13th March 2012

The Manager – Air Quality
Auckland Council
Private Bag 92 300
Auckland 1142

Dear Sir / Madam

Re: Investigation of Total Suspended Particulate Trigger at Three Kings Quarry

With regard to condition 20 of the Three Kings Quarry Air Discharge Consent (Permit Number 21875), this is to confirm that a result greater than 80µg/m^3 as a 24 hour average was recorded by one of the HiVol samplers on the 17th February 2012.

The trigger is as follows:

- 17th February 2012 - 90.1µg/m^3 at the monitor located at the site offices.

As required by condition 21 of the Air Discharge Permit, an investigation has been undertaken. This letter details the results and conclusions of the investigation.

Air quality monitoring at Three Kings Quarry consists of:

- Two Lear Siegler Flow Set HiVol samplers measuring total suspended particulate. These units are located at the Office and the Northern Boundary.
- A FH62 Beta Accentuation Monitor (BAM) located at the site offices.
- A meteorological monitoring station located at the site offices that records wind speed, wind direction and rainfall on a continuous basis;
- Video cameras that monitor the site from the north and south.
- Visual inspections of air quality carried out by site staff.
- Recording of dust suppression equipment use and malfunctions.

All relevant air quality-monitoring results collected on the day of the trigger have been summarised in Table 1.

Table 1: Air Quality Monitoring Results

Date	17/02/2012
HiVol - Office (µg/m³)	90.1
HiVol - Northern Boundary (µg/m³)	23.4
BAM - Office (µg/m³)	11.9
Daily Rainfall (mm)	2.2
Daily Average Wind Speed (m/s)	1.359
Daily Average Wind Direction (degrees)	141.958
Sprinklers Operational? (yes/no)	yes
Video Monitors Operational (yes/no)	yes
BAM Text Alarm Received (yes/no)	no

Investigation of the Trigger:

- The average daily wind speed was not particularly strong and the wind direction is of no significance.
- The sprinkler system was fully operational and the water cart in full operation.
- The crushing plant was in operation however crushing damp scoria feed material.
- The HiVol monitor located at the Office was the only unit showing levels above the trigger value of 80µg/m³. The HiVol unit located at the Northern Boundary and the BAM Monitor did not show elevated results.
- The BAM monitor is set to send out text messages to the Site Manager and Environmental Coordinator at levels which provide an early warning of potential dust issues if action is not taken. No texts were received on this date.
- Video monitors of the site were reviewed and there is no evidence of dust being generated along the haul roads, within the quarry or off of any stockpiles on this date.
- The video records showed the sweeper truck arriving on site at 08:59 on the 17th February 2012 and working within 0.5-1m from the Office monitor until 09:01. During this time dust can be seen being generated as the sweeper truck focuses on a specific area outside of the building which the monitor is mounted on.
- The video records show the sweeper truck remains working onsite until 09:35 (as it does weekly) without any further dust issues observable.
- The results from the laboratory analysis made note that loose dust was present on the filter paper from the Office monitor on this date.

Cause of Trigger:

In preparation of the commencement of fill activities on 2nd April 2012 site improvements are being undertaken. As such a number of concrete blocks located in the vicinity of the Office monitor have been moved as well as the relocation of a large skip bin.

Over time fine material had built up around and under these objects which became exposed once they were moved. When the sweeper truck came in on the 17th February this is an area it focused on. As there was a build of loose material the volume of water that the sweeper truck doses the ground with and the power of the vacuum on the sweeper truck was insufficient to deal with the amount of material the brooms of the truck were disturbing. This created an isolated cloud of dust around the sweeper truck as it passed over areas of built up material.

Furthermore this activity was occurring within 0.5-1m from the Office monitor. Therefore the dust that was generated was blown by the exhaust of the sweeper truck directly at the monitor.

Environmental Effect:

It is considered that this was an exceptional event. The video records clearly show the cause of the incident. The records also show that the dust generated was isolated to a small area and would not have cause a nuisance or disturbance outside the boundary of the site.

The sweeper truck cleans the hardstand area of the site weekly. The truck uses water to dampen the surface as is sweeps. It is also fitted with a vacuum that runs with the broom so as to sucks up any of the fines that are disturbed as it works. The operation of the sweeper truck has not previously caused a trigger and is not expected to do so again.

Corrective Actions:

The cause of the incident was due to the sweeper truck working outside of its normal requirements and capabilities. Therefore prior to the arrival of the sweeper truck arriving (if there has been any changes to the layout of site) the grounds are to be inspected and any areas were loose material has built up is to be shoveled or swept up by hand.

Again, the regular use of the sweeper truck is not considered an issue. The use of the sweeper truck in all other cases assists in the prevention of dust issues. This is because it is able to minimise the build up of fines on hardstand areas as it is these fines that are easily picked up in windy conditions.

As no alarms were sent in regards to this exceedance the BAM monitor trigger levels for sending an alarm have been reviewed. As a result an addition trigger value has been set. This is to ensure an appropriate level of early warning of a potential dust issues is received so that the necessary action can be taken.

Closing:

No complaints to date have been received by neighbouring properties as a result of this exceedance.

The video footage of the cause of this trigger is available to be view at site. Please contact me to arrange a suitable time to view the video if deemed necessary.

If there are any further queries or comments on this investigation please do not hesitate to contact me on 027 504 3624 or at elyse.laface@winstoneaggregates.co.nz

Yours faithfully

Elyse LaFace

Environmental Coordinator