



Runoff quality impacts of dust suppression using saline water

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In mining and gas operations, dust generation from unsealed roads is a major problem. Commonly, road watering is used to suppress dust, with the lowest water quality available generally being selected for that purpose. Whilst minimising water usage for the site, that practice does create concerns with respect to potential environmental impacts if runoff from the treated roads has significantly elevated salinity.

For coal seam gas operations, the water extracted concurrently with the gas contains predominantly sodium bicarbonate. Therefore, where coal seam gas water is sprayed onto roads, there is potential for elevated sodium in runoff to impact on soil adjoining the roads, but there is no information on the rates of dissolution and mobilisation of soluble salt from the surface of roads that have been sprayed with low quality water to reduce dust.

Therefore a rainfall simulator study was carried out to investigate rates of mobilisation of sodium bicarbonate from compacted soil surfaces simulating an unsealed road. The study considered effects of the amount of precipitated sodium bicarbonate on the soil surface and variations in rainfall intensity.

Because the soil surfaces were compacted, runoff commenced almost immediately following application of rain. For all treatments with applied surface salt, runoff quality data showed a peak in salt concentration in the first flush of runoff, and relatively rapid reduction through time in those initial concentrations. The magnitude and duration of peak concentrations depended on both rainfall rate and the quantity of salt present on the soil surface.

The flush of salts in run-off from the roads occurred very early in the run-off event, when none of the surrounding area would have commenced to run off. Consequently, the relatively small volume of run-off produced directly by the road could be expected to predominantly infiltrate in the table drain adjoining the road. The initial flush of saline water would then be leached to depth or diluted by the less saline runoff generated from the road in the latter part of the run-off event, or by non- saline runoff from the surrounding catchment.

Particularly for mine sites, the data indicate that the use of saline water in dust suppression on unsealed roads is unlikely to impact significantly on the wider surrounding environment. It is recognised that watering for dust suppression on mine sites typically salinises the road area, and that eventual rehabilitation has to deal with those saline areas. Therefore, additional salinity in the soil adjoining the road is not considered to be of concern.