Inquiry into management of the Murray Darling Basin – impact of mining coal seam gas

Environmental impacts of mining coal seam gas on food production and human and animal health.

The aspects of coal seam gas production that I wish to comment on, relate to the production of water from the wells. Very substantial volumes of water are extracted together with the gas. The present evidence is that variable concentrations of a range of minerals are dissolved in the water, depending on the site of the well. Frequently the mineral content of this coal-seam water does not meet either the NH&MRC Australian Drinking Water Guidelines, or the ANZ Guidelines for Fresh and Marine Water Quality.

For safe release, or use, of this water, treatment is needed so that the appropriate Guidelines are met for concentration of dissolved minerals. Once these quality standards are met, the water from coal seams is a valuable resource for irrigation agriculture and for the environment.

The ensuing issues are the treatment methodology and quality-monitoring processes, which are required for the water to meet the standards, and the disposal of the brine concentrate arising from the treatment.

The major soluble minerals are likely to be sodium chloride and sodium bicarbonate, with a wide range of metals at lower concentrations. Ultrafiltration and reverse osmosis are technologies of choice for salt removal from seawater, wastewater and saline potable water. Analytical methods for on-line quality control are available.

The outstanding issue is the disposal of the brine. Simply pumping the brine into an evaporation pond for crystallization has many defects. Wind will blow dry salts and concentrated brine into the environment. Evaporation ponds are likely to leak into groundwater, leading to salinisation of the surface aquifer. Flooding or fracture of retaining walls releases the salt into the local streams, with great detriment to the aquatic ecology and irrigation farms drawing water downstream. There is no reliable permanent answer to the environmental safety problems arising from an artificial salt-lake.

If this is to be avoided, there are two options. One is to concentrate the brine further, and remove it completely from the area, leading to the inevitable problem of final disposal. The second is to pump it back into the coal seam from which it came. This is environmentally the best answer, since the total salt load in the seam remains constant, though at a higher concentration. Care is needed to ensure that the well is sealed from intersecting aquