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Report

On

Le Hamel War Memorial FRANCE

For

Gary Beck – Australian War Graves

Precision stone work
Commercial * Domestic * International

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Dear Gary

Re: Condition of the Australian Monument at Le Hamel.

Stoneplus staff attended site on November 14, 2003 – Pieter Boer (Snr), Kerry Anne Boer, Pieter Boer (Jnr) & Phillip Boer.

The monument is constructed from 30mm thick Imperial black granite tiles from Black Hill in South Aust. These tiles are 400mm x 400mm in dimension and are polished with a small arris on all sides.

There exists a joint of approximately 3mm around each tile but due to tolerances this joint varys down to 1.5mm & up to 5mm in some areas. The joint is filled with silicon mastic either black or clear in colour. There is no provision for any expansion anywhere in the granite cladding and it is obvious that the joint space allowed is not sufficient to accommodate the thermal movements that occur. (see photos 0341, 0342, 0343, 0339 attached).

This is particularly evident on the outer face of the monument as the radius is such that the tiles would almost touch when not back relieved and in fact the tiles have moved off the wall significantly in places (see photo 0341 attached). The tiles are only staying in place because they are 'locked together' by the joint spaces filling with foreign material and some of the tiles can be pushed back into the wall and then spring back out. This is extremly dangerous and unstable. The tiles higher up on the monument show signs of sagging without the support of the tiles beneath. If the lower tiles actually fall out, the tiles above will be put under more stress.

Continued.....
We were told whilst on-site that all the tiles were installed using normal tile adhesive. This sort of adhesive is not a suitable construction material for exterior applications, especially when there is very little or no joint space. It also isn't stable in areas with large changes in exposure to water and temperature.

Because of the large thermal variances possible with this material (Surface temp can reach 70° Celsius on black granite), We would have expected a specified 5-6mm joint space with each tile independently tied back to the concrete structure with Stainless Steel restraints.

We believe there would also be a requirement for expressed expansion joints to allow enough movement throughout the structure. This should be a recommendation from a structural engineer.

The quality of the Imperial Black is at places a little dubious and the stone more closely reflects 'Austral Black' quality as witnessed by the 'flares and lighter 'clouds' as seen in photos 0347, & 0348 attached.

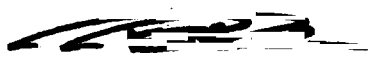
Generally the construction of the monument is poorly carried out and this is evident by the lack of care to minimize lips across the joints (see photo 0347 attached), lazy set-out to avoid small & inappropriate cuts (see photo 0331 attached), misaligned joints on the vertical plane to the horizontal plane (see photo 0329 attached), misaligned letters in the sandblasted engraving (see photos 0349, 0350 attached), misaligned edge details from capping to cladding (see photo 0334 attached), sloppy application of the waterproofing being smeared unevenly over the polished face (see photo 0332 attached).

This monument will continue to shed tiles in its present condition, which to date has been confined to local areas on lower sections. Due to the transfer of weight from the stacking effect of these tiles and once the adhesion has been compromised this problem will increase in severity and occurrence. This will make maintenance more difficult to effect.

It is our opinion that this cladding has already failed significantly enough to be beyond repair and should be dismantled or locked away from the public. The monument has become a danger to visitors due to the uncertainty of when a tile will fall.

To positively fix a pin to the face of the stone won't even be a complete remedy to the problem as there still won't be any allowance for movement.

Sorry to be the bearer of bad news but this how we see it.



Pieter Boer - Director
Stoneplus Pty Ltd

PB:KB Report to Gary Beck – Le Hamel December 03, 2003(Please quote these references when making an enquiry regarding this letter.)

Continued.....

