant Head Permeability Tests

UK COAL
 REMEDIATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
 MONCKTON WORKS, ROYSTON - CAPPING WORKS

Summary of Constant Head Permeability Test Results

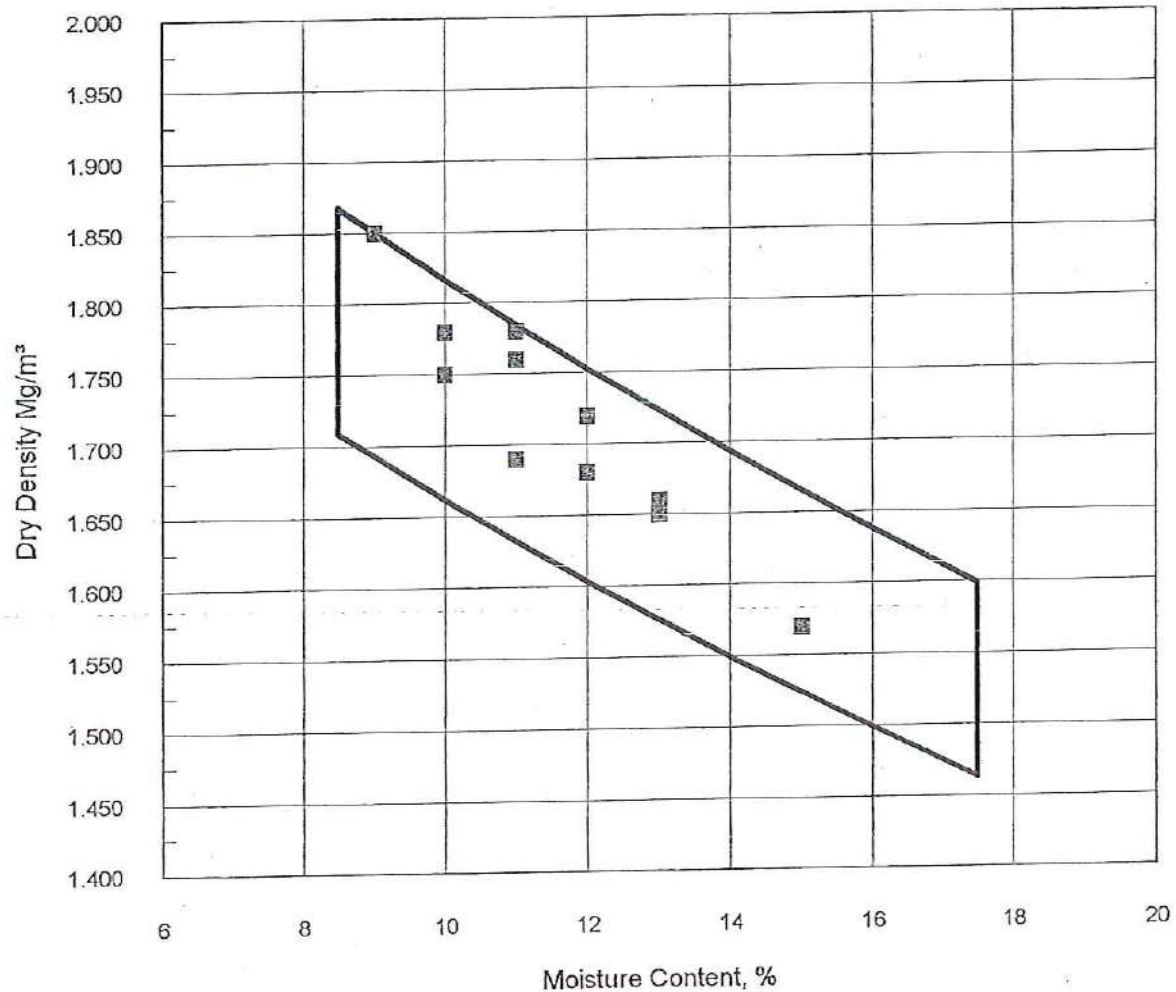
Date	Lab Ref	Location	Wet Density Mg/m ³	Moisture %	Dry Density Mg/m ³	Permeability m/s
20/10/03	7214	Layer 1 No. 2	1.81	15	1.57	3.5E-010
20/10/03	7215	Layer 2 No. 11	1.88	11	1.69	7.7E-010
21/10/03	7248	Field Trial Layer 3 No. 5	1.88	13	1.66	2.5E-010
22/10/03	7303	Field Trial Layer 4 No. 5	1.88	12	1.68	2.8E-010
22/10/03	7304	Layer 1 Capping	1.86	13	1.65	3.3E-010
27/10/03	7477	Layer 4 Capping SE 37315 11841	1.93	10	1.75	8.0E-010
29/10/03	7532	Layer 2 Capping SE 37307 11806	1.93	12	1.72	2.6E-010
29/10/03	7533	Layer 3 Capping SE 37319 11809	2.02	9	1.85	7.3E-010
30/10/03	7577	Layer 2 Capping SE 37295 11787	1.96	10	1.78	2.3E-010
04/11/03	7652	Layer 2 Capping SE 37349 11751	1.98	11	1.78	2.0E-010
06/11/03	7735	Layer 1 Capping SE 37355 11738	1.95	11	1.76	3.0E-010
Average			1.91	12	1.72	4.1E-010
Standard Deviation			0.06	1.6	0.07	

No of Tests

11

U K Coal plc
Monckton Coke & Chemical Works
Capping Works

Revised Envelope of Acceptance vs. Permeability Densities
1 Part MRF : 2 Parts Processed Shale



— Target Requirements ■ Constant Head Permeability Tests

UK COAL

**REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS**

Authorised signatories

L.J. Church, Managing Director
J.A. Hardcastle, Lab Manager ✓
A.F.D. Rozario, Dep Lab Mgr
M. Beattie, Dep Lab Mgr
J. Church, Q.A. Manager

Laboratory Report:	SA/03/CHP/7214	Date Sampled:	20/10/03
Sample Number:	SA/03/7214	Date Received:	20/10/03
Date:	19-Jan-04	Date Completed:	28/10/03
Material Description:	1 Part MRF - 2 Parts Colliery Shale (Processed)	Client Ref:	
Source:	Kellingley Colliery	Location:	Layer 1 No. 2
Supplier:	UK Coal		

The results below represent tests conducted on a sample of the above material which was taken from the site by L.J. Church Laboratory Services Ltd.*

The sample was received with an accompanying certificate of sampling.

Determination of constant head permeability in a triaxial cell - BS 1377: Part 6: 1990

Specimen Data:

Sample Type	undisturbed
Sample Length	119.8 mm
Sample Diameter	100.8 mm
Bulk Density	1.81 Mg/m ³
Initial Moisture Content	15 %
Dry Density	1.57 Mg/m ³
Specimens saturated by increments of back pressure and cell pressure	
Final B value	0.98

Permeability Stage

Pressure Difference	25 kPa
Mean Effective Stress	50 kPa
Hydraulic gradient	21.4
Mean rate of flow	3.6E-003 ml/min

