Field Operations Directorate
Wales and South West Division
Specialist Group¹
Occupational Hygiene Section

Potential exposures to teachers and others from the use of drawing pins on asbestos insulating board (AIB)

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Date: 20th August 2004

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Occupational Hygiene Section

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Summary: Following concern that teachers, routinely puncturing asbestos insulating board (AIB) with drawing pins, might be exposed to significant airborne respirable asbestos fibres, and the receipt of a report from Howie Associates, I arranged for HSL Fibre Section to develop and apply tests mainly focussed on the use of drawing pins on AIB. The initial tests used a vacuuming technique but later tests measured airborne respirable asbestos fibre release directly. The tests were done on widely and closely spaced holes (see HSL report MF2004/02) and suggest that airborne respirable asbestos fibre release is about 30 fibres/hole (widely spaced) and about 60 fibres/hole (closely spaced). Howie Associates estimated airborne respirable asbestos fibre release at about 6000 fibres/hole. The two orders of magnitude difference in airborne respirable asbestos fibre release are discussed and the conclusion is that the much higher measurements produced by the vacuuming technique are an artefact of the sampling method and do not reflect the degree of airborne fibre release that occurs in practice.

The report ends with seven conclusions including: Based on normal primary infant school activity exposure, for a short period, might be between 0.00000632 and 0.00000316 f/ml. Such levels are between 0.5 and 60% of the usual low background airborne asbestos fibre levels in the UK. They represent (conservatively) an additional daily inhaled asbestos fibre dose of between 0.006 and 0.44%. Such short-term low-level additional exposures are unlikely to add significantly to the risk caused by the “natural” asbestos fibre exposure to which we are all subjected. Any unnecessary disturbance of ACMs should be avoided. The application of the new Duty to Manage asbestos containing materials (ACM) will help protect people who work on and maintain building fabric and minimise disturbance of ACM for other people, such as teachers.

Author / Grade / Discipline:  M Piney / PSI / OH

Copies to: PI, HoSG, CSD3 DHU, PSI, Education Sector, CFPD, File,
Potential exposures to teachers and others from the use of drawing pins on asbestos insulating board (AIB)

1.0 Introduction

This report:

- Gives some of the background behind the tests using drawing pins and asbestos insulating board (AIB) done by HSE’s Health and Safety Laboratories (HSL)
- Describes the development of an effective test of airborne respirable asbestos fibre release from AIB
- Refers to and include some of the test results
- Consider the exposure that might occur from the action of drawing pins on AIB
- Interprets and puts in context, the test methods and findings.

2.0 Background behind the asbestos fibre release tests

Mr Michael Lees contacted various people in it HSE in the Autumn of 2001 including myself. We spoke on the phone for perhaps, an hour in the late afternoon of Tuesday 9th October. Mr Lees was concerned that his wife’s death from mesothelioma may have been due to asbestos exposure in the various schools she had worked in. Mrs Lees was an infant school teacher in a number of primary schools for over two decades. Mr Lees believed that his wife may have been significantly exposed to asbestos fibres from sticking drawing pins in AIB at schools. It appears, from information supplied by Mr Lees, that the ceiling tiles in the classroom, in which Mrs Lees worked, were made of AIB. Mr Lees explained that a proportion of the artwork made by the infant children was fixed to the ceiling tiles, by his wife. He had calculated his wife’s potential cumulative exposure to asbestos fibres, using his own observations, and assumptions about her normal work practices and data in the HSE’s Guidance (EH35 “Probable asbestos dust concentrations at construction processes” ISBN 0118854216) Mr Lees had assumed that use of drawing pins on AIB would cause about 1/5th the levels of airborne respirable asbestos fibre released as reported for drilling AIB in EH35 i.e. one asbestos fibre per millilitre of air (f/ml). From his calculations, which we did not discuss in detail, Mr Lees calculated that his wife’s exposure might have exceeded the Action Level as described in the UK Control of Asbestos at Work Regulations (1987).