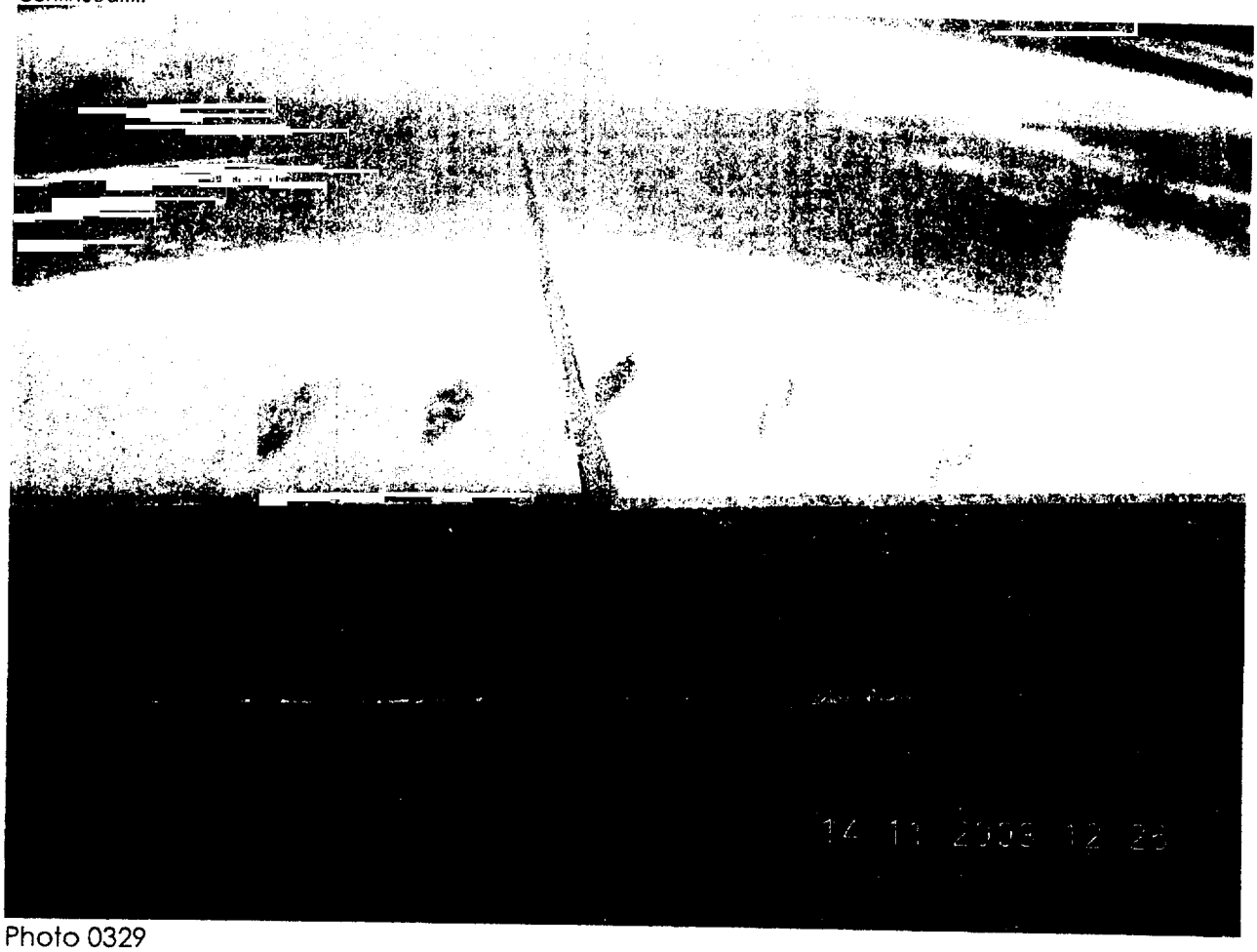


Photo 0329

Continued.....

