GAS PIPE LINE AT EASTCHURCH

ISLE OF SHEPPEY, KENT

MATTERS RELATING TO TREE HEALTH

PRELIMINARY REPORT

OCTOBER 1999

PBA Consulting

5 Yeomans Way

Bournemouth

BH8 0BL

01202 816134

INDEX

1.0 INTRODUCTION AND BRIEF

Possible damage to trees has been reported along the route of a narrow bore gas pipeline adjacent to the public road from Eastchurch to Minster on the Isle of Sheppey in north Kent.

This report has been commissioned by the Loss Adjusters in order to advise the owners of the pipeline, Transco, about the likelihood of escaping domestic gas supply affecting the trees.

2.0 THE INVESTIGATION

The investigation and study was carried out by R H Allen BSc Hons (Lond) and P F Barton NDT, MIoH and has been conducted in three parts:

1. An examination of each poplar tree along the route of the pipeline to ascertain its health and outward presentation of damage.

2. An examination of the soils between the trees and the pipeline and

3. An examination of roots in the vicinity of the pipeline that might have caused damage to the pipeline.

3.0 TREE HEALTH

3.1 General Description of the Trees

The trees are probably Hybrid Black Poplars, thought to have been planted about 70 years ago and most likely to be the Black Italian Poplar *Populus x 'Serotina'*.

Some 51 trees have been planted in a single row alongside the public highway along a distance of 218m at an average spacing of 4.3m. (See photograph No 1)

In addition, are a number of small elm suckers and occasional sycamore trees. Blackthorn scrub occurs locally. The large elm suckers have been affected by Dutch elm disease and are dying or dead, but smaller suckers are very vigorous, typical of the disease.

There are several gaps in the row of trees and there has been some gapping up with poplar whips (See Photograph No 2). There is a dead tree at the start of the section (One arrow, photograph No 1) and in one area, there are about four trees that have very low vigour (2 arrows, photograph No 1).

The line of trees runs uphill from east to west and, from a distance, it is apparent that the crown branch density decreases from the mid-point of the row towards the end of the row to the west.

Each tree is growing on a pronounced bank between the tarmac surface of the public highway and cultivated agricultural fields. The form of the bank varies, but is typically 3-4m wide and about 0.75m high.

The tree canopy is wider than the bank upon which they are growing and extends over the field margin and over the tarmac road.

3.2 Lopping and Trimming Below Overhead Cables

Overhead lines follow the north side of the road for the full length planted with trees.

In the east (downhill), overhead lines cross the road from the south and become increasingly closer to the trees that rise above them. As the overhead lines come close to the trees they have been trimmed back to avoid damage to the lines.

About mid-way along the row of poplar trees and for the rest of the row westwards, the overhead lines are aligned with the approximate southern part of the tree canopy. Along the full western length, the trees have been lopped so as to remove the southern half of the canopy (See photograph No 3).

In a few places, some of the trees appear to have been more severely cut back leaving a tall stump.

This lopping and trimming has had least effect in the eastern run of trees but has become severe in the western part where the trees are misshapen in the most affected area (see photograph No 4).

Despite this severe trimming and lopping, the majority of the poplar trees remain of very high vigour with robust re-growth and considerable branch extension this year.

3.3 Roots

The canopy extends either side of the bank to the north and south and it would be expected that underground-feeding roots would extend out to twice the distance to the canopy. Poplar roots are particularly robust and can grow out from the stem well beyond the drip line of the canopy as they explore for moisture and nutrients.

At this site, the roots are constrained to the south by the road construction and to the north by cultivation of the field. However, it is evident from trenches dug during renewal of the pipeline, that poplar roots to do penetrate downwards over 1m below the ground surface.

Any restriction on root growth caused by the presence of the road and cultivated field does not appear to be reflected in the vigorous re-growth following heavy pruning.

3.4 Disease/Pest

A number of trees had small cankers, dead patches, on some older branches and twigs. The Poplar Canker fungus *Dothichiza populea* may have caused these. While these cankers were not uncommon, they were not sufficiently extensive to cause server damage to the trees.