I explained that the degree of release of respirable asbestos fibres from asbestos containing materials will depend on a number of factors including the amount of damage done to be material, particularly the matrix holding the fibres, the amount of asbestos in the ACM, the degree of disturbance (energy applied and imparted to be material) and how long the disturbance lasted. Following this logic, the release of fibres from the use of drawing pins on AIB would be far less than drilling AIB and the cumulative exposure was unlikely to approach the Action Level. At the time I did not agree to HSE doing tests but explained that various occupational hygienists may be able to arrange such tests. There followed a significant correspondence between Mr Michael Lees and HSE. I wrote to him in a letter dated 10th of September 2002 and this is reproduced at Appendix 1.
Attached to a letter, dated 26th September 2003, Mr M Lees sent a report, dated 7th April, prepared by Mr Robin Howie, of Robin Howie Associates. After some discussion with colleagues I arranged for, initially similar, tests to be done at HSE’s Health and Safety Laboratory (HSL) in Sheffield but then, in discussion with the Minerals and Fibres section in, HSL, the testing regime was modified and extended.

3.0 Drawing pin test methods

The details of the development of the test methods “Tests to determine release of respirable asbestos fibres from asbestos insulating board due to drawing-pin damage” are included in HSL report MF2004/02

3.1 Development and application of test methods

The tests applied to the AIB can be divided into two types; vacuuming and air sampling.

3.1.1 Vacuuming test methods

Initially HSL used the Howie Associates sampler (see HSL report) and a modified asbestos sampling cowl. Results were variable and all but one result returned asbestos fibre numbers per hole less than the 6000/hole reported by Mr Howie. The difference in test results could be for a number of reasons, for instance: The AIB sampled by Mr Howie may have been softer, less dense and more friable than that tested HSL. Mr Howie gives no details, in his report, of the AIB tested apart from the fact that it was covered with wallpaper. Another issue which would be difficult to reproduce was the test method adopted. Instead of separate tests on widely spaced and closely spaced holes Mr Howie combined the two sets of tests. It is therefore not possible to identify, from the test results, the average fibre release from single and widely separate holes compared with overlapping holes. Also the HSL vacuum sampler probably imparted less energy to the debris sucked up (see later discussion in sub-section 4.2).

3.1.2 Air sampling test method

Having reviewed the earlier test results and clarifying the primary aim of the tests it became clear that the main interest, in any effective test of fibre release and emission, was the number of respirable asbestos fibres released into the air by disturbance of AIB with drawing pins as only airborne fibres are a risk to health. It was decided to develop a test method for measuring the release of airborne respirable asbestos fibres directly.

HSL developed a test method and apparatus, modifying a standard asbestos cowled sampling head (see HSL report MF2004/02) and measuring fibre release at different distances (12.5, 25, 50 and 75 millimetres) from the holes created in the test AIB. The modified cowl sample head was, in effect, being used as a small “captor” hood, drawing in the respirable particle-laden air, including respirable asbestos fibres, created by the pin insertions and withdrawals. As with any captor hood, the capture effectiveness will depend on a number of variables. Two key ones are the “capture velocity”, for the process to be controlled, and the air velocity actually generated at the source by the captor hood. Together these two variables tend to define the “capture distance” for a captor hood/process combination. In this case the modified cowl sampler had a “face velocity” of approximately six metres per second, which means the velocity induced at the centreline of the sampler approximately
2.5 centimetres from the face would have been approximately 0.6 metres per second. The movement of air through the test chamber was on average < 0.1 metres per second; more or less, still air, and the process generating the dust-laden air to be captured was not very energetic. In these circumstances one would expect the capture effectiveness of the modified cowed sampler, acting as a captor hood, to be close to 100% at distances from the AIB of 2.5 centimetres or less i.e the effective capture distance of the modified cowl sampler was likely to be at least 2.5 centimetres and more.

4.0 Test results

Howie Associates findings were that: “...over 6,000 respirable asbestos fibres were released per single drawing pin insertion and removal” (RMH/03/324, 7.4.03) All the test results referred to in this report are to be found in HSL’s report (HSL MF2004/02).

4.1 Air sampling

I will discuss the airborne sampling results first and a summary of the results is given in Table 1

| Table 1 Average number of airborne respirable asbestos fibres released per drawing pin hole as measured by air sampling |
|---------------------------------------------------|---------------------------------|---------------------------------|-------------------|-------------------|
| Distance from sampler “face” to hole               | 75mm                           | 50mm                           | 25mm              | 12.5mm            |
| Well spaced holes                                  | 3 fibres                       | 8 fibres                       | 19 and 23 fibres  | 21 fibres         |
| Grouped holes                                      | 16 fibres                      | 56 fibres                      |                   |                   |

Although there is a variation in the test results the overall pattern suggests that the modified sampling cowl, acting as a captor hood, was approximately 100% effective at capturing airborne asbestos fibres released by the action of the test pin on the AIB, at distances up to 25 millimetres from the AIB surface. When the cowl (captor hood) was moved further from the AIB surface capture effectiveness was reduced and measured airborne asbestos fibres released per hole fell to 8 at 50 millimetres and 3 at 75 millimetres. The results also suggest that closely spaced holes lead to more disturbance of the AIB matrix and approximately double the number of fibres released per hole made. In what follows I will assume that the action of well spaced drawing pin insertion and withdrawal releases approximately 30 airborne respirable asbestos fibres per hole and 60 fibres per hole when more closely spaced.