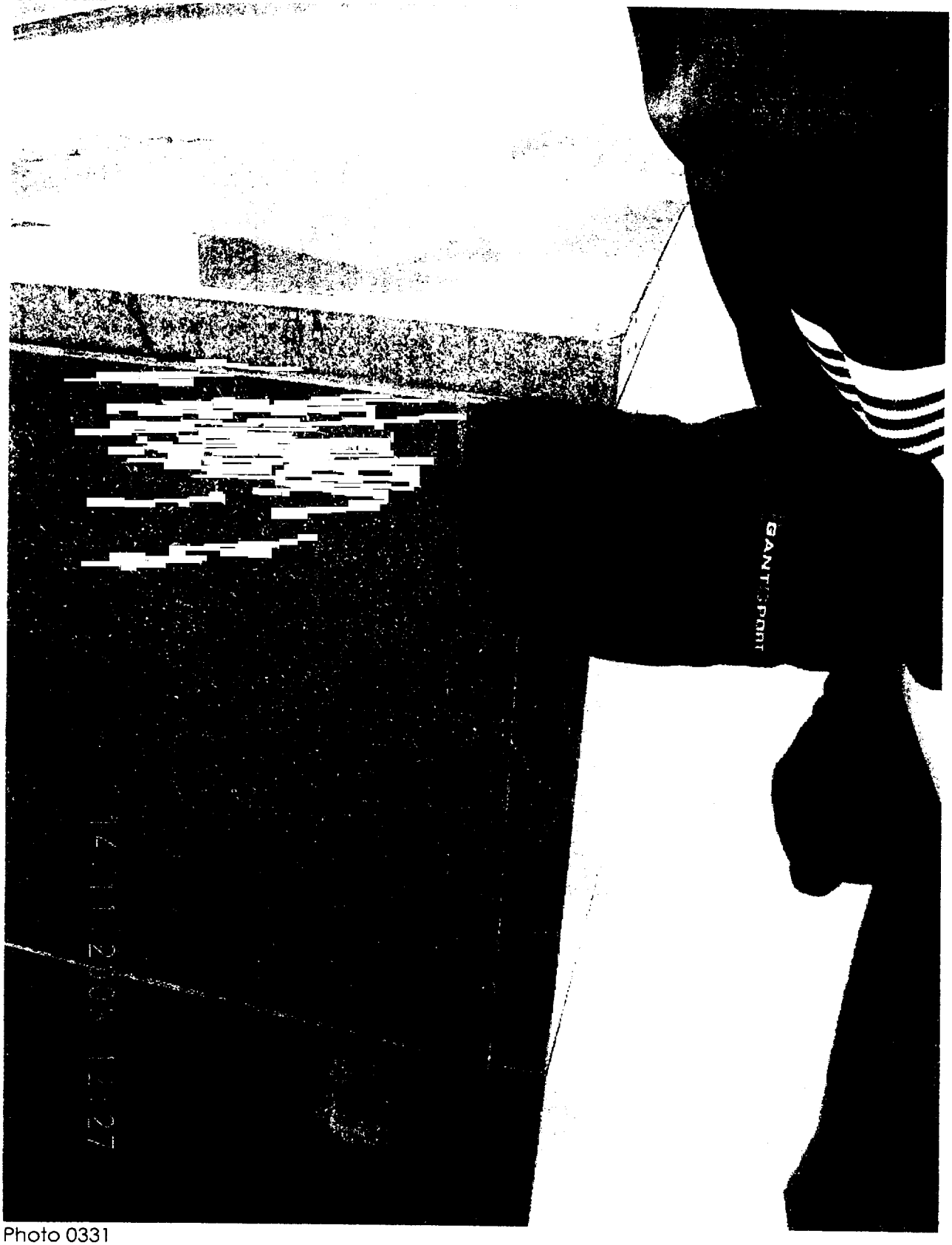


Photo 0331

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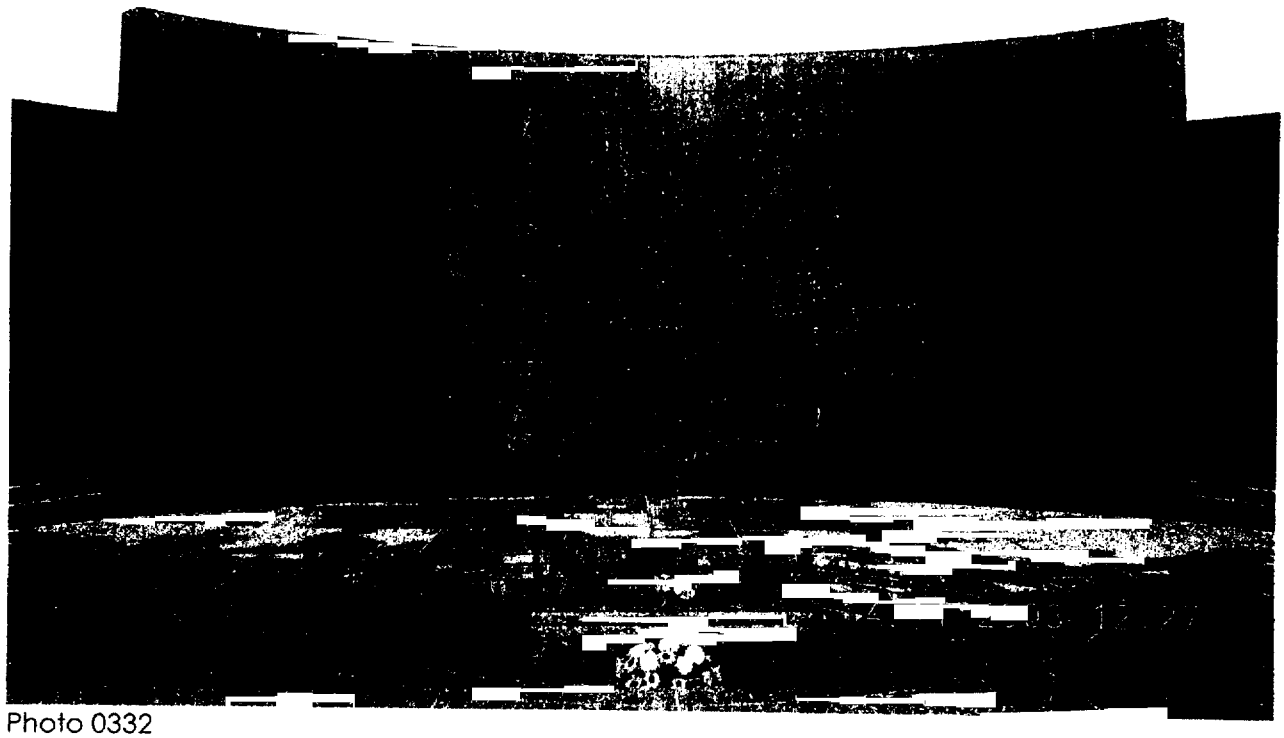

Photo 0332

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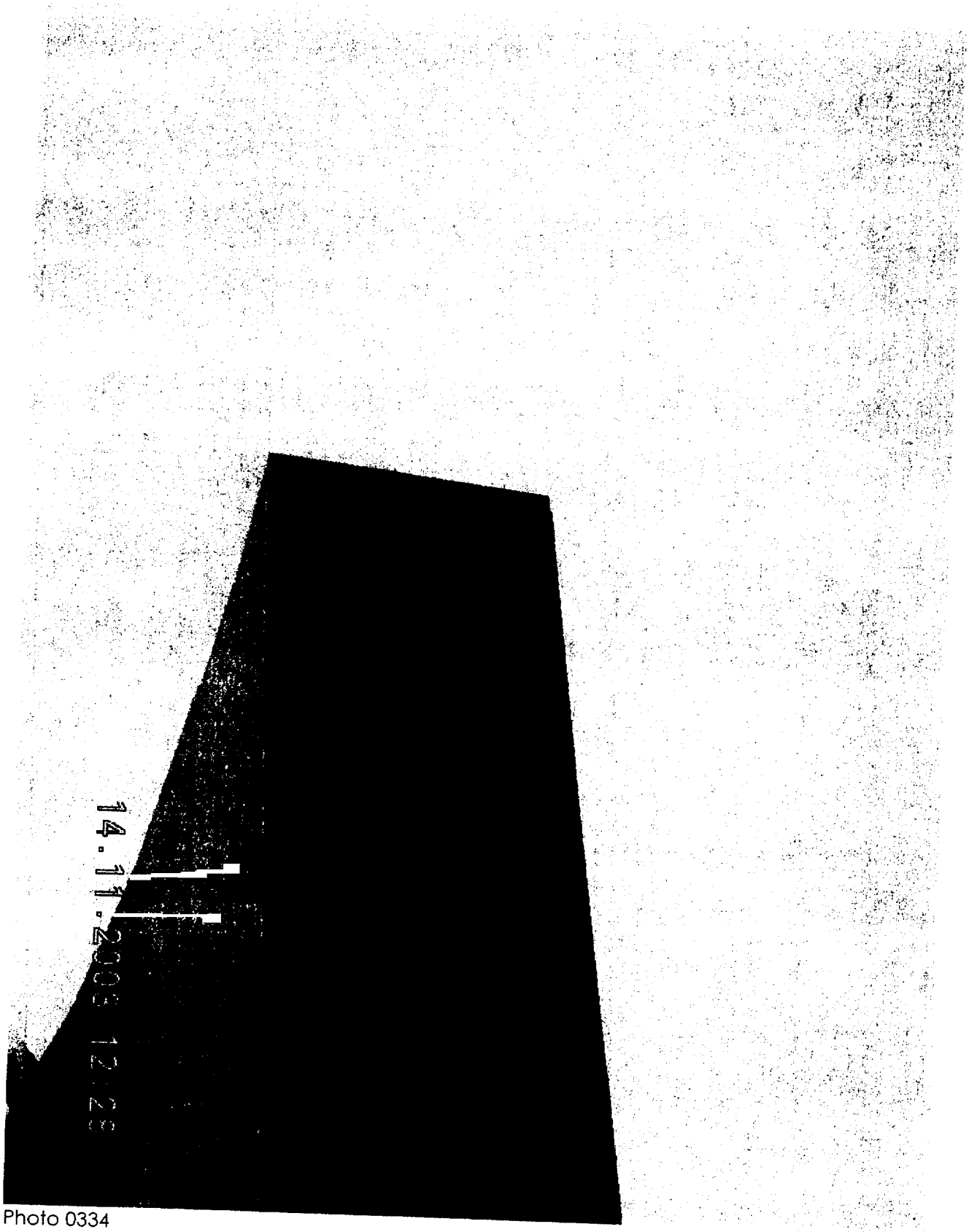