Some trees had very small areas of slime exuding from small cankerous fissures and these are likely to be caused by one of a number of tree infecting bacteria including *Xanthomonas populi*. Again the amount of infection was very small and unlikely to be important in the more vigorous healthy trees. This particular variety of poplar (‘Serotina’) is generally resistant to these canker-forming bacteria.

Two trees exhibited butt rot fungi which if left; the decay will render the trees unsafe. A fungal fruit body sample was taken from the tree located at 161.6m, and identified as *Pleurotus calyptratus,* a rare butt rot fungi of poplar trees. See Appendix A.

The base of most trunks where not obscured by dense ivy growths, was attacked by wood boring insects, probably Hornet Clearwing Moth *Sesia apiformis.* On some trees, these attacks appeared to be with a quite high density judging by the regular holes in the bark (See photograph No 5). These borings appeared on the lower part of the trees and on some extended to about 1.5 high. The extent of activity was difficult to see on many trees because of the strong ivy growth. There is a paucity of information on these moths and whether the attacks occurred because of low tree vigour or were a cause of low vigour has not been demonstrated.

3.5 Site Conditions

Poplars are best suited to loamy, well drained, base rich soils in sheltered areas. The soils at this location are naturally loamy, base rich and well drained and so seem suited. The site is very exposed, although in this instance most of the trees appear to be of high vigour and have no difficulty responding to the severe lopping below overhead wires.

3.6 Dead Trees or Trees of Low Vigour

Commencing at the eastern end (i.e. from the farm track), the first tree in the row had a large basal cavity and was dead.

At about 50m from the start of the section there was a small and mostly dead ivy covered poplar stump about 8m high. Growth from the stump was of very low vigour and it is suspected that the stump is hollow.

The next poplar tree at 51.5m was small and had been severely lopped. There was a cavity at about 3m height and the tree was suffering from moth attack and covered in dead ivy or ivy of low vigour (in contrast to most of the other trees in which the ivy was very vigorous).

At 54m, the next poplar tree was hollow and of low to moderate vigour and had been lopped and affected by moth damage. Again the ivy was of low vigour.

At 56.5m the next poplar was spindly and of poor vigour and with only small re-growth following lopping. The tree had moth infection to at least 2m high, seen through a very light cover of ivy. There were many lopped branches affected by internal decay. There was also some barbed fencing wire in-growth into the stem.

At 61m from the south end, the next poplar tree had been lopped at about 6m from ground level being immediately below the overhead lines. Covering ivy was very vigorous. This tree and the rest of the row all appeared healthy despite the lopping (See photograph No 6).

4.0 SOIL CONDITIONS

4.1 Background

Because poplars like well aerated soil conditions, a detailed examination was made of the soils exposed in two trenches at each end of the pipeline.

Poplar trees prefer deep well drained base rich soils but can tolerate limited waterlogging as long as the water is flowing and well oxygenated. Stagnant, poorly drained or acidic sites are not suited to poplar trees.

Most of the soils in this northern part of the Isle of Sheppey are developed over London Clay and have severe impeded drainage and prolonged seasonal water-logging. However, a small area to the east of Minster has loamy soils with only slight seasonal water-logging. The study site is on the edge of this area of lighter soils. Downhill and towards Eastchurch, the soils become clayey and more typical of the heavy soils of the general area. It is concluded that the soils in the study area will be more permeable to gas than elsewhere in the vicinity of Eastchurch.

4.2 Effects of Gas on Soil and Vegetation

The main effect of contamination of soils by small amounts of town gas will be displacement and exclusion of oxygen from the soil atmosphere in the root zone and so starving roots and their symbiotic root environment of a gas (oxygen) which is essential to root growth.

The soils are moderately permeable when well drained during the summer, but the diffusion of gases through the soil mass will be very slow because of the small pore space available.

Gases under pressure will permeate faster through the soils by mass flow, especially if there are any larger fissures or pores present such as cavities from dead roots or rabbit burrows. This could be the situation with methane gas escaping under pressure from a leaking pipeline.

Any methane trapped within the soil after a leak event will also be slow to escape because of the only moderate permeability of loamy soils although a slow upward seepage of methane would be likely with venting to the atmosphere. Seepage would be enhanced along dead root channels and considerably reduced when the soils are saturated after rain.