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3 As a reasonable rule-of-thumb velocity, at one diameter from the face of a captor hood on the hood centreline, falls to approximately 1/10 of the initial face velocity and this explains why captor hoods, unless closely applied are often not very effective.
The direct measurement of the release of airborne respirable asbestos fibres from AIB by drawing pins, in my opinion, is a reasonable and fair test of what probably happens in practice. It remains to consider the vacuum sampling results.

4.2 Vacuum sampling results

Taking the Howie Associates average estimated asbestos fibre release as 6000 fibres per hole this is two orders of magnitude higher than the 60 fibres per hole (closely spaced) from the HSL tests (Table 1) and 200 times higher than the 30 fibres per hole for widely spaced holes. Why is there such a large difference in the test findings of the two measurement methods? I believe that the answer lies in a consideration of what one is trying to simulate in the tests and what effects the vacuum methods might have on the final vacuum test results. As considered earlier, the aim of the tests is to measure the release of airborne respirable asbestos fibres. Such tests could then be used to work out how exposed someone might be who regularly punctured AIB with drawing pins. The problem with the vacuum test methods is that they don’t measure the release of airborne respirable asbestos fibres and, more seriously, the methods would seem to inflate, quite dramatically, the apparent asbestos fibre release per hole. Both vacuuming methods do this although the Howie Associates’ device of a cyclone inside a glass jar, would seem to create higher respirable fibre counts. How do the vacuum sampling methods do this? Both apply a vacuum to the drawing pin holes via a nozzle. This vacuum tends to suck up relatively large non–respirable particles of debris from the holes and respirable fibres lodged in the holes. The vacuumed debris is then partially (or perhaps wholly) broken up, as it is drawn into and travels through the sampling nozzle. And, in the case of the Howie Associates’ sampler, whirled around inside the sampling jar and cyclone further breaking-up the debris.

The vacuum test methods produce, in my opinion, abnormal and unrealistic estimates of fibre release from the use of drawing pins on AIB. The much higher results are an artefact of the test methods and, in my opinion, not a true and accurate measure of airborne respirable asbestos fibre release which occurs in practice.

5.0 Disturbance, disruption and release of airborne respirable asbestos fibres from ACM

The number of airborne respirable asbestos fibres released from an ACM which is physically disturbed will depend on a number of factors. These include:

- The type of ACM (how hard it is particularly the matrix; how much asbestos it contains; how well bound are any asbestos fibre bundles into any matrix; it’s condition etc)
- The degree of disruption and disturbance that occurs to the ACM (the degree to which the matrix, holding the fibre bundles, is disrupted; the amount of ACM disturbed; the energy imparted to the ACM especially the energy delivered to and disrupting the ACM matrix; the duration of the disturbance etc)

\[\text{Recently we have come across what appears to be a similar effect in organic mixed dust sampling. In these measurements respirable organic dust samples recorded higher fungal and bacterial spore levels than inhalable dust samples. This is a puzzle because one would expect the opposite result i.e. if anything higher counts in the inhalable dust sample. We believe that these results may be due to soil particles, with spores attached, breaking up in the cyclone respirable dust sampler causing a higher bacterial/fungal count to be returned in respirable dust samples than the gentler inhalable dust sampling.}\]
• The physical state of the ACM (how wet or dry it is; whether it is coated etc)