Photo 0334

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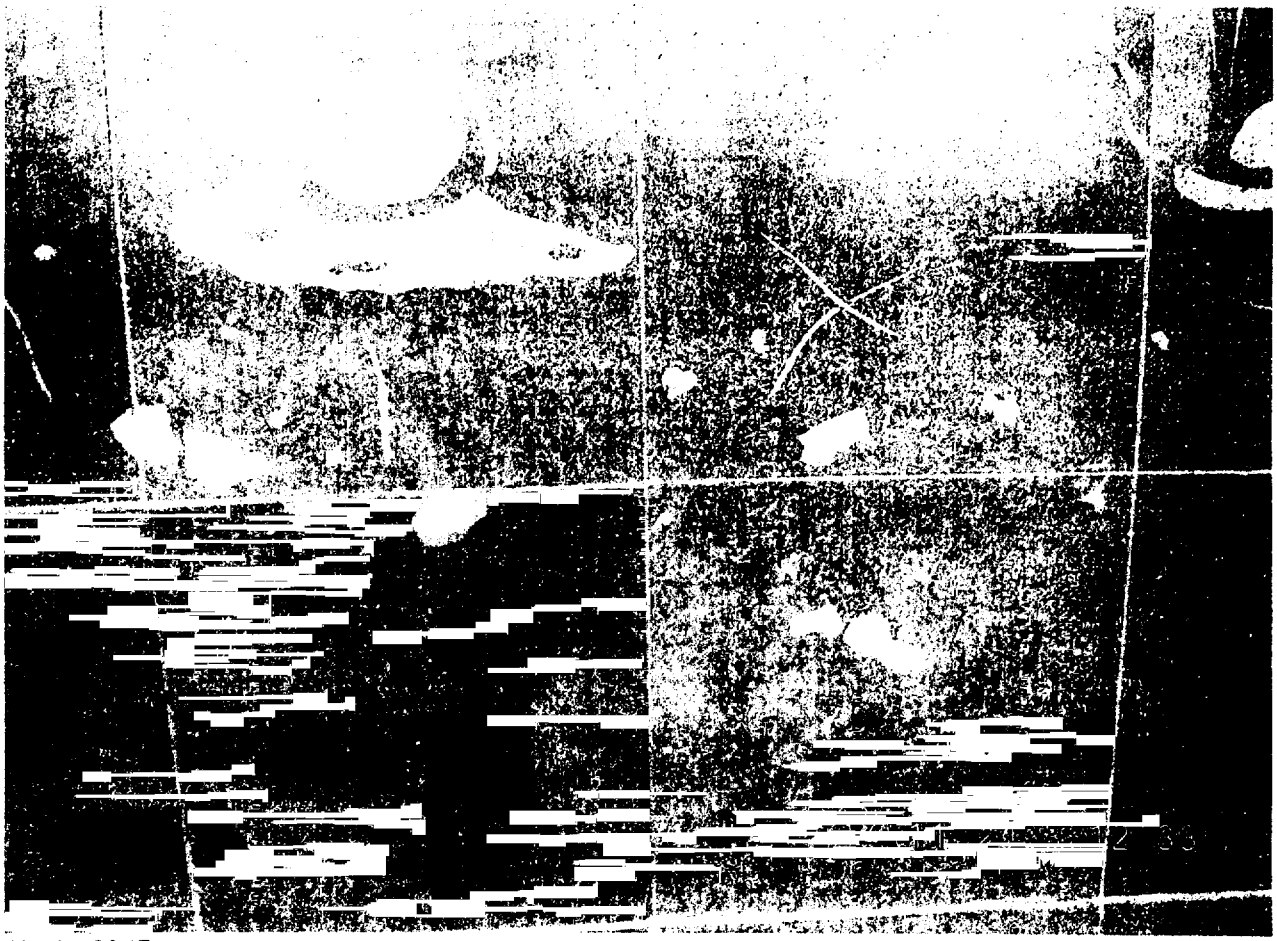