4.2 Effects of Gas on Soil and Vegetation cont..

The limestone sub-base to the road appeared to be more permeable than the soil and this would be a further escape route for gas.

Methane in small quantities is not in itself poisonous to plant roots (and occurs in small quantities naturally in some soils), but large amounts may not only exclude oxygen, but also dissolve in the soil solution to the detriment of nutrient supply to plants and death of certain soil born bacteria and fungi (mycorrhiza) which are important to soil and plant health.

Extensive gas within the soil will tend to destroy soil structure causing poor drainage, and will create conditions that are directly toxic to plant roots.

Soils that are starved of oxygen become anaerobic with an alteration in iron and manganese to soluble forms which can affect plants. They might also affect the bacterial flora of the soil to the detriment of tree root physiology.

Anaerobic soils affected by gas will not be suited to poplar trees. However once any gas leak has been repaired the conditions will stabilise. Often trees will recover particularly if the majority of the root zone is in unaffected soil. Anaerobic soils affected by gas would remain as a "pocket" of contaminated soil for many years into which plants would not root.

4.3 Soil Examination

In order to assess the likely extent of anerobism caused by any possible leak, the soils were examined in three areas. These were from pre-dug trenches at the lower and upper end of the row of trees concerned and also from an auger boring made in the vicinity of the small cluster of trees of low vigour.

Soils of the pre-dug trenches

The descriptions follow for the two main soil profiles exposed in the pre-dug trenches:

Soil Profile 1 in the lower trench(Photograph No 7)

Profile below healthy poplar tree with elm scrub between tree and soil face.

The soils are generally well drained and coarse loamy throughout.

0-9 cm	Yellowish brown (10 YR 5/4), fine sandy silt loam, common fine fibrous roots, strong fine friable sub-angular blocky structure, calcareous.
9-63 cm	Yellowish brown (10 YR 5/6), fine sandy silt loam, common fine fibrous and locally abundant very fine woody roots, some woody roots to 6-10 mm diameter, some dead, some live with pale reddish brown cuticle resembling elm, strong fine and medium sub-angular blocky structure breaking to coarse crumb structure locally, about 5% small and medium sub-angular flints, slightly calcareous.
63-114 cm	Yellowish brown (10 YR 5/4), fine sandy silt loam, abundant woody roots to 6-10 mm diameter, mostly in one close cluster but occurring throughout this layer, compact coarse to moderate angular blocky structure, slightly calcareous.
114-150 cm	Yellowish brown (10 YR 5/4), slightly variegated fine sandy loam near loamy fine sand, few fine fibrous and fine medium woody roots, very weak very coarse sub-angular blocky structure in places tending to structureless, very fine sandy loam, non-calcareous.

A sample of soil was also taken from the undisturbed base of the trench adjacent to and from under the gas pipe. This was sent for an Atterberg test to ascertain its plasticity and the probability of tree roots causing subsidence damage to the gas pipe. The sample was confirmed as none plastic and therefore the roots would not cause subsidence damage. See Appendix A

There were no large (over 25mm) tree roots seen in walls of the trench although the pipe was surrounded by small fibrous roots, samples of these were sent for identification and were confirmed as emanating from poplar trees. See Appendix A

Trees adjacent to these soil profiles appeared to be in good health and the soil conditions were well drained and base rich and appeared to be well suited to poplar trees. Wind exposure was on the high side for poplars, but these trees were generally very vigorous in their growth pattern and exposure to high winds off the Thames Estuary appeared not to limit growth.

Soil Profile 2 in the upper trench (Photograph No 8)

Profile below healthy poplar tree with ivy and stinging nettle.
Described from side of exposed trench and therefore the soil is partly dried out.
Parent material is loamy Head.

Soil is affected by slight seasonal waterlogging below about 75cm depth and has coarse loamy over fine loamy. Part of the exposed profile may be fill from earlier trench backfilling.