After test

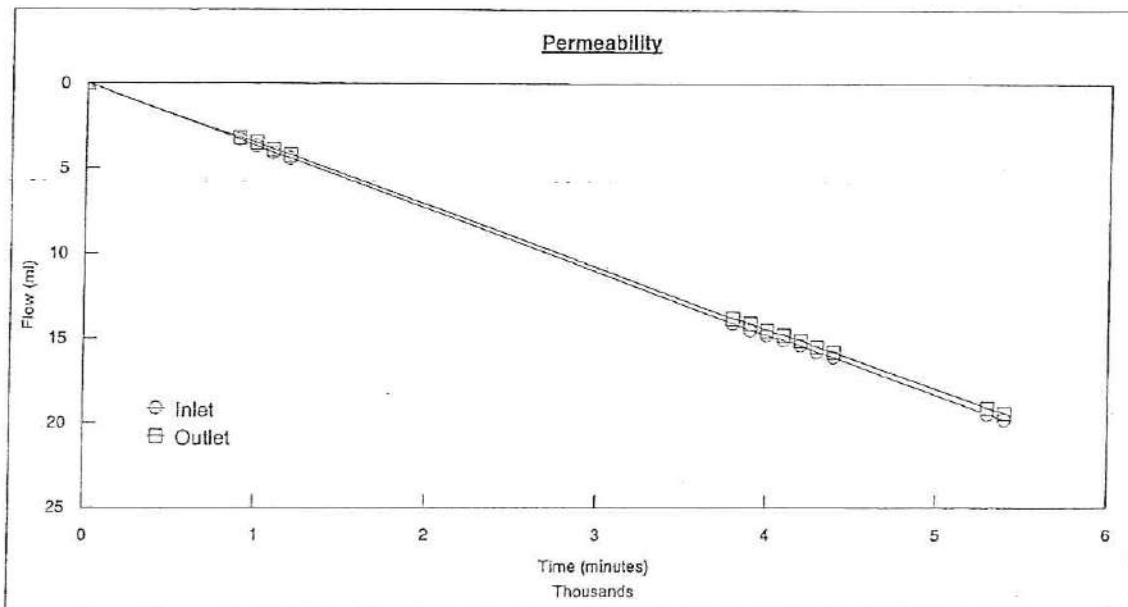
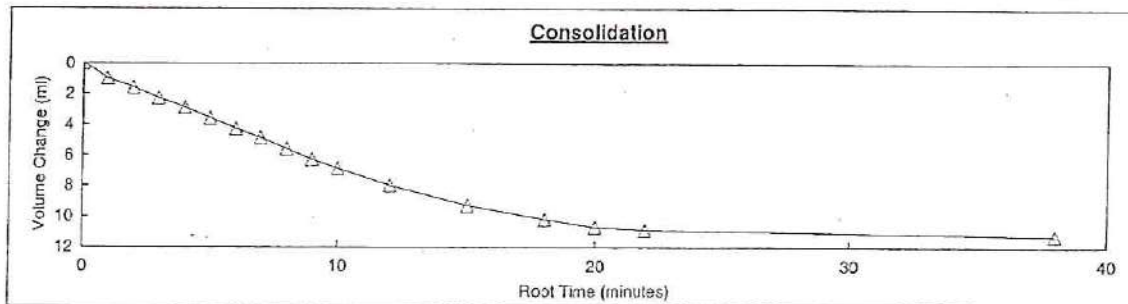
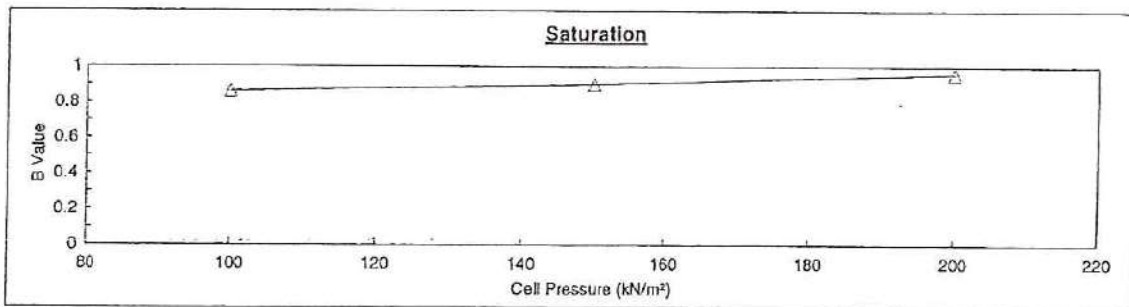
Final bulk density	1.82 Mg/m ³
Final moisture content	14.3 %

Coefficient of Permeability (kv) at 20°C	3.5E-010 m/s
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* denotes not UKAS Accredited. Tests marked "not UKAS Accredited" in this report are not included in the United Kingdom Accreditation Schedule for our laboratory

Laboratory Report:
Date:

SA/03/CHP/7214 continued
19-Jan-04



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Page 2 of 2

UK COAL

**REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS**

Authorised signatories

L.J. Church, Managing Director
J.A. Hardcastle, Lab Manager ✓
A.F.D. Rozario, Dep Lab Mgr
M. Beasly, Dep Lab Mgr
J. Church, O.A. Manager

Laboratory Report:	SA/03/CHP/7215	Date Sampled:	20/10/03
Sample Number:	SA/03/7215	Date Received:	20/10/03
Date:	19-Jan-04	Date Completed:	28/10/03
Material Description:	1 Part MRF - 2 Parts Colliery Shale (Processed)	Client Ref:	
Source:	Kellingley Colliery	Location:	Layer 2 No.11
Supplier:	UK Coal		

The results below represent tests conducted on a sample of the above material which was taken from the site by L.J. Church Laboratory Services Ltd.*

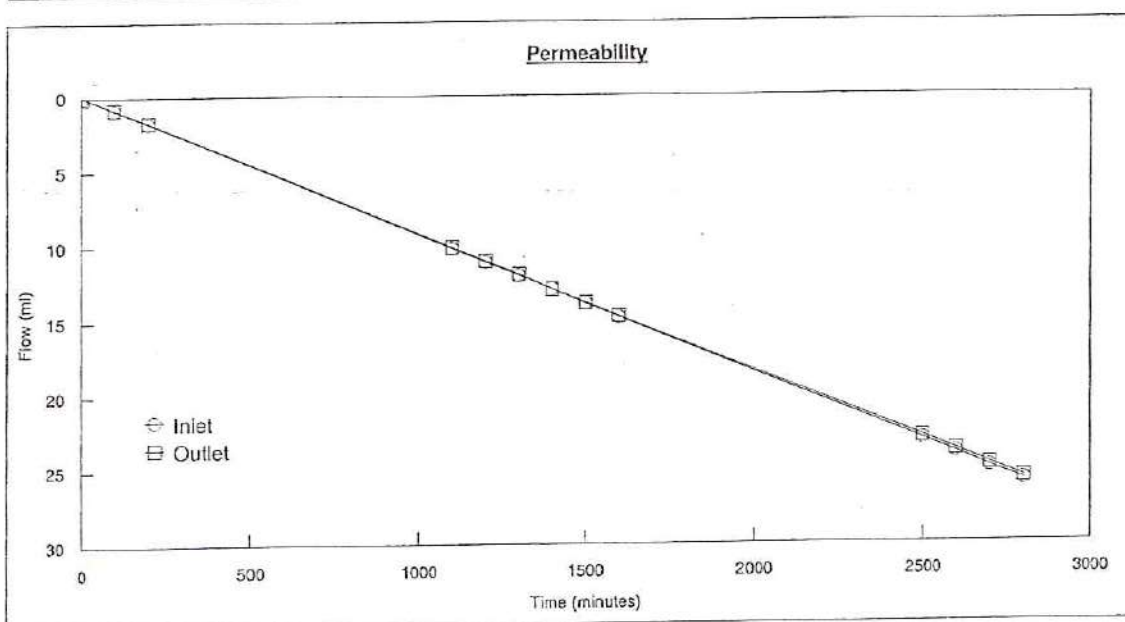
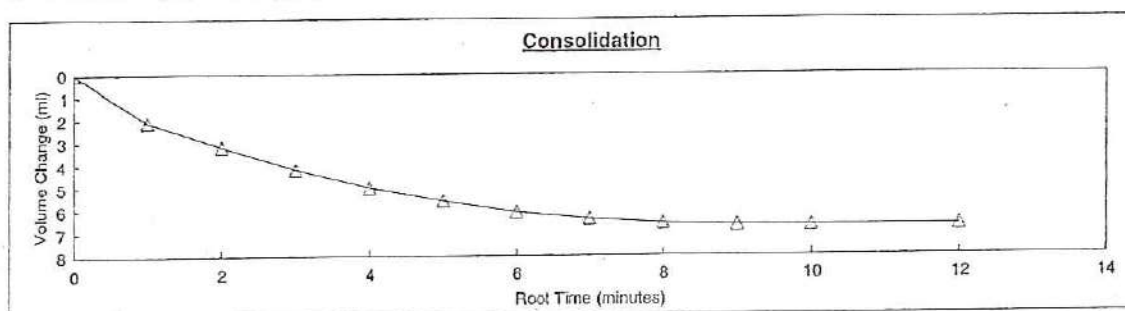
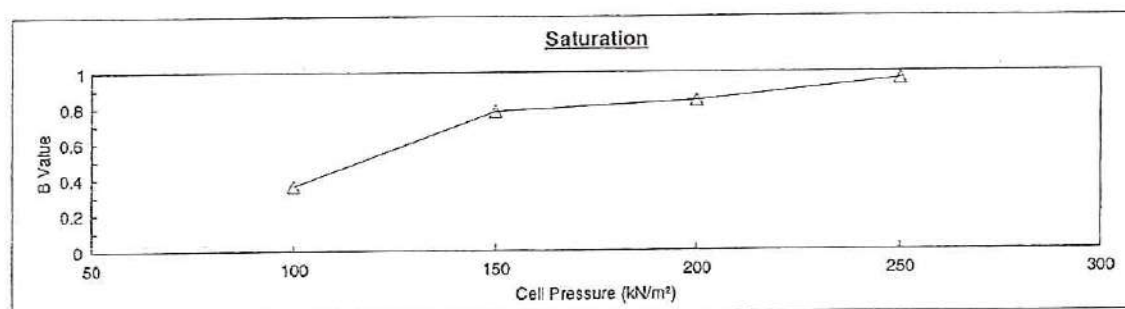
The sample was received with an accompanying certificate of sampling.