Photo 0347

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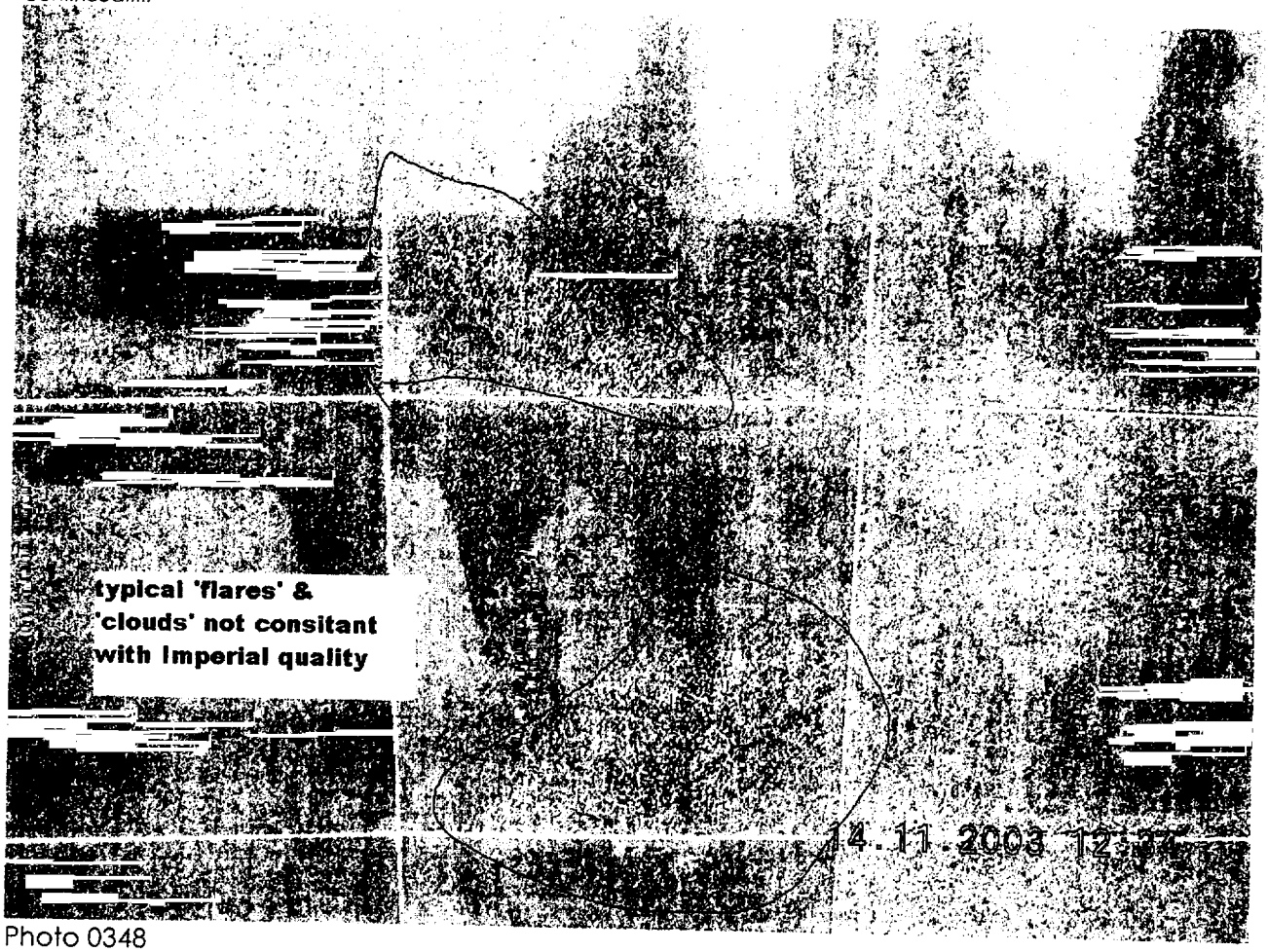

Photo 0348

Continued.....