0-16 cm	Very dark brown (10YR2/2), humus enriched, medium sandy loam with very strong friable medium to fine crumb structure, abundant fine fibrous roots, occasional small flints, calcareous.
16-44 cm	Brown (10YR4/3) clay loam near medium sandy loam with fine to medium sub angular blocky structure, about 5% rounded and sub-rounded small and medium flints, common fine and medium woody roots and few fine fibrous roots, calcareous.
44-77 cm	Rather heterogeneous layer of sandy loam (near sandy silt loam) with slight brownish and yellowish brown variegation (within the range of 10YR4/3, 5/4 and 5/6), about 15% small and medium flint stones with many rounded black flints and occasional small angular flints, occasional red brick fragments, a few fine fibrous roots, medium woody roots nearby, weak medium sub-angular blocky structure, slightly calcareous. (Partly fill material).
77-140 cm	Mostly stoneless greyish brown (10YR5/2) heavy clay loam (near silty clay loam) with abundant very fine strong brown (7.5YR5/8) mottles, very occasional rounded black flint pebbles, occasional coarse woody roots, occasional fine woody roots and fine fibrous roots, slightly calcareous.

A sample of soil was also taken from the undisturbed base of the trench adjacent to and from under the gas pipe. This was sent for an Atterberg test to ascertain its plasticity and the probability of tree roots causing subsidence damage to the gas pipe. The sample was confirmed as being of low plasticity and therefore the roots would not cause subsidence damage. See Appendix A

There were no large (over 25mm) tree roots seen in walls of the trench although the pipe was surrounded by small fibrous roots, samples of these were sent for identification and were confirmed as emanating from poplar trees. See Appendix A

Soils in the vicinity of the trees with very low vigour

The soils were also examined in the vicinity of the cluster of four trees located at 50-60m west from the lower end of the tree row (marked by a farm entrance roadway). Examination was by hand auger and here the soils below approximately 300mm depth were dark in colour, highly anaerobic and smelt very strongly indeed. The augured profile description is provided below.

Soil Profile 3 adjacent to trees of very low vigour

Below the tree canopies.

0-30 cm Slightly variegated brownish fine sandy silt loam.
30-90 cm Extremely smelly, anaerobic, black and dark grey loam.

This last layer issued a strong smell from out of the auger hole and appeared to be from gaseous material under slight pressure. No root samples were obtained.

White deposits in adjacent ploughed field

A number of white deposits have occurred in the ploughed field adjacent to some of the trees; a sample was tested on site and found to be calcareous in nature. This calcareous material would not have been caused methane gas. Additionally, many of these deposits are a considerable distance from the gas main. See Appendix A.

4.4 Methane Analysis

In order to check the anaerobic soils for methane, two samples were taken from the auger boring and a further aerobic control sample taken from the lower open trench at a similar depth. These three samples were submitted to STL (Severn Trent Laboratories) for methane analysis. The samples were leached with water to dissolve out soluble gases and tested for methane.

STL failed to detect any methane within their laboratory detection limit (See Appendix A). The strong smell may have originated from anaerobic decomposition following from the previous effects of gas. It is possible that the soils at this point are contaminated by something other than gas, oil is a possibility.

It is understood that the gas main had been turned off some time prior to the investigation and it may have been that the levels of gas in the soil were by that time too low for detection.

5.0 SUMMARY OF RESULTS AND DISCUSSION

Most of the poplar trees and associated young elms and other vegetation appeared to be in good health being affected by only minor diseases typical of these species. The poplars suffered from minor cankers and a little die back together with effects of bark boring Hornet Clearwing Moth larvae, while the elms were very clearly suffering from Dutch elm disease once they reached a suitable size.

The poplars had been lopped to keep them clear of the overhead lines. In the east the trees were simply trimmed back, but from the central section westwards, the trees had been severely lopped creating distorted and very thin one sided crowns. Despite such treatment, the majority of the trees had been able to produce extremely vigorous re-growth, matched only by the vigour of the covering ivy. Even the small elms (yet to be affected by Dutch elm disease) were growing well.

Of the fifty-one mature poplars, only five were considered to be affected by disorders that seriously affected vigour or were dead. These were at the east end of the section. The first tree was dead and a cluster of four trees was between 50m and 60m from the start of the section. These trees suffered from low vigour (even of the covering ivy), hollow stems, decay and moth infection.