Determination of constant head permeability in a triaxial cell - BS 1377: Part 6: 1990	
<u>Specimen Data:</u>	
Sample Type	undisturbed
Sample Length	105.8 mm
Sample Diameter	101.9 mm
Bulk Density	1.88 Mg/m ³
Initial Moisture Content	11 %
Dry Density	1.69 Mg/m ³
Specimens saturated by increments of back pressure and cell pressure	
Final B value	0.98
<u>Permeability Stage</u>	
Pressure Difference	25 kPa
Mean Effective Stress	50 kPa
Hydraulic gradient	33.6
Mean rate of flow	9.2E-003 ml/min
<u>After test</u>	
Final bulk density	1.87 Mg/m ³
Final moisture content	11.7 %
Coefficient of Permeability (kv) at 20°C	7.7E-010 m/s

* denotes not UKAS Accredited. Tests marked 'not UKAS Accredited' in this report are not included in the United Kingdom Accreditation Schedule for our laboratory

Laboratory Report:
Date:

SA/03/CHP/7215 continued
19-Jan-04




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UK COAL

**REMEDICATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
 MONCKTON WORKS, ROYSTON - CAPPING WORKS**

Authorised signatories

L.J. Church, Managing Director
 J.A. Hardcastle, Lab Manager ✓
 A.F. D'Rosario, Dep Lab Mgr
 M. Basistat, Dep Lab Mgr
 J. Church, O.A. Manager

Laboratory Report: SA/03/CHP/7248
 Sample Number: SA/03/7248
 Date: 19-Jan-04

Date Sampled: 21/10/03
 Date Received: 21/10/03
 Date Completed:

Material Description: 1 Part MRF - 2 Parts Colliery Shale (Processed)
 Source: Kellingley Colliery
 Supplier: UK Coal

Client Ref:
 Location: Field Trial Layer 3
 No. 5

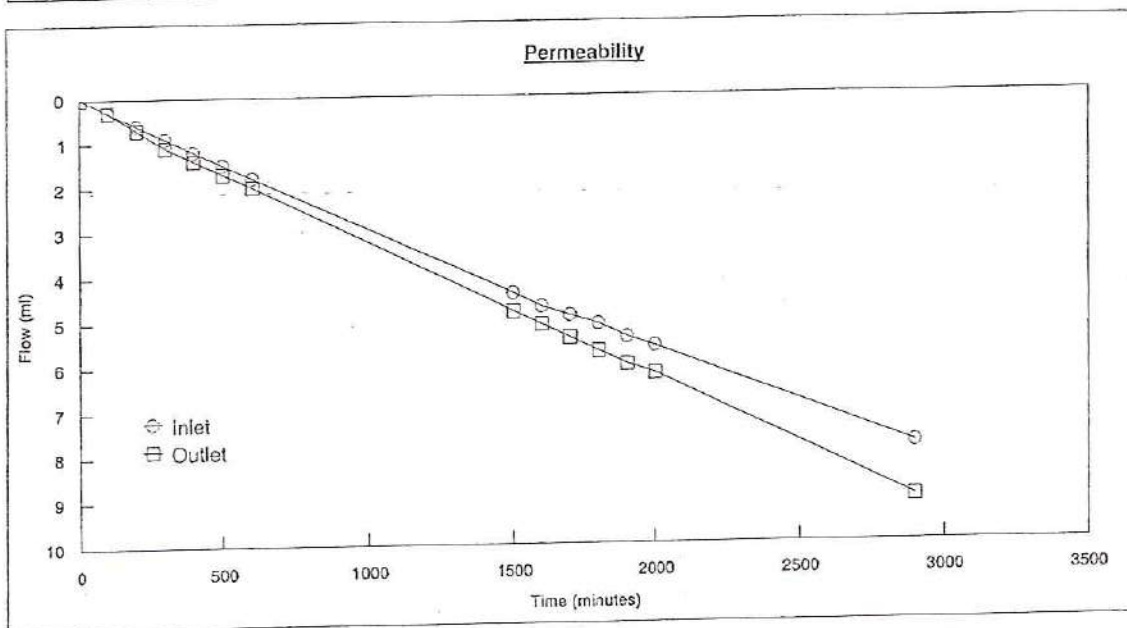
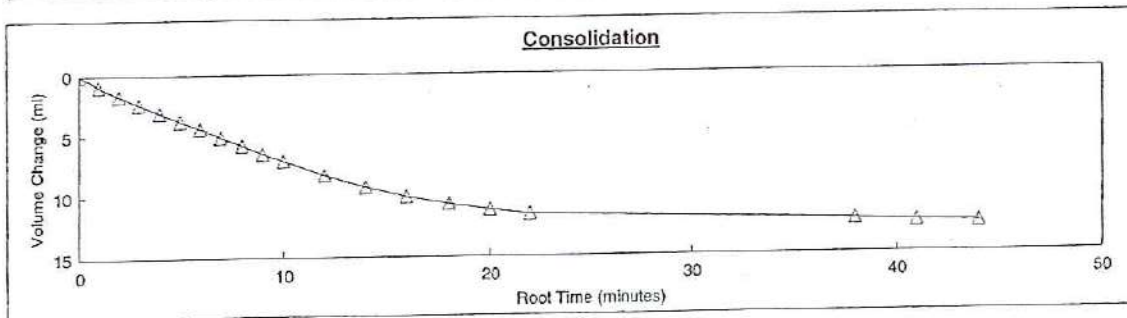
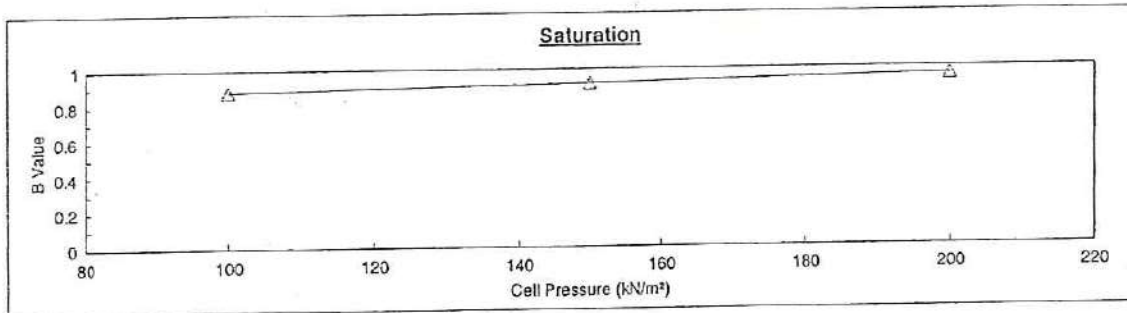
The results below represent tests conducted on a sample of the above material which was taken from the site by L.J. Church Laboratory Services Ltd.*
 The sample was received with an accompanying certificate of sampling.