Photo 0349

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Photo 0350

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Photo 0339

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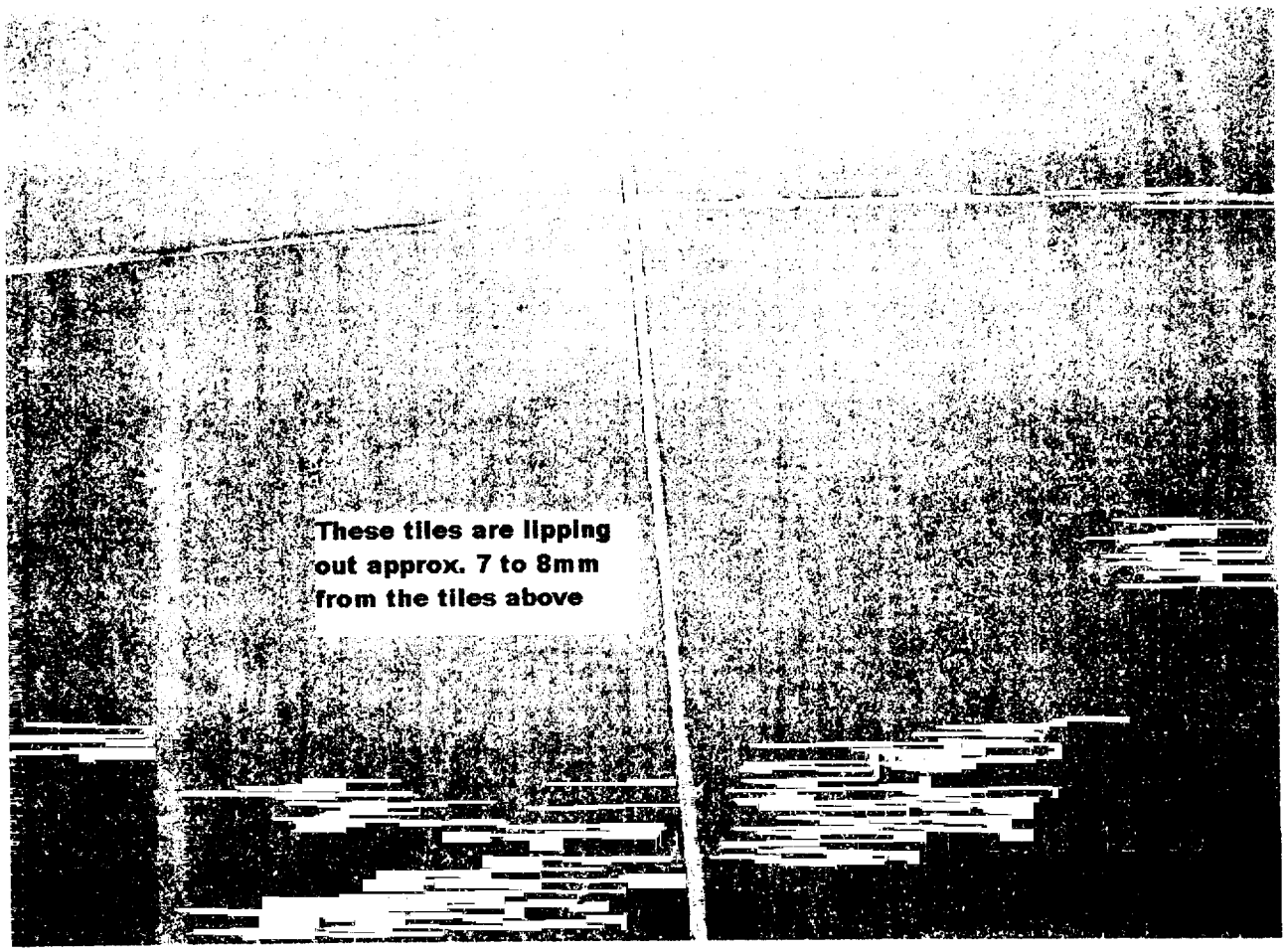

Photo 0341

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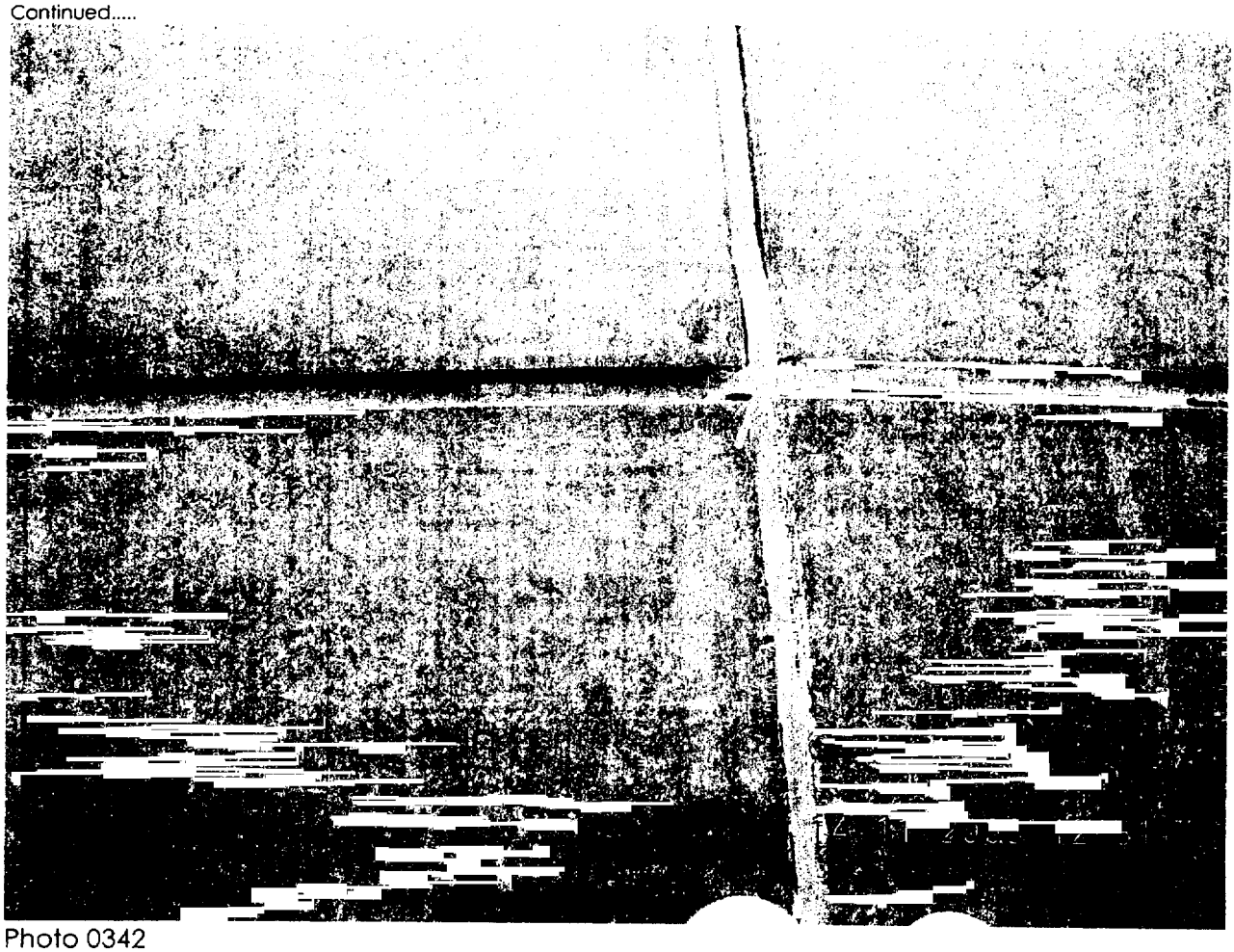

