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Report to the Environment Committee
from Brenda Rosser, Resource Technician

Dust Deposition in the Hutt Valley

1. Purpose

To inform the Committee of the results of an investigation of dust deposition in the Hutt Valley.

2. Background

The Wellington Regional Council has carried out dust deposition monitoring since September 1996. This monitoring has determined coastal background deposition rates on Wellington's southern coast, assessed the contribution of quarry dust to urban background levels in the Hutt Valley, and established background dust levels in the Wainuiomata Valley.

Previous dust monitoring in New Zealand and Australia has indicated that normal urban background levels of 1-4 $g/m^2/30$ days can be expected *(Discussion Document On Proposed Ambient Air Quality Guidelines,* Ministry for the Environment, June 1994). However, dust monitoring in the Taita area during 1996 and 1997 (see Report No. WRC/RINV-T98/02) indicated that, on average, the urban background levels were 5-6 $g/m^2/30$ days. Although these levels were higher than expected for urban environments elsewhere, deposited particulate levels were not considered excessive when compared to background monitoring sites in similar environments.

The objective of this investigation was to determine whether windblown alluvial sediment from the Hutt River influenced the rate of dust deposition in the Hutt Valley.

3. Methodology

Dust deposition monitoring in the Hutt Valley was undertaken using horizontal deposit gauges (the method is outlined in the Draft International Standard ISO/DIS 4222.2). A monitoring network of dust deposition gauges was established in the Hutt Valley, including Upper Hutt. A total of eight new dust deposition sites were

installed. Results from these new sites were complemented by data from existing sites at Mabey Road and Wainuiomata. Deposition gauges were collected and replaced every 30 days. Monitoring was carried out from October 1998 to April 1999.

The deposition gauges were placed at sites within the Hutt Valley that were not expected to be influenced by local dust generating activities (e.g. quarries). Five sites were located in Upper Hutt, and four sites were located within the Lower Hutt basin.

4. Results

The results of dust deposition monitoring in the Hutt Valley for the period from October 1998 to April 1999 are presented in the report "Dust Deposition in the Hutt Valley" (Publication number: WRC/RINV-T-99/12). Copies of this report are available for Councillors who would like a copy. The key findings of the report are:

- The average amount of dust deposited in the Hutt Valley was 6.9 g/m^2/30 days. However, the rate of dust deposition was quite variable. The average value for Upper Hutt was 8.4 g/m^2/30 days, and the average value for Lower Hutt was 5.2 g/m^2/30 days.

- The amount of dust deposited at a site was dependent upon the climate. Higher rates of dust deposition occurred during the windier sampling periods. Stronger and more frequent winds provide a mechanism to entrain fine particles from the exposed river bed, and to transport the particles throughout the valley. No correlation was found between wind direction and the rate of dust deposition.

- Rainfall and deposited particulate levels showed a positive exponential correlation. This relationship suggests that during wetter sampling periods a greater rate of dust deposition occurs. Rain is also a mechanism that can cause dust particles to fall from the atmosphere. Dust particles can adhere to rain droplets and fall to the ground with them.

- The highest levels of dust deposition were consistently experienced at the upstream end of the Hutt Valley.

- Higher levels of dust deposition were evident at sites that were subjected to locally elevated wind speeds, such as at the downstream end of Kaitoke Gorge, and Taita Gorge. Wind flow through a topographical constriction, such as a gorge, results in locally accelerated wind speeds.

- In general, the rate of dust deposition decreased in the downstream direction. The lowest dust deposition rates were consistently recorded at the deposition gauges located at Huia Pool and Shandon Golf Course. It is likely that the decline in dust deposition rates was related to morphological changes that occurred in the Hutt River in the downstream direction.

- The rate of dust deposition decreased with increasing distance away from the Hutt River. This is consistent with the notion that the concentration of dust decreased with increasing distance from the dust source.

- On average the Hutt Valley experiences higher levels of atmospheric dust deposition than previously reported for normal urban background levels. Results from this study indicate that the geomorphological setting of the valley is likely to be responsible for the elevated dust levels.

5. Implications

- Elevated dust levels in the Hutt Valley are a natural consequence of the geomorphological setting of the valley. Local dust generating activities, such as quarries, may contribute to dust levels in the immediate vicinity, but the Hutt River is an important source of particulate dust in the Hutt Valley.

- The results of this investigation provide baseline information that can be used to assess the impacts of dust generating activities, either as part of a resource consent application, or in response to public complaints.

6. Communications

The findings of this report will be communicated to the public through a press release. Copies of the report will also be sent to each Territorial Authority.

7. Recommendation

That the report be received and the contents noted.

Report prepared by:

BRENDA ROSSER
Resource Technician

Approved for submission:

JOHN SHERRIFF
Manager, Resource Investigations

JANE BRADBURY
Divisional Manager, Environment