The further tests done by HSL illustrate the point. As well as developing sampling methods to measure airborne respirable asbestos fibre release from drawing pin holes made in AIB methods were developed for measuring similar airborne releases from drilling AIB. Drawing pins do not disrupt the AIB matrix significantly and small numbers of airborne respirable asbestos fibres are released on the insertion and withdrawal of a pin (see Table 1). In contrast, when the same type of AIB is drilled with a ¼ inch drill bit something greater than 3000 airborne respirable asbestos fibres are released per drilled hole. Comparing this result with the pin experiments the airborne respirable asbestos fibre release rate is between 50 and 100 times greater for drilling. Looking at the factors listed which will determine airborne respirable asbestos fibre release, the results of the pin and drilling experiments can be understood. Drilling is far more disruptive and imparts far more energy to the matrix of the AIB and the fibre bundles within the AIB. Consequently far more airborne respirable asbestos fibres are released or created. This result also explains why I could not agree with Mr M Lees use of the fibre levels in HSE Guidance Note EH35 where he assumed that drawing pins would cause the release of 1/5th the number of fibres quoted for drilling.

The test findings show that drawing pins do not do a lot of damage to the AIB matrix and release small numbers of airborne respirable asbestos fibres compared with the far more disruptive and damaging disturbance of drilling AIB.

6.0 Calculation of potential airborne asbestos fibre exposure and dose

I have taken advice on the normal practice of infants school teachers from two headmistresses managing primary schools in Birmingham. I can also recall, and have discussed with my wife, the usual pattern of classroom decoration and re-decoration we experienced when our two children attended the local primary school.

According to the headmistresses the usual procedure is that classroom displays are changed every term, in the case of infant reception classes, displays may also be changed at the half-term. This information chimes with my and my wife’s personal experience. Practice varies but most artwork is pinned, or otherwise fixed, to boards on the classroom walls, although some may be hung from the ceiling. Normally, if items are to be regularly hung from the ceiling, a piece of string or thin rope is slung between hooks.

To enable calculation of potential release of respirable asbestos fibres and the levels these would generate in a classroom, I have assumed the following:

• 30 children in the class
• At worst case, 10 pieces of art work are fixed to the ceiling using two drawing pins for each piece
• Classroom is 30’ by 30’ by 7 ½ in height (given a volume of approximately190 cubic metres)

Calculation results are shown in Table 2.
Table 2 Potential short term exposure to respirable asbestos fibres released from drawing pins applied to AIB

<table>
<thead>
<tr>
<th>Number of children in class</th>
<th>Number of pins per item of artwork</th>
<th>Number of items attached to the ceiling</th>
<th>Total number of airborne asbestos fibres released (Well spaced and closely spaced)</th>
<th>Level of asbestos fibres in air generated in classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Well spaced</td>
<td>Closely spaced</td>
<td>Well spaced pins</td>
</tr>
<tr>
<td></td>
<td></td>
<td>600</td>
<td>1200</td>
<td>0.00000316 fibres per millilitre of air</td>
</tr>
<tr>
<td>30</td>
<td>4</td>
<td>10 (using 2 pins per item)</td>
<td></td>
<td>Closely spaced pins</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00000632 fibres per millilitre of air</td>
</tr>
</tbody>
</table>

6.1 Calculated exposure compared with UK background levels

All people in the UK have been and are exposed to a continuous low background level of fine airborne asbestos or asbestiform fibres. These come from previous use of asbestos containing materials, quarrying and weathering of minerals containing fibrous deposits. One way of assessing the significance of the calculated levels of airborne asbestos fibres is to compare them with the “natural” background levels in the UK. The Institute for Environment and Health (supported by the UK Medical Research Council) fairly recently reviewed the evidence.\(^5\) Also, I have chosen two fairly recent and comprehensive reports, from the review of outdoor measurements, as indicative and have compared these levels with those calculated in Table 2. The comparisons are shown in Table 3.

Measurements of background asbestos fibre levels vary and there will probably be higher levels in towns and cities compared to the countryside but all of us are exposed to a greater or lesser degree. The comparisons in Table 3 show that for a short time levels in the classroom could be between 0.5% and 60% of the background but these percentage figures should themselves be put in context. The fibre levels in the classroom will exist for a short time and will dissipate quickly depending upon the general ventilation rate. The background levels reported will be present continuously so that the dose received will be far greater than the short-term use of drawing pins would generate.