The owners of the adjacent farm, reported weak thin crowns of this row of trees when compared to the row of trees adjacent to the farm entrance track (See photograph 9). The weak thin crowns were probably the result of the lopping of branches below overhead lines. Other factors that may have affected the roadside trees and contributed to the thin crown effect and not the "control" trees include salt treatments to the road and soil cultivations over the root zone.

The soils (as examined at both ends of the row of poplar trees) were generally suited to poplar trees being loamy, well drained and base rich. The climate was a little too exposed for really good tree growth, but despite this the re-growth following lopping was of remarkable vigour.

The soil between the pipeline and the cluster of four poor quality trees was quite unsuited to tree growth due to the anaerobic conditions. Such anaerobic soils are toxic to tree roots and it is very likely that this has affected this cluster of trees.

The reason for this anaerobism is not clear, but the soils emitted a foul smelling gas and which could have contained town methane or perhaps resulted from the anaerobic process in the soil following from gas contamination.

The gas supply had been switched off prior to our site examination and so there would have been little gas to detect. Samples were taken for laboratory determination, but no methane was detected in them.

The soils, as demonstrated by the laboratory analysis (See Appendix A) are not shrinkable clay soil and therefore the trees would have cause subsidence damage to the pipeline. Also, as no significant sized tree roots were evident adjacent to the pipeline, physical damage is unlikely.

6.0 CONCLUSION

46 of the 51 trees, and the associated vegetation, appeared to be vigorous considering the extent to which the poplars had been heavily pruned and the potential to become diseased from bacterial, fungal and insect attack.

Of the other five trees, the first tree, at the east end of the row was dead. The remaining four trees with low vigour were in a group approximately 70m to the west of the first tree.

The results of this study suggest that of the 51 trees inspected only five were likely to have been affected by soil anaerobism leading to phytotoxity. These anaerobic conditions could have been caused by small but continued underground gas leaks.

Apart from any “pocket” of contaminated soil, once a gas leak has been repaired the conditions will stabilise. Often trees affected by small quantities of methane gas will recover, particularly if the majority of the root zone is in unaffected soil. Once the trees have recovered there are normally no long-term effects that could be attributed to methane gas. It is doubtful if the four trees with low vigour will fully recover.

7.0 RECOMMENDATIONS

In order to fully investigate the extent of phytotoxic anaerobic soils in the vicinity of the dead or dying trees, it is recommended that a series of trial holes be dug at 5-10m intervals, to either side of the affected trees, and the soils examined for signs of anaerobic conditions.

It is further recommended that most of the anaerobic soils be removed and replaced with clean loamy subsoil particularly when new trees are planted to fill gaps. Any new trees should be of good quality stock, supplied, planted and maintained to the appropriate British standards to ensure their survival.

Appendix A

LABORATORY ANALYSIS REPORTS

THE TREE ADVICE TRUST

ARBORICULTURAL ADVISORY and INFORMATION SERVICE

ALICE HOLT LODGE • WRECCLESHAM • FARNHAM • SURREY • GU10 4LH

Tree Helpline: 0897 161147
Premium Rate Calls charged at £1.50/minute

Administration: 01420 22022
Fax: 01420 22000

Mr P Barton
PBA Consulting
Bryn Gardens
Rake Lane
LISS
Hmpshire
GU33 7HB

RECEIVED 19 OCT 1999

Your Ref:

Our Ref: 278.1

Date: 18 October 1999

Dear Mr Barton,

Thank you for returning the completed diagnostic report form together with the sample.

The fungal fruit body is most likely a species of *Pleurotus*, most probably *Pleurotus calyptratus*, but we cannot be absolutely certain of this identification because of the poor condition of the specimen on arrival here at Alice Holt Lodge.

Pleurotus calyptratus is described as very rare and is said to be found only on poplar; it is similar to *P. dryinus* with which it may have been confused in the past. Species of *Pleurotus* are frequently found growing on wounds and dead wood of broadleaved trees and can cause a white rot.

As *P. calyptratus* is a rare fungus we would be grateful if you would supply us with information as to the location of the tree on which you found the specimen.

Please let me know if you require any further information.

Yours sincerely,

Brian Greig.