Photo 0342

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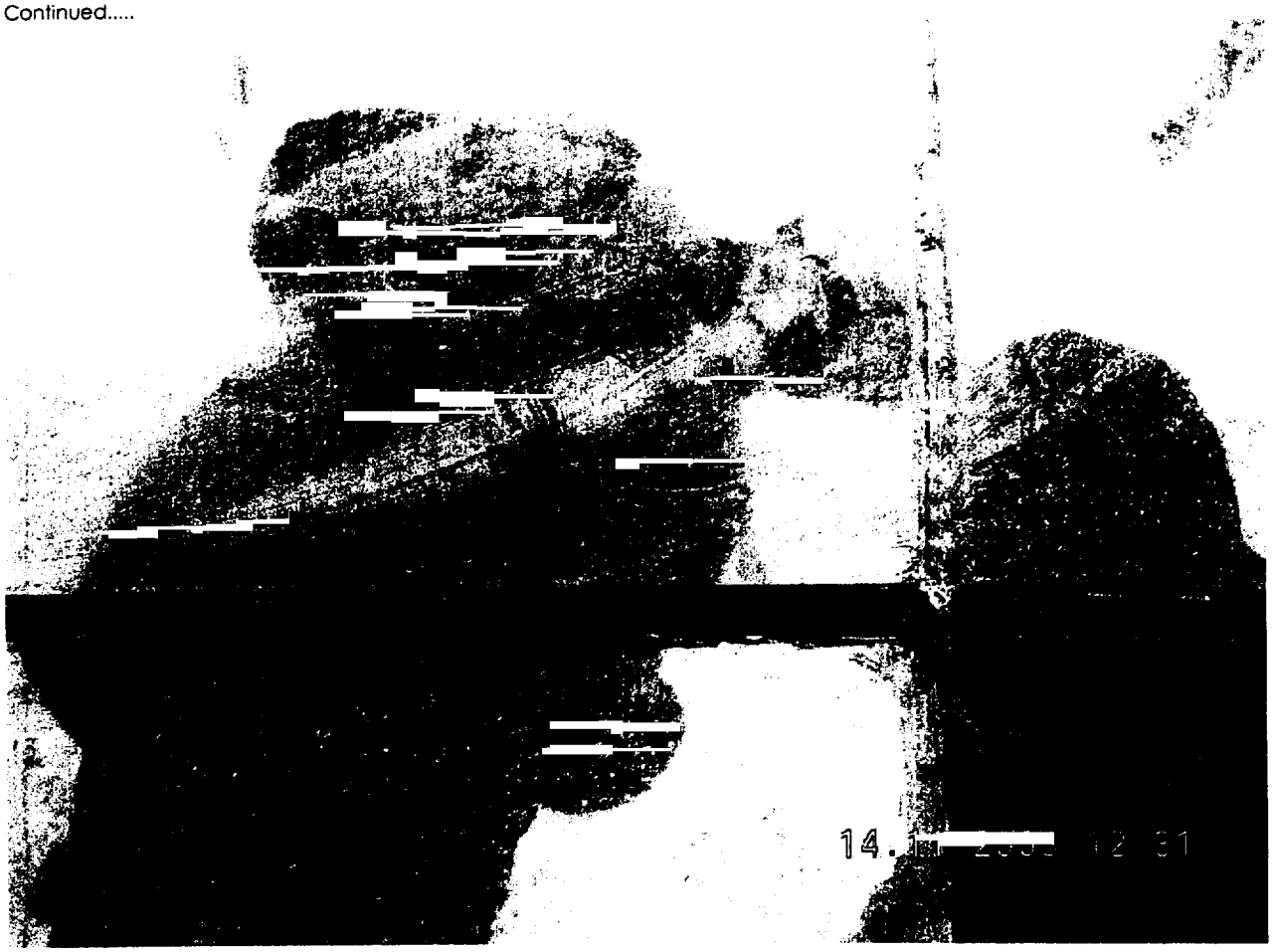

Photo 0343

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For the attention of Mr Barry Edwards

Our ref ULCWGE11/882
5 April 2004 Your ref

Dear Sirs

Australian National Memorial
Le Hamel

Further to your letter dated 4th March 2004 and our site visit on 17th March 2004 we are pleased to set out in the following our answers to the questions which you have raised. Our answers are numbered in the same order as the questions were presented in your letter.

1. There is an immediate danger to the public from the tiling which is detaching, moveable under light hand pressure and noticeably bulging on the centre line of the north face of the central wall of the memorial. The granite tiling on this part of Wall A could fall on those below therefore it would be prudent to have a means to keep those visiting away from this part of the memorial.