Determination of constant head permeability in a triaxial cell - BS 1377: Part 6: 1990	
<u>Specimen Data:</u>	
Sample Type	undisturbed
Sample Length	106.4 mm
Sample Diameter	100.8 mm
Bulk Density	1.88 Mg/m ³
Initial Moisture Content	13 %
Dry Density	1.66 Mg/m ³
Specimens saturated by increments of back pressure and cell pressure	
Final B value	0.98
<u>Permeability Stage</u>	
Pressure Difference	25 kPa
Mean Effective Stress	50 kPa
Hydraulic gradient	24
Mean rate of flow	2.9E-003 ml/min
<u>After test</u>	
Final bulk density	1.88 Mg/m ³
Final moisture content	12.8 %
Coefficient of Permeability (kv) at 20°C	2.5E-010 m/s

* denotes not UKAS Accredited. Tests marked "not UKAS Accredited" in this report are not included in the United Kingdom Accreditation Schedule for our laboratory

Laboratory Report:
Date:

SA/03/CHP/7248 continued
19-Jan-04



[Signature]
pp L J Church Laboratory Services Ltd

UK COAL

**REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS**

Authorised signatories

L.J. Church, Managing Director ✓
J.A. Hardcastle, Lab Manager
A.F. D'Rozario, Dep Lab Mgr
M. Bursnell, Dep Lab Mgr
J. Church, Q.A. Manager

Laboratory Report: SA/03/CHP/7303
Sample Number: SA/03/7303
Date: 19-Jan-04

Date Sampled: 22/10/03
Date Received: 22/10/03
Date Completed:

Material Description: 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source: Kellingley Colliery
Supplier: UK Coal

Client Ref:
Location: Field Trial Layer 4
No. 5

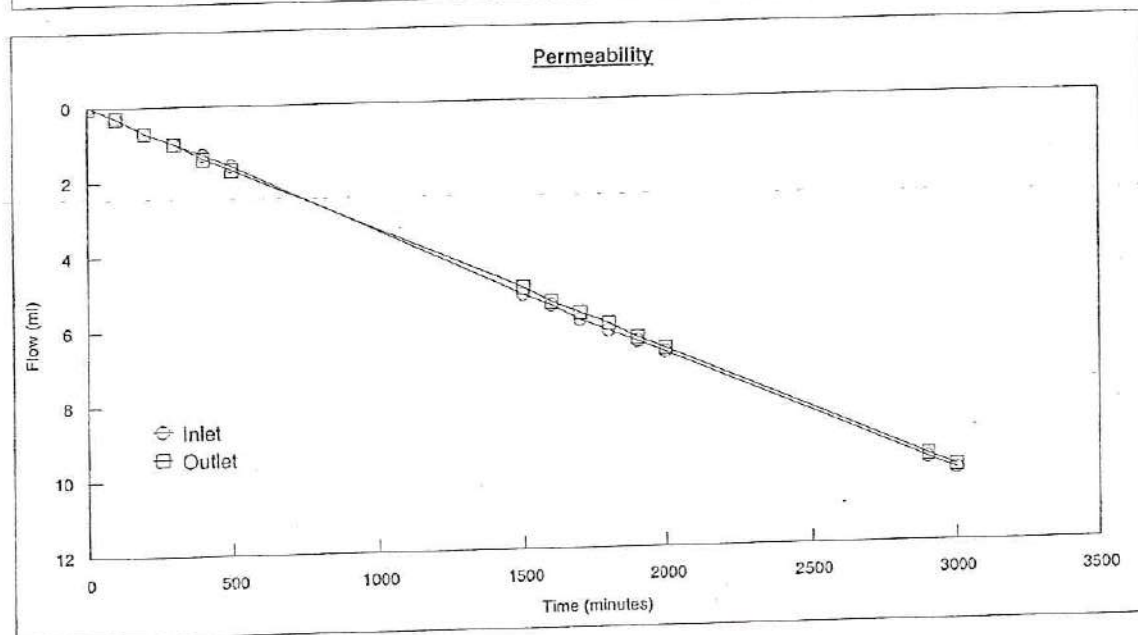
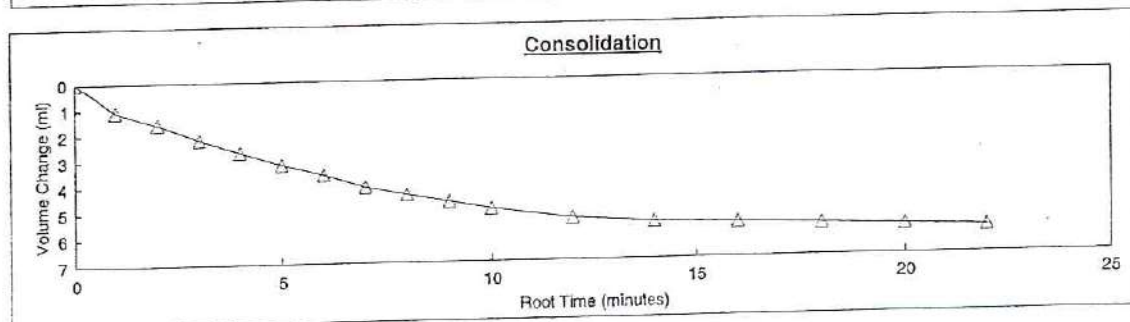
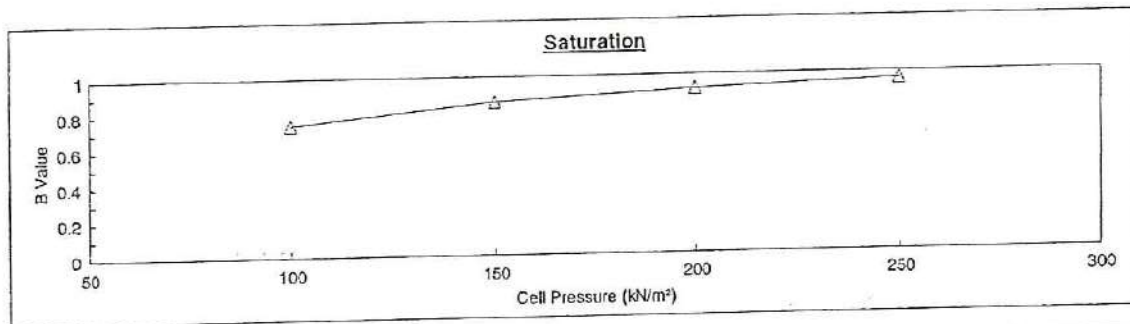
The results below represent tests conducted on a sample of the above material which was taken from the site by L.J. Church Laboratory Services Ltd.*
The sample was received with an accompanying certificate of sampling.

Determination of constant head permeability in a triaxial cell - BS 1377: Part 6: 1990	
<u>Specimen Data:</u>	
Sample Type	undisturbed
Sample Length	105.8 mm
Sample Diameter	101.2 mm
Bulk Density	1.88 Mg/m ³
Initial Moisture Content	12 %
Dry Density	1.68 Mg/m ³
Specimens saturated by increments of back pressure and cell pressure	
Final B value	0.97
<u>Permeability Stage</u>	
Pressure Difference	25 kPa
Mean Effective Stress	50 kPa
Hydraulic gradient	24.3
Mean rate of flow	3.3E-003 ml/min
<u>After test</u>	
Final bulk density	1.89 Mg/m ³
Final moisture content	12.1 %
Coefficient of Permeability (kv) at 20°C	2.8E-010 m/s

* denotes not UKAS Accredited. Tests marked "not UKAS Accredited" in this report are not included in the United Kingdom Accreditation Schedule for our laboratory

Laboratory Report:
Date:

SA/03/CHP/7303 continued
19-Jan-04



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REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS

Authorised signatories

L.J. Church, Managing Director
J.A. Handcastle, Lab Manager ✓
A.F. DiRozario, Dep. Lab Mgr
M. Bostall, Dep. Lab Mgr
J. Church, Q.A. Manager

Laboratory Report: SA/03/CHP/7304
Sample Number: SA/03/7304
Date: 19-Jan-04

Date Sampled: 22/10/03
Date Received: 22/10/03
Date Completed:

Material Description: 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source: Kellingley Colliery
Supplier: UK Coal