Richardson's Botanical Identifications

Root identification
Vegetation surveys
Tree/Building investigations
Plant taxonomy

RECEIVED
21 OCT 1999

Dr Ian B K Richardson
BSc, PhD, CBiol, MIBiol, MIHort, FLS

The Innovation Centre
The University of Reading
Whiteknights
Reading RG6 6BX

Tel: (0118) 986 9662 *(Direct line)*
(0118) 986 1361 *(Innovation Centre)*
Fax: (0118) 986 9553
E-mail: richardsons@botanical.net

Peter Barton & Associates
Bryn Gardens
Rake Road
LISS, Hampshire
GU33 7HB

20/10/99

Your ref: PR 009/516/PFB
Our ref: 56/1309

Dear Sirs

Sheerness, Kent

The roots you sent in relation to the above on 12/10/99 have been examined. The structure was referable as follows:

R1 by farm entrance: 1 root the family **Salicaceae** (*Salix* (**Willows**) and *Populus* (**Poplars**)).
5 further roots, not examined in detail, appeared similar under low magnification.
Recently **alive.***

3 pieces too thin.

R2 at site: 1 root the family **Salicaceae** (*Salix* (**Willows**) and *Populus* (**Poplars**)).
7 further roots appeared similar.
Recently **alive.***

I trust this is of help. Please call us if you have any queries; our invoice is enclosed.

Yours faithfully

Dr Ian B K Richardson

* Based mainly on the **Iodine test** for starch. Starch is present in some cells of a living woody root, but it is more or less rapidly broken down by soil micro-organisms on death of the root, sometimes before decay is evident. This result need **not** reflect the state of **the** parent tree.

Soils Laboratories Ltd
Newton House
Tadworth
Surrey KT20 5SR
01737 814221

Certificate No:	T6902ATT.DOC-1
Project Code:	T6902ATT.DOC

ATTERBERG LIMIT ANALYSIS CERTIFICATE

Client	pba consulting
Scheme	Sheerness, Kent
Location of Sample	Sample 1
Nature of Sample	Disturbed sample - as supplied
Sampling by	pba consulting
Date Received	13/10/99
Date Tested	20/10/99

Test Results

Atterberg Limit
Test Method: BS1377:Part 2:1990 Clause 7.3

Liquid Limit %	Plastic Limit %	Plasticity Index %	Passing 425 micron %
-	-	-	88

Natural Moisture Content
Test Method: BS1377:Part 2:1990 Clause 7.1

Moisture Content %
36.1

Soil Classification: Class Non Plastic

Soil Description: Brown orange grey mottled partly friable sandy clayey SILT with occasional FM roots rootlets and very occasional fine gravel

Comments:

Report To:	Client File	Issued By:	(Authorised Initials)
		Issue Date	October 26, 1999

Authorised Initials:
L O'Hagan
D Seeley

soils

Soils Laboratories Ltd
Newton House
Tadworth
Surrey KT20 5SR
01737 814221

Certificate No:	T6902ATT.DOC-2
Project Code:	T6902ATT.DOC

ATTERBERG LIMIT ANALYSIS CERTIFICATE

Client: pba consulting
Scheme: Sheerness, Kent
Location of Sample: Sample 2
Nature of Sample: Disturbed sample - as supplied

Sampling by: pba consulting

Date Received: 13/10/99
Date Tested: 20/10/99

Test Results

Atterberg Limit
Test Method: BS1377:Part 2 1990 Clause 7.3

Liquid Limit %	Plastic Limit %	Plasticity Index %	Passing 425 micron %
38	23	15	93

Natural Moisture Content
Test Method: BS1377:Part 2 1990 Clause 7.1

Moisture Content %
26.8

Soil Classification: Class CI

Soil Description: Brown orange grey mottled partly friable sandy silty CLAY with occasional FM gravel FM roots and rootlets

Comments: NHBC Chapter 4.2 classified low shrinkability

Report To:	Client File	Issued By:	(Authorised Initials)
		Issue Date	October 26, 1999