6.2 Calculated daily doses compared to UK background

It is possible to calculate the additional daily dose received, over and above that which occurs normally from background airborne asbestos levels, using the calculated fibre levels generated by the drawing pin activity. This has been done assuming that the fibre levels calculated and displayed in Table 2 are present for 10 minutes. This is a generous estimate and in practice airborne asbestos levels will be diluted more quickly. Even so, the additional daily dose of asbestos fibres generated by the drawing pins would be, by these calculations, at worst between 0.006 and 0.44% the usual

\(^5\) Fibrous materials in the environment\(^*\) Editor – K Shuker UK Medical Research Council Institute for Environment and Health (November 1997) ISBN 1899110178
background dose people receive in the UK and probably, in practice, the dose would be much lower. (see Table 3)

<table>
<thead>
<tr>
<th>Reference source</th>
<th>Reported continuous atmospheric fibres concentrations</th>
<th>Comparison with calculated short-term levels in classroom – Levels and additional doses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Widely spaced pin holes</td>
</tr>
<tr>
<td>Schneider et al(^6)</td>
<td>0.0001 – 0.000001 f/ml</td>
<td>Levels = ~3 – 30%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Additional dose = 0.022 - 0.22%</td>
</tr>
<tr>
<td>Chadwick et al(^7)</td>
<td>0.00065 f/ml</td>
<td>Levels = ~0.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Additional dose = 0.003%</td>
</tr>
</tbody>
</table>

### 7.0 Some conclusions

#### 7.1 Inserting and withdrawing drawing pins into AIB does not normally cause significant disturbance and damage. There is some airborne respirable asbestos fibre release, which HSE’s tests indicate will vary from 30-60 airborne respirable asbestos fibres per hole\(^8\).

#### 7.2 Based on normal primary school infant class activity and making reasonable and conservative assumptions the calculated airborne respirable asbestos fibre levels in the classroom could be between 0.00000632 f/ml and 0.00000316 f/ml for a short period, while artwork displays were taken down and put up.

#### 7.3 The calculated short-term levels are between 0.5% and 60% of the usual more–or–less continuous low background levels of asbestos/asbestiform fibre exposure in the UK.

#### 7.4 Using conservative assumptions the additional daily dose of asbestos fibres generated by the use of drawing pins applied to AIB would be between 0.006 and 0.44% of the usual daily dose people on average experience in the UK (see Table 3)\(^9\).


\(^7\) Chadwick D, Buchanan RM, and Beaulieu HJ (1985) *Airborne asbestos in in Colorado public schools*. Environmental Research Volume 35. Pages 1 – 13

\(^8\) Where individual holes overlap fibre numbers released are likely to be higher and highly variable

\(^9\) These dose figures would be much lower if we considered the annual dose increase caused by the use of drawing pins on AIB but the daily calculations are used illustratively
7.5 It is unlikely that such short-term low-level additional exposure will add significant risk to the “natural” asbestos/asbestiform fibre exposure to which we are all subjected.

7.6 Even though the potential exposure caused by use of drawing pins on AIB is likely to be very low, it is not good practice to deliberately disturb any asbestos containing material unnecessarily and such disturbance should normally be avoided.

7.7 Application of the change in the Control of Asbestos at Work Regulations (2003), whereby the potential risk from the remaining asbestos containing materials in premises must be managed, will help protect people further. Especially those who maintain and work on the fabric of such premises (the main group at continuing risk) and the application of the modified Regulations will minimise any unnecessary disturbance of asbestos containing materials for other people, such as teachers.

Dr Mark Piney
HM Principal Specialist Inspector (Occupational Hygiene)
Appendix 1  Letter to Mr M Lees

Wales and South West SG : Head - Mr S Maidment

Mr Lees
Hardsworthy House, Hardsworthy
Bradworthy
Holsworthy
Devon
EX22 7SD

Your Reference:

Our Reference:  010404323

10 September 2002

Dear Mr Lees

DISTURBANCE OF ASBESTOS CONTAINING MATERIALS (ACM), EXPOSURE AND RISK

Introduction  Mr Parkes (HSE Services Sector) has passed me a copy of your letter to him dated 4th July and asked me to comment on some of the issues we discussed on 9th October last year and which you raise in your July letter. I will do so in what follows but I also think it would be useful to reaffirm my overall views on your wife's exposure to asbestos fibres in air and any connection between that and her contracting mesothelioma. Mr Parkes has replied to you separately, in his letter of 16th August, concerning other matters you raised.

Firstly please accept my sympathy at your profound loss. Please also accept my apologies for the delay in sending you this letter. I spent most of July convalescing after an operation and took annual leave in August.