Client Ref:
Location: 1st Layer Capping

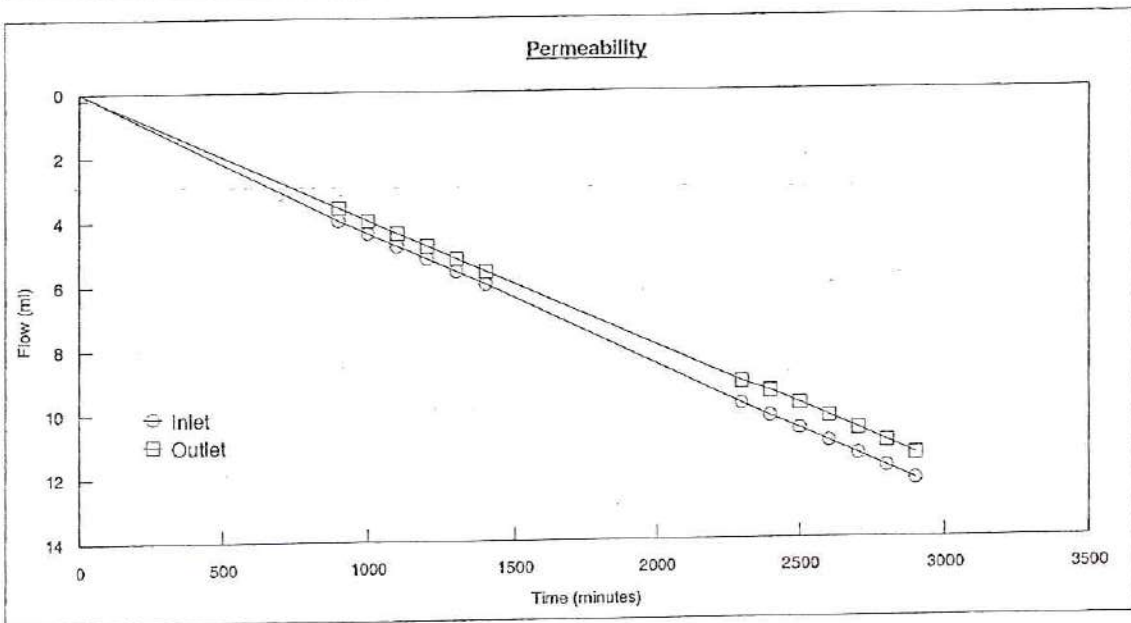
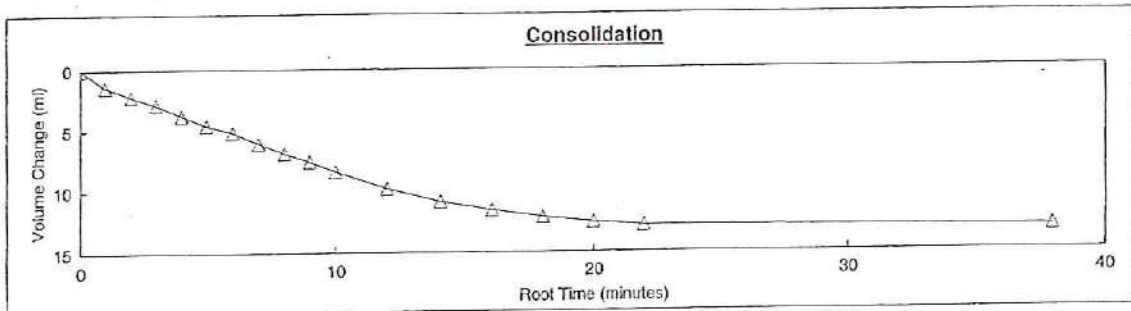
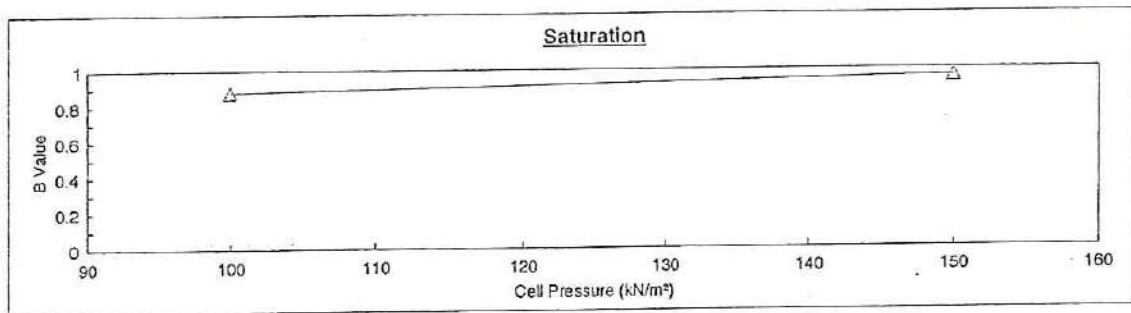
The results below represent tests conducted on a sample of the above material which was taken from the site by L.J. Church Laboratory Services Ltd.*
The sample was received with an accompanying certificate of sampling.

Determination of constant head permeability in a triaxial cell - BS 1377: Part 6: 1990	
<u>Specimen Data:</u>	
Sample-Type	undisturbed
Sample Length	103.5 mm
Sample Diameter	102.5 mm
Bulk Density	1.86 Mg/m ³
Initial Moisture Content	13 %
Dry Density	1.65 Mg/m ³
Specimens saturated by increments of back pressure and cell pressure	
Final B value	0.98
<u>Permeability Stage</u>	
Pressure Difference	25 kPa
Mean Effective Stress	50 kPa
Hydraulic gradient	24.8
Mean rate of flow	4.1E-003 ml/min
<u>After test</u>	
Final bulk density	1.87 Mg/m ³
Final moisture content	12.6 %
Coefficient of Permeability (kv) at 20°C	3.3E-010 m/s

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Laboratory Report:
Date:

SA/03/CHP/7304 continued
19-Jan-04



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**REMEDICATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
 MONCKTON WORKS, ROYSTON - CAPPING WORKS**

Authorised signatories

L.J. Church, Managing Director
 J.A. Handcastle, Lab Manager
 A.F. D'Almeida, Dep Lab Mgr
 M. Beattie, Dep Lab Mgr
 J. Church, O.A. Manager

Laboratory Report:	SA/03/GHP/7477	Date Sampled:	27/10/03
Sample Number:	SA/03/7477	Date Received:	27/10/03
Date:	19-Jan-04	Date Completed:	27/10/03
Material Description:	1 Part MRF - 2 Parts Colliery Shale (Processed)	Client Ref:	
Source:	Kellingley Colliery	Location:	Capping Layer 4
Supplier:	UK Coal		SE 87315E 11841N

