

7th February 2014

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/m³ as a 24 hour average was recorded by one of the HiVol samplers on the 14 January 2014.

The trigger is as follows:

- 14 January 2014 - 93µg/m³ at the monitor located at the Office blocks of the site.

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 (HiVol) samplers. These units are located at the Office and the Northern Boundary.
- Two Beta Attenuation Monitors (BAM) units. These units are located at the Office and the Southern Boundary.
- 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	14/01/2014
HiVol - Office (µg/m³)	93
HiVol - Northern Boundary (µg/m³)	69
BAM - Office (µg/m³)	31.1
BAM - Southern Boundary (µg/m³)	23.8
Daily Rainfall (mm)	0.0
Daily Average Wind Speed (m/s)	5.385
Daily Average Wind Direction (degrees)	217.573
Sprinklers Operational? (yes/no)	Yes
Video Monitors Operational (yes/no)	Yes
BAM Text Alarm Received (yes/no)	Yes – a number were received and responded to between 13:30 and 19:00.

Investigation of the Trigger:

- The daily average wind speed on the day of the trigger was recorded as 5.385m/s which was the second highest value for the month. The average daily wind speed over the month was recorded as 3.4m/s with the monthly value for the previous year (January 2013) came in just under that at 3.1m/s.
- There was no rainfall recorded on the day of the trigger or the four days prior. The total rainfall recorded for the month of January 2014 was 35.8mm and nearly half (46%) fell in one day later in the month (26 January 2014). The total rainfall for January 2014 was less than half the total recorded for the month of January over the past 5 years (2009-2014) which on average is documented in our records as 73.6mm. Over this period the highest rainfall for the month of January was in 2011 at 200.4mm while the lowest total rainfall for the month of January was in 2013 at 3.4mm. It is noted that the last air quality monitoring trigger was recorded in January 2013.
- The daily average wind direction on the day of the trigger was comparable to the prominent wind direction for the month. The daily average wind direction on 14 January 2014 was 217.6° while the daily average for the month was 211.9°.
- The HiVol monitor located at the Office Block was the only unit showing levels above the trigger value of 80µg/m³. The HiVol unit located at the Northern Boundary and both BAM Monitors did show elevated results but not in excess of the trigger value.
- The sprinkler system and water cart were fully operational on the day of the exceedance.
- The BAM monitors are currently set to send out text messages to the Site Manager, Supervisor and Environmental Coordinator at levels which provide an early warning of potential dust issues if action is not taken. A number of text messages were received starting from approximately 13:30 until 19:00. Upon receipt of the first alarms the site was investigated and it was noted that:
 - The sprinkler system and water cart were fully operational; and
 - The active work areas and haul roads were visibly wet.The water cart was continued to be used throughout the day to maintain the haul roads and active work areas as visibly wet. The water cart also began to dampen areas that were not actively being worked or traversed as an additional measure. As a result, the daily water cart use was 45.9% greater on 14 January 2014 than the average daily use for the month.
- Video monitors of the site have been reviewed and there are no specific areas or activities observed that were significant generators of dust on the day of the trigger.
- When the filter from the Office Block HiVol was collected it was noted that there was visible fine granular particles present on the filter.
- The dust log contains entries on 14 January 2014 that significant dust was observed at construction projects in the surrounding areas (by site personnel that were undertaking monitoring/tasks outside of the quarry). There is the potential that these outside generators increased the ambient dust elevating the results from that solely sourced from quarry activities. This is supported by the results of the Southern Boundary BAM which is located 'downstream of the quarry' in regards to the average wind direction on the day of the trigger. On the day of the trigger the Southern Boundary BAM recorded a 24 hour average of 23.8µg/m³ which is the third highest reading for the month and above the monthly average of 15.5µg/m³.

Cause of Trigger and Corrective Actions:

The investigation into the result greater than 80µg/m³ as a 24 hour average recorded at the Office Block HiVol samplers on the 14 January 2014 was due to the exceptionally dry and windy conditions on this day.

Our standard daily management practices were not able to cope with the extreme conditions on the day. It is noted that construction sites around the area were also observed to be significant generators of dust due to the severity of the conditions on the day. We consider that the additional measures taken on the day (ongoing and increase use of the water cart) though they did not prevent a trigger certainly managed the degree of exceedance and effect as best as practicable.

Closing:

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

With the ongoing daily practices being implemented (a part from the rare extreme weather conditions) we are confident that we can continue to manage the site to minimise the occurrence of such triggers.

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