Asbestos exposure  We had a long conversation on 9th October last year covering a wide range of issues. You told me of your wife's death from mesothelioma in September 1999 and the subsequent coroner's inquest. You explained that your wife had been a kinder-garden teacher a long time and had worked in many schools over the years. You described how she regularly put up and displayed the children's art work, some on display boards and some pinned to the classroom ceiling. The ceiling turned out to be made of Asbestos Insulating Board (AIB). From seeing how your wife pinned artwork onto the ceiling you calculated her potential exposure. In doing so you assumed that inserting and removing drawing pins would cause exposures of about 1 fibre per millilitre of air (f/ml). You based this assumption on published HSE information on recorded asbestos fibre levels during various construction-related activities. The 1 f/ml figure you used was one fifth of the level reported to be generated by drilling into AIB. I explained that the number of fibres
released from an asbestos containing material (ACM) depends on a variety of factors including the density and strength of the matrix holding the asbestos fibre bundles and the energy and disruption of any disturbance. As we discussed the calculations you had done I explained that I thought that your 1 f/ml assumption was too high as use of drawing pins would be far less disruptive of the AIB matrix than drilling. We did discuss the question of doing tests of fibre release from AIB from the use of drawing pins but I made it clear that HSE could not commit itself to doing such tests. In my opinion fibre release from AIB from the use of drawing pins will, in most instances, be very low because disturbance of the AIB matrix is so small. The exposure of your wife from such actions will have been low. Also, while you know that the ceiling tiles were made of AIB, it is difficult to be sure that this was the case at other schools at which she worked. Some of the schools will have contained asbestos containing material (ACM), as your enquiries have revealed, but others may not have or, if they did, it is possible, in certain schools, the ceiling tiles were not made of AIB. Also, it may be that your wife adopted different practices for displaying children’s artwork at different schools and, in some, did not pin work to the classroom ceiling. I conclude that her exposure from drawing pin work is likely to have been low.

**Exposure of other people**  
If drawing pin work was unlikely to cause significant exposure to your wife then it is also unlikely to have caused significant exposure to the children she was teaching or other teachers. This is not to say that it good practice to routinely put drawing pins in AIB or to unnecessarily disturb any form of ACM. As Mr Parkes has explained, in his letters of 2nd July and 16th August, HSE takes the potential risk which could arise from significantly disturbing ACMs in schools and other educational institutions very seriously and the new Regulations will help reduce any potential risk still further.

**Latent period**  
You described other times and circumstances when your wife might have been exposed to airborne asbestos fibres. When she was housed in a Nissen Hut in an ex-RAF camp when she first arrived in the UK and in the mid-1980s when waste “chicken wire” from heating ductwork was used. It is also possible that she was exposed at other times when, for instance, repairs or other building work inadvertently disturbed asbestos containing materials (ACMs). If her mesothelioma was connected with exposure to airborne asbestos the relevant exposure responsible will have occurred a long time ago relatively early in her teaching career. The latent period for mesothelioma induced by asbestos is long and, depending to a degree on dose, can vary from 20 to 50 years. Recent exposures over the last 20 years will not have been relevant if her mesothelioma was asbestos induced.

**Natural mesothelioma incidence**  
It is possible that that the mesothelioma occurred spontaneously as I mentioned in our conversation in October. As I understand it perhaps 2-4% of mesotheliomas diagnosed each year in the UK probably occur naturally and not because of any environmental cause such as asbestos exposure. We discussed how one might be able to demonstrate that a mesothelioma was probably asbestos exposure related. It is not my area of expertise but the occupational hygiene/medical literature does
indicate that the higher the lung tissue asbestos fibre burden the more likely that a mesothelioma case was caused by asbestos exposure. A lung biopsy might have provided evidence in your wife's case as to whether her mesothelioma was likely to have been asbestos induced or not but no post-mortem was done.

Conclusions  We covered a lot of ground in a relatively long conversation in October. From my recollection of the conversation and my notes I thought that I had made it clear that HSE would not be in a position to arrange tests and I apologise if I gave you the impression that this was going to happen. As for agreeing with you that your wife was significantly exposed to airborne asbestos fibres, I do not recall agreeing with you on this point and again I apologise if, at the end of our conversation, you had this impression. For the reasons stated earlier I do not believe that there would have been significant release and exposure, although sticking drawing pins into AIB was certainly not good practice.

I hope that the points that I have outlined in this letter deal with your concerns.

Yours sincerely

Dr Mark Piney

HM Principal Specialist Inspector (Occupational Hygiene)