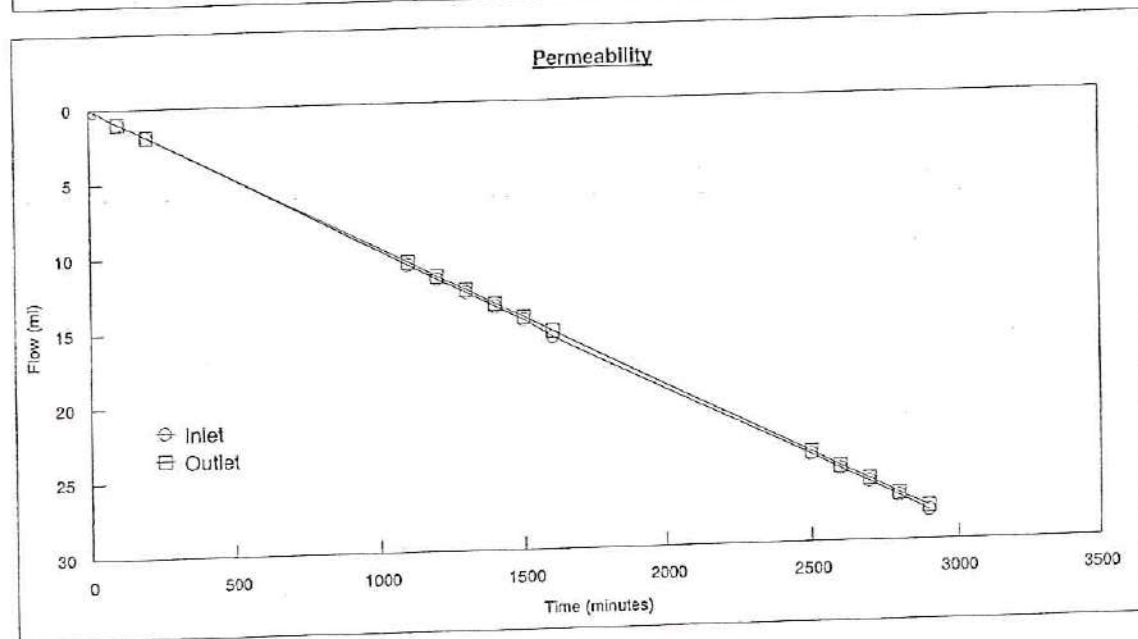
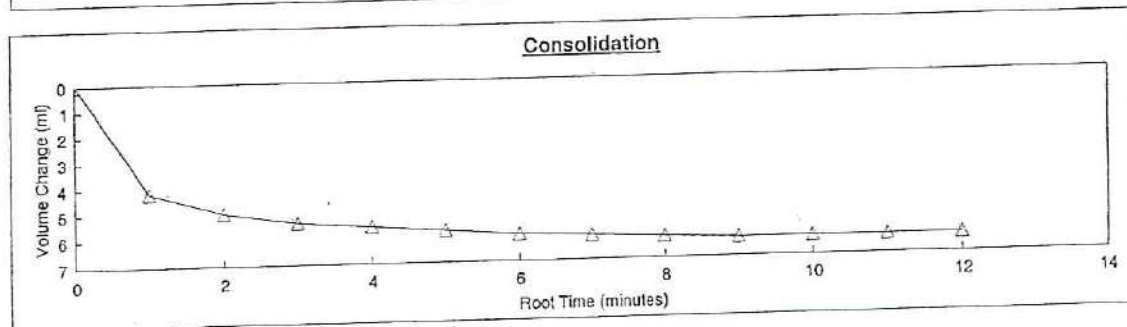
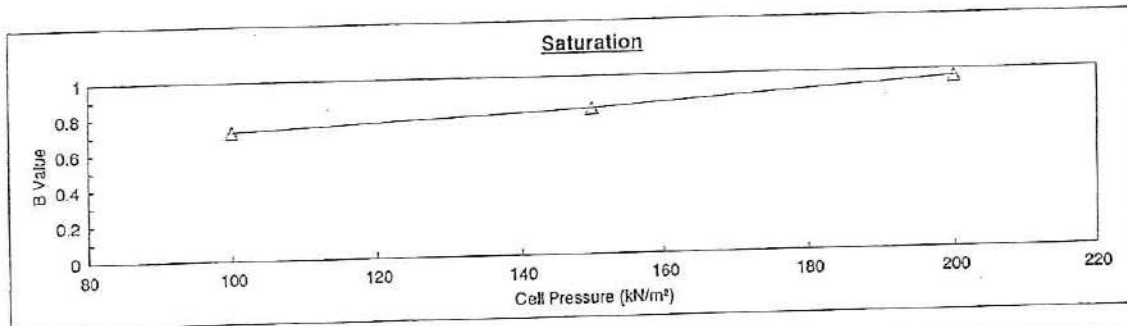
The results below represent tests conducted on a sample of the above material which was taken from the site by L.J. Church Laboratory Services Ltd.*
 The sample was received with an accompanying certificate of sampling.

Determination of constant head permeability in a triaxial cell - BS 1377: Part 6: 1990	
<u>Specimen Data:</u>	
Sample Type	undisturbed
Sample Length	104.0 mm
Sample Diameter	102.0 mm
Bulk Density	1.93 Mg/m ³
Initial Moisture Content	10 %
Dry Density	1.75 Mg/m ³
Specimens saturated by increments of back pressure and cell pressure	
Final B value	0.98
<u>Permeability Stage</u>	
Pressure Difference	25 kPa
Mean Effective Stress	50 kPa
Hydraulic gradient	24.4
Mean rate of flow	9.7E-003 ml/min
<u>After test</u>	
Final bulk density	1.93 Mg/m ³
Final moisture content	11 %
Coefficient of Permeability (kv) at 20°C	8.0E-010 m/s

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Laboratory Report:
Date:

SA/03/CHP/7477 continued
19-Jan-04



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 REMEDIATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
 MONCKTON WORKS, ROYSTON - CAPPING WORKS

Authorised signatories

L J Church, Managing Director
J A Handcastle, Lab Manager
A F D'Rozario, Dep Lab Mgr
M Bassett, Dep Lab Mgr
J Church, C A Manager

Laboratory Report:	SA/03/CHP/7532	Date Sampled:	29/10/03
Sample Number:	SA/03/7532	Date Received:	29/10/03
Date:	19-Jan-04	Date Completed:	12/11/03
Material Description:	1 Part MRF - 2 Parts Colliery Shale (Processed)	Client Ref:	
Source:	Kellingley Colliery	Location:	Capping Layer 2
Supplier:	UK Coal		SE 37307E 11806N

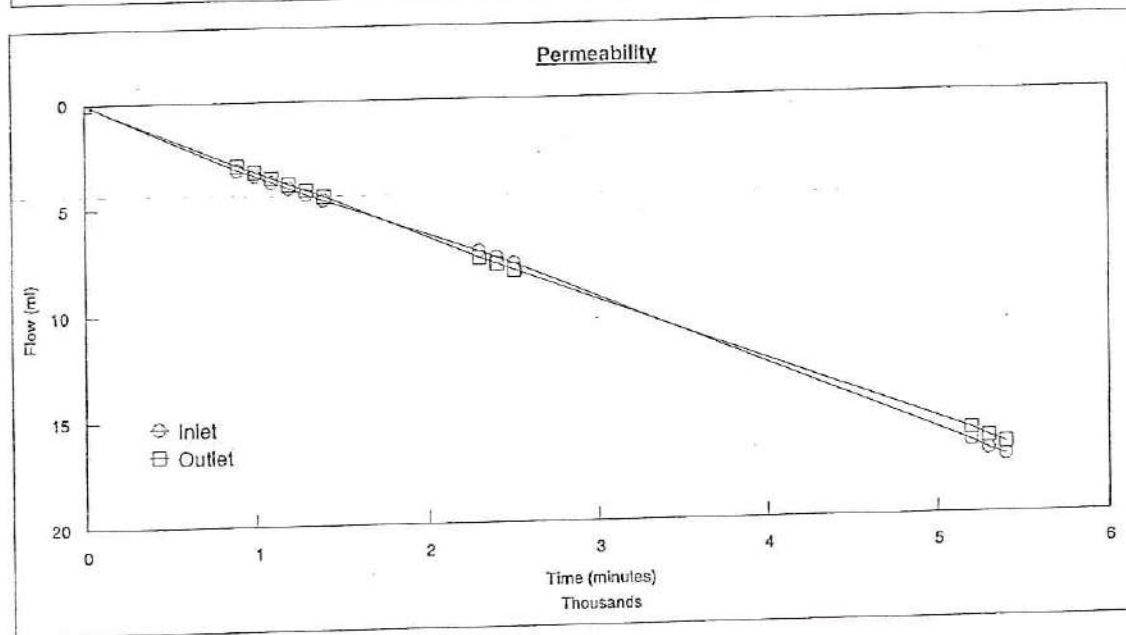
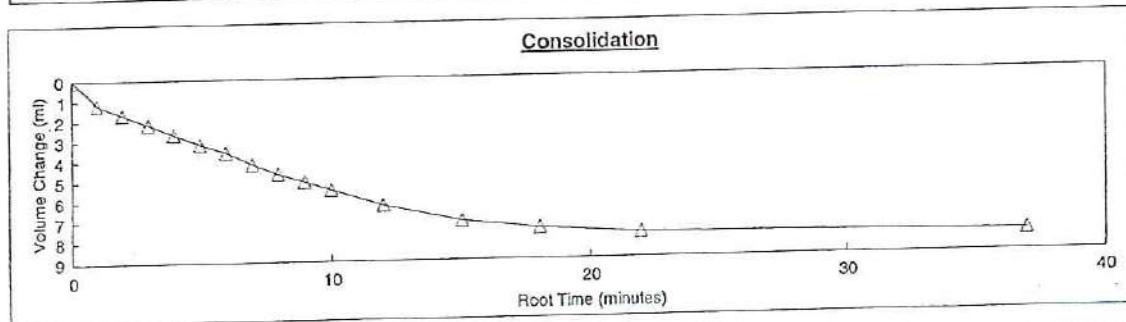
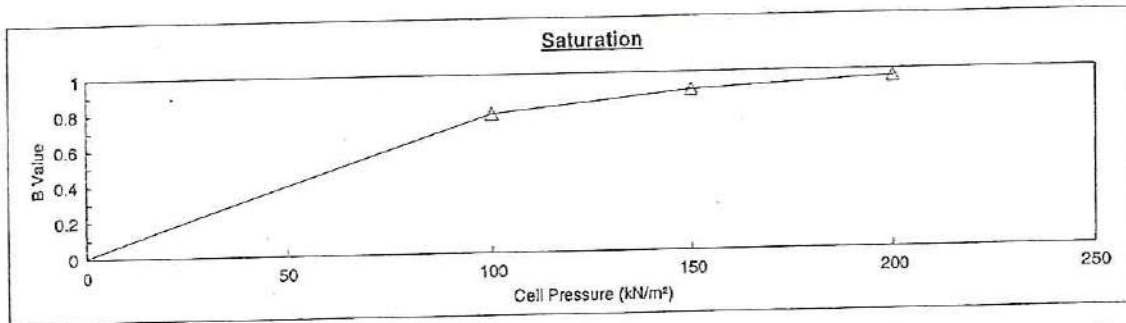
The results below represent tests conducted on a sample of the above material which was taken from the site by L J Church Laboratory Services Ltd.*
 The sample was received with an accompanying certificate of sampling.