Authorised Initials:
J Eklager
E Bealey

Certificate of Analysis

NAMAS TESTING No 1314

STL

Sample 1 Laboratory Number . 621113
of 3 Report Number TH/ 76493/1999 Issue 1

Sample Source THE ENVIRONMENTAL PROJECT
Sample Point Description . The Environmental Group
Sample Description . SAMPLE 1

Sample Date . 11 October 1999 Sample Received : 11 October 1999 Analysis Complete : 13 October 1999

Test Description	Result	Units	Accreditation	Method
Dissolved Methane	<5	ml/m3	*	

Certificate of Analysis

NAMAS TESTING No. 1314

STL

Sample 2 Laboratory Number . 621114
of 3 Report Number : TH/ 76493/1999 Issue 1

Sample Source THE ENVIRONMENTAL PROJECT
Sample Point Description : The Environmental Group
Sample Description : SAMPLE 2

Sample Date 11 October 1999 Sample Received . 11 October 1999 Analysis Complete 13 October 1999

Test Description	Result	Units	Accreditation	Method
Dissolved Methane	<5	ml/m3	*	

Certificate of Analysis

NAMAS TESTING No. 1314

STL

Sample 3 Laboratory Number : 621115
of 3 Report Number : TH/ 76493/1999 Issue 1

Sample Source THE ENVIRONMENTAL PROJECT
Sample Point Description : The Environmental Group
Sample Description SAMPLE 3

Sample Date 11 October 1999 Sample Received : 11 October 1999 Analysis Complete : 13 October 1999

Test Description	Result	Units	Accreditation	Method
Dissolved Methane	<5	ml/m3	*	

RECEIVED 04 NOV 1999

THE ENVIRONMENTAL PROJECT CONSULTING GROUP

Peter Barton Esq.
Peter Barton Associates
Brynn Gardens
Rake Road
Liss, Hampshire GU33 7HB

31st October 1999

Dear Peter

White material from field adjacent gas pipeline at Eastchurch, Isle of Sheppey

I have examined the sample of white material collected from a location about 20m into the cultivated arable field adjacent to the route of this gas pipeline.

This material was common in the field and appeared to have been turned up by the plough and appeared as irregular white lumps incorporated into the field soils.

From its bright white appearance, the material appeared very like white chalk and indeed (like chalk) it fizzed violently when tested with 10% hydrochloric acid. This test confirmed that the material was most likely to be composed primarily of calcium carbonate.

However, looking at the sample more closely, it appeared to have a soft fibrous texture, unlike chalk and perhaps rather like a soft fibrous asbestos looking material, reminiscent of a fibrous plaster based filler.

Without undertaking a more rigorous analysis of the material it is difficult to be certain as to its origin, but while it is white and strongly calcareous, it does not appear to be the simple geological material known as Chalk. It is however, most unlikely to be native to the soils and geology of this field and so is most likely to be an addition to the soil.

The most likely reason to added calcareous materials to agricultural soils would be to provide a source of agricultural lime. Lime rich materials, such as this, are added to naturally acidic soils to bring their pH value up to about the value of 6.5 best suited to arable cropping.

You have asked if this material could be connected with possible leakage of gas from the pipeline. I can perceive of no mechanism whereby material composed mostly of calcium carbonate could be generated within soil from the leakage of methane into the field. This material is most unlikely to be connected in any way with gaseous leakages from the pipeline.

With kind regards
Yours sincerely

M. Allen

R H Allen

[illegible] WINCHESTER ROAD PETERSFIELD HAMPSHIRE GU32 [illegible]
TELEPHONE 01730 [illegible] FACSIMILE 01730 [illegible]
E-mail [illegible] Webpage www.epcg.co.uk
[illegible]