   There may be other areas of the granite tiling which are showing a similar deterioration but these were not discerned from a walk around visual inspection from ground level.

2. We have inspected the lower parts of the black granite tiled walling and we could find no visible evidence that mechanical fixings as detailed on the drawings (D-G0-04 and D-G0-06) have been used in this construction. Rather the granite tiling appears to have been set on cement mortar mixture on the vertical faces. Where the edges of the granite tiling were accessible at the bottom of Wall B, we could find no evidence that the tiling had been drilled in preparation to receive mechanical fixings as shown on drawings (D-G0-04, D-G0-05 and D-G0-06) which may be additional evidence that mechanical fixings have not been used.

3. As it appears that there are no mechanical fixings, the tiling as presently set will continue to be prone to the types of deterioration which are now seen, a little more than 5 years after original construction. There is evidence that the substrate on which the granite tiling is set is

being penetrated by moisture which in some positions is flowing out of the joints in the tiling. The joints have been filled flush with a black elastic compound. There are three remedial options which might be considered, in the first instance, to deal with the fact that the walls do not appear to have been tiled the way the drawings suggest they should have been as follows:

(a) Accept the construction as presently found and carry out repairs to the failing granite tiling as and when it becomes necessary. Such work may continue indefinitely as replacement becomes necessary or deterioration creates problems for health and safety.

(b) Carefully take down from top to bottom and store for re-use the existing granite tiling. Remove the cementatious seating layer on which the tiling sits and thus expose the underlying shuttered reinforced concrete walling. Supply and position the fixings which should have been used to support the granite tiles as shown on D-G0-06 1/5. Carefully drill the granite slabs to receive the fixings and re-erect the granite slabs from the bottom to the top. Those granite tiles which are to be set on the outer radius of the walls will have to be ground on their back vertical edges so that there is a greater allowance for thermal movement between the tiles.

These are difficulties associated with this approach and any one of them could add further expense which would be difficult to quantify without actually carrying out the work.

- Significant numbers of tiles could be damaged during removal, storage, handling re-drilling and re-erection.

- The underlying shuttered reinforced concrete walls may be damaged during removal of the granite tiling and stripping the underlying bedding layer, which could necessitate expensive and time consuming repairs.

- The fixings could not be made until the walls are stripped and surveyed to ensure that any inaccuracies in their construction could be taken up within the fixings.

- The contractor selected to carry out the works would need to have experience in fixing tiling by using bespoke fixings and the accurate adjustment of the fixings to line and level.

(c) The present granite tiling is all left in position and 5/6 diameter holes drilled to accept new 4 mm diameter stainless steel threaded pins to the reinforced

concrete, through the bedding, and resined into position where the corners of each granite tile meet. Once installed each pin could be provided with a black coloured captive head which would sit proud of the granite tile surface and say 12 mm diameter so that, once set in position, it captures the corner of each tile.

Whilst this method of fixing appears on initial examination to have the most potential for being the least expensive, it will depend, very much, on available expertise from a specialist fixing contractor. It may be difficult to archive a satisfactory set for the fixings in the core of the wall. Tiles may be damaged during the drilling and fixing and obviously there will be a change in the appearance of the tiling, because the fixings will be very visible.

4. The mechanical fixing system detailed on drawing D-G0-06 1/5 would appear to be adequate. It allows the granite tiling to be erected in courses, fixes each tile to the wall in a secure way and by having open joints and a cavity behind the tiling should remain free draining which is desirable. However, if it is necessary to replace a tile, all those above that tile will have to be removed before replacement can be achieved. There would appear to be the means with this detail, of adjusting the position of the fixing so that the tiling face can be aligned vertically. There are other fixing systems available which may provide the same characteristics and performance as that as that detailed in D-G0-06 1/5.

   We understand that it was the intention that the granite tiling was to be erected using this detail and as noted previously this has not occurred. We suggest that this is a suitable mechanical fixing system provided it is installed by suitably skilled persons or specialist fixing contractor.

5. The joints should all be at face of tiles 4 mm wide as shown on D-G0-06 1/5, which is adequate for thermal movements in the granite tiling where the tiles are placed on an inside face of a radius wall. However, when they are placed on the outside face of a radius wall the backs of the tiles may almost be touching leaving no room to accommodate thermal movement. In this circumstance the tiles should have been ground at their edges so that the 4 mm joint is retained over the thickness of each granite tile on all vertical joints.

6. If the fixing detail shown on D-G0-06 1/5 had been adopted the staining which is evident on some of the tiling due to rainwater penetration would not be an issue. The staining is from salts leaching from the cementatious backing which has been used for fixing the tiles. In many instances the adhesion between the tiling and the backing appears to be breaking down which means the tiling is in danger of falling off as it is not effectively fixed in position.

   A free draining and ventilated system with a cavity as shown on D-G0-06 1/5 would have obviated the current defects.

7. Should the construction as presently found he retained, it will be necessary to keep the joints weatherproof, by maintaining their present jointing sealant in excellent condition at all times. Any moisture which is rising up the wall from the ground would have to be monitored over a full cycle of seasons to discover if there is a problem of any significance to the tiling. Any solution which might be devised would depend on the scale of the problem. However, if the tiling had been erected to the details shown on D-G0-06 1/5 this would not now be an issue of concern.

We trust that in the foregoing we have been able to answer your queries adequately. If there are items which you require clarifying if you have further queries we shall be pleased to address them.

Yours faithfully

C. Bucketon

pp. Tom Sutcliffe