Determination of constant head permeability in a triaxial cell - BS 1377: Part 6: 1990	
<u>Specimen Data:</u>	
Sample Type	undisturbed
Sample Length	106.0 mm
Sample Diameter	102.0 mm
Bulk Density	1.93 Mg/m ³
Initial Moisture Content	12 %
Dry Density	1.72 Mg/m ³
Specimens saturated by increments of back pressure and cell pressure	
Final B value	0.98
<u>Permeability Stage</u>	
Pressure Difference	25 kPa
Mean Effective Stress	50 kPa
Hydraulic gradient	24.1
Mean rate of flow	3.1E-003 ml/min
<u>After test</u>	
Final bulk density	1.94 Mg/m ³
Final moisture content	11 %
Coefficient of Permeability (kv) at 20°C	2.6E-010 m/s

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Laboratory Report:
Date:

SA/03/CHP/7532 continued
19-Jan-04



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**REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS**

Authorised signatories

L.J. Church, Managing Director
J.A. Hardcastle, Lab Manager
A.F.D. Rozario, Dep Lab Mgr
M. Beestall, Dep Lab Mgr
J. Church, Q.A. Manager

Laboratory Report: SA/03/CHP/7533
Sample Number: SA/03/7533
Date: 19-Jan-04

Date Sampled: 29/10/03
Date Received: 29/10/03
Date Completed: 12/11/03

Material Description: 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source: Kellingley Colliery
Supplier: UK Coal

Client Ref:
Location: Capping Layer 3
SE 37319E 11809N

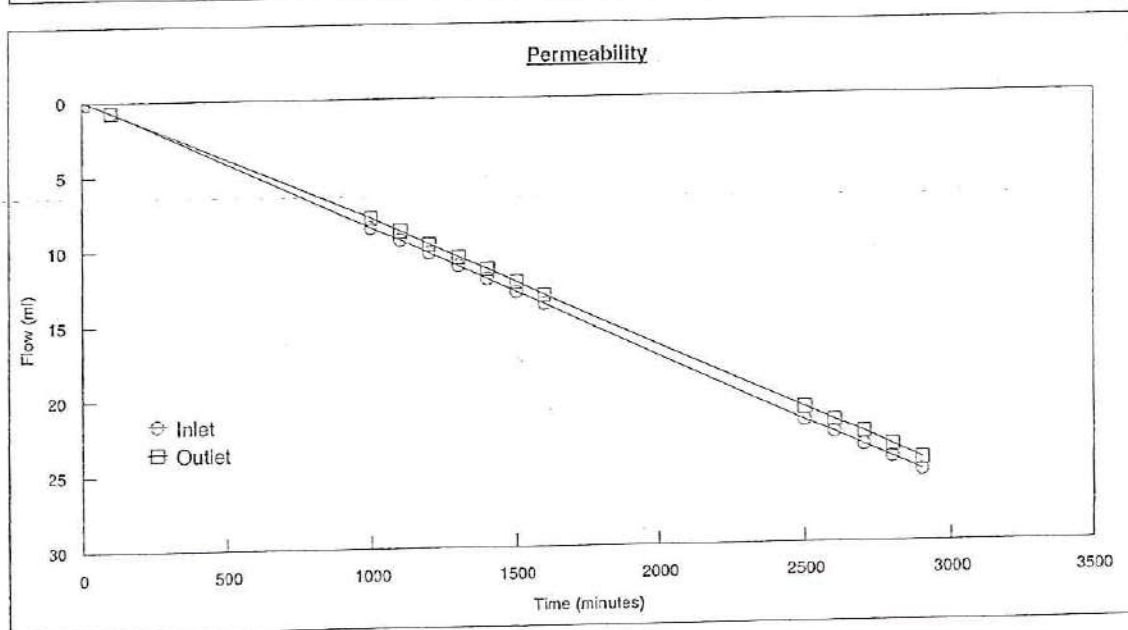
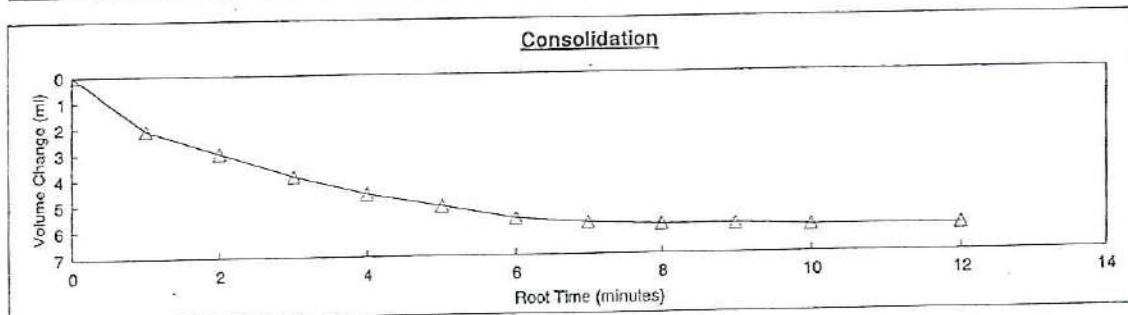
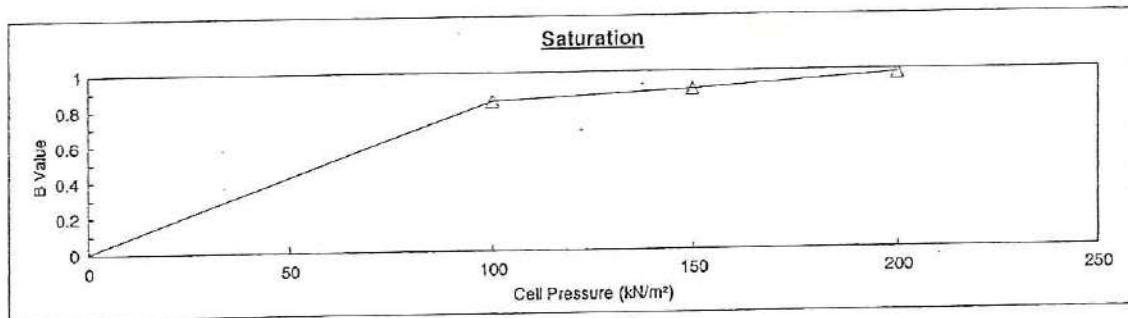
The results below represent tests conducted on a sample of the above material which was taken from the site by L.J. Church Laboratory Services Ltd.*
The sample was received with an accompanying certificate of sampling.