Appendix B

PHOTOGRAPHS

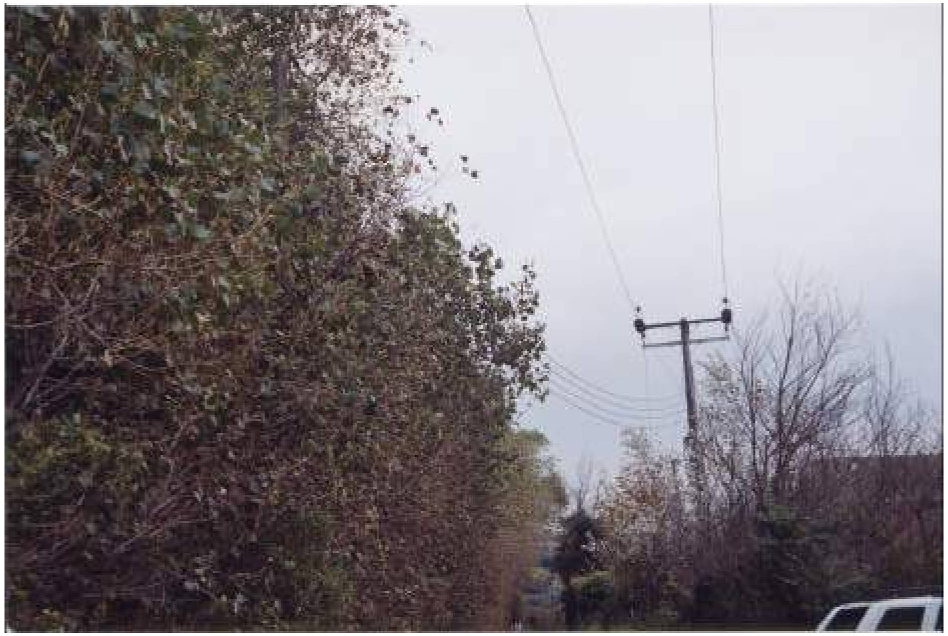
Photograph No1
Photomontage of row of trees with alleged damage
Dead tree and weak trees shown with arrows

Photograph No 2
Whip planting to West of row

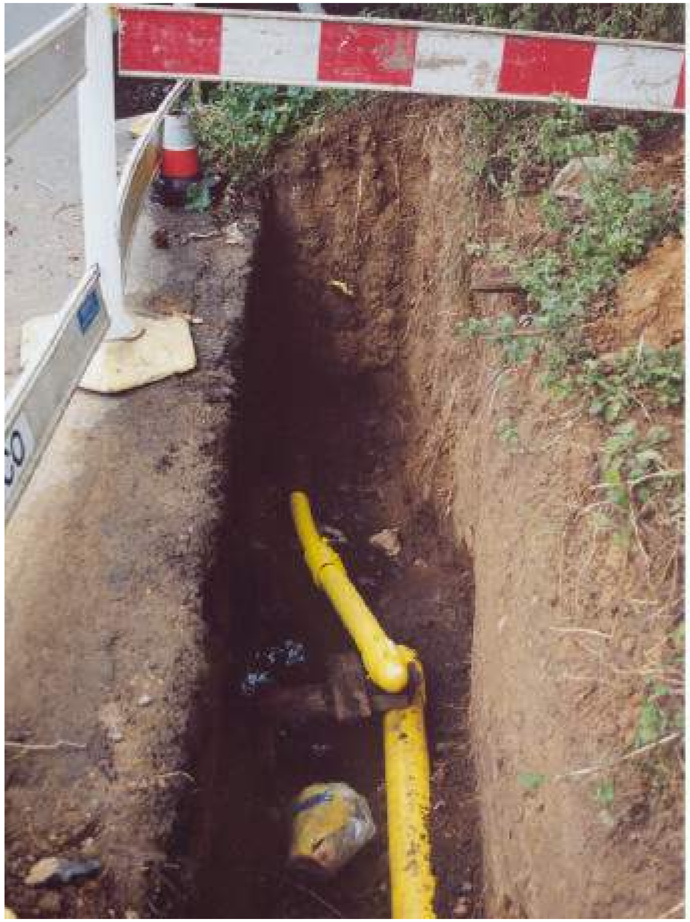
Photograph No 3
Lopping of the south side of trees under power lines

Photograph No 4
Mis-shaped tree caused by lopping to clear power line

Photograph No 5
Bore hole activity of Hornet Clear Wing Moth



Photograph No 6
Healthy growth of trees in West section



Photograph No 7
Lower trench from which soil and root samples were taken.

Photograph No 8
Upper trench from which soil and root samples were taken.

Photograph No 9
Row of trees adjacent to farm track