Determination of constant head permeability in a triaxial cell - BS 1377: Part 6: 1990	
<u>Specimen Data:</u>	
Sample Type	undisturbed
Sample Length	106.0 mm
Sample Diameter	102.0 mm
Bulk Density	2.02 Mg/m ³
Initial Moisture Content	9 %
Dry Density	1.85 Mg/m ³
Specimens saturated by increments of back pressure and cell pressure	
Final B value	0.98
<u>Permeability Stage</u>	
Pressure Difference	25 kPa
Mean Effective Stress	50 kPa
Hydraulic gradient	24.1
Mean rate of flow	8.6E-003 ml/min
<u>After test</u>	
Final bulk density	2.03 Mg/m ³
Final moisture content	10 %
Coefficient of Permeability (kv) at 20°C	7.3E-010 m/s

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Laboratory Report:
Date:

SA/03/CHP/7533 continued
19-Jan-04



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**REMEDICATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
 MONCKTON WORKS, ROYSTON - CAPPING WORKS**

Authorised signatories

L.J. Church, Managing Director
 J.A. Handcastle, Lab Manager
 A.F. D'Almeida, Dep. Lab Mgr
 M. Bassell, Dep. Lab Mgr
 J. Church, O.A. Manager

Laboratory Report: SA/03/CHP/7577
 Sample Number: SA/03/7577
 Date: 19-Jan-04

Date Sampled: 30/10/03
 Date Received: 30/10/03
 Date Completed: 13/11/03

Material Description: 1 Part MRF - 2 Parts Colliery Shale (Processed)
 Source: Kellingley Colliery
 Supplier: UK Coal

Client Ref:
 Location: Capping Layer 2
 SE 37295E 11787N

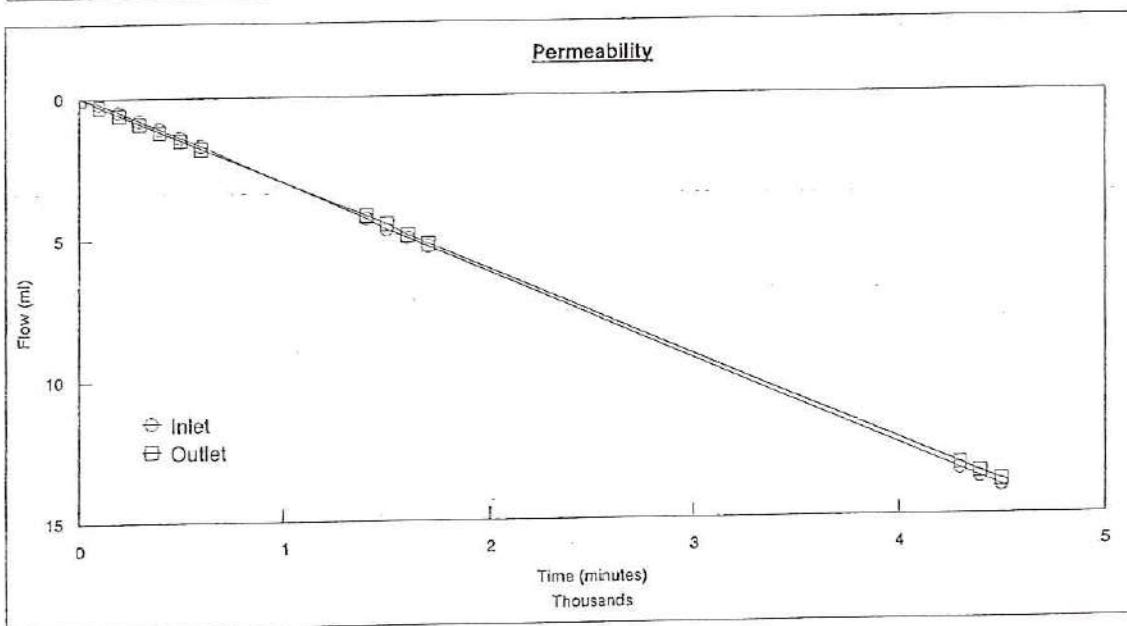
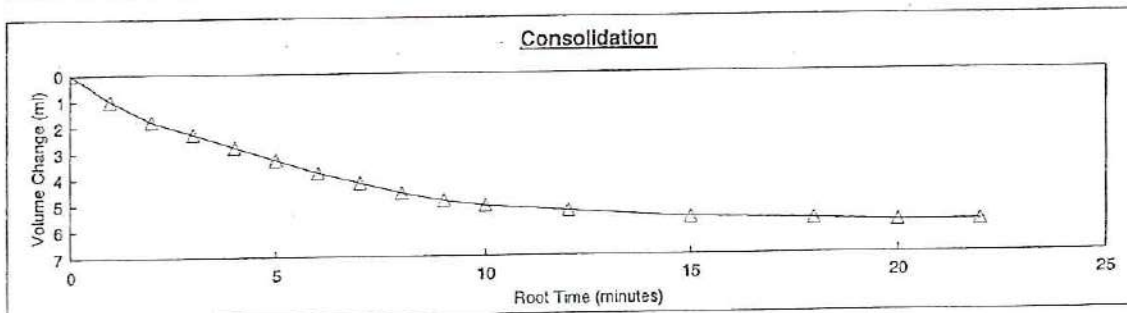
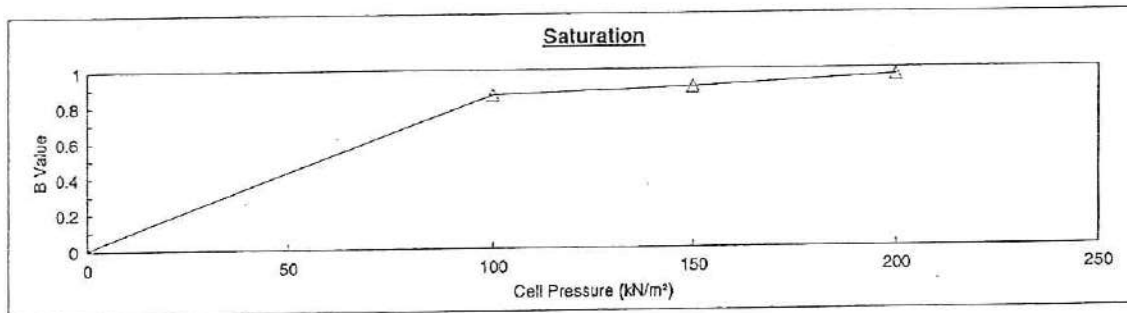
The results below represent tests conducted on a sample of the above material which was taken from the site by L.J. Church Laboratory Services Ltd.*
 The sample was received with an accompanying certificate of sampling.

Determination of constant head permeability in a triaxial cell - BS 1377: Part 6: 1990	
<u>Specimen Data:</u>	
Sample Type	undisturbed
Sample Length	93.9 mm
Sample Diameter	102.0 mm
Bulk Density	1.96 Mg/m ³
Initial Moisture Content	10 %
Dry Density	1.78 Mg/m ³
Specimens saturated by increments of back pressure and cell pressure	
Final B value	0.98
<u>Permeability Stage</u>	
Pressure Difference	25 kPa
Mean Effective Stress	50 kPa
Hydraulic gradient	27.2
Mean rate of flow	3.1E-003 ml/min
<u>After test</u>	
Final bulk density	1.97 Mg/m ³
Final moisture content	10 %
Coefficient of Permeability (kv) at 20°C	2.3E-010 m/s

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Laboratory Report:
Date:

SA/03/CHP/7577 continued
19-Jan-04



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**REMEDATION OF LAND CONTAMINATION AT FORMER GAS PURIFICATION PLANT
MONCKTON WORKS, ROYSTON - CAPPING WORKS**

Authorised signatories

L.J. Church, Managing Director
J.A. Handcastle, Lab Manager
A.F. D'Rozario, Dep Lab Mgr
M. Boostall, Dep Lab Mgr
J. Church, Q.A. Manager

Laboratory Report: SA/03/CHP/7652
Sample Number: SA/03/7652
Date: 19-Jan-04

Date Sampled: 04/11/03
Date Received: 04/11/03
Date Completed: 26/11/03

Material Description: 1 Part MRF - 2 Parts Colliery Shale (Processed)
Source: Kellingley Colliery
Supplier: UK Coal

Client Ref:
Location: Capping Layer 2
SE 37349E 11751N

The results below represent tests conducted on a sample of the above material which was taken from the site
by L.J. Church Laboratory Services Ltd.*
The sample was received with an accompanying certificate of sampling.

Determination of constant head permeability in a triaxial cell - BS 1377: Part 6: 1990	
<u>Specimen Data:</u>	
Sample Type	undisturbed
Sample Length	101.5 mm
Sample Diameter	101.4 mm
Bulk Density	1.98 Mg/m ³
Initial Moisture Content	11 %
Dry Density	1.78 Mg/m ³
Specimens saturated by increments of back pressure and cell pressure	
Final B value	0.98
<u>Permeability Stage</u>	
Pressure Difference	25 kPa
Mean Effective Stress	50 kPa
Hydraulic gradient	25.1
Mean rate of flow	2.4E-003 ml/min
<u>After test</u>	
Final bulk density	1.99 Mg/m ³
Final moisture content	11 %
Coefficient of Permeability (kv) at 20°C	2.0E-010 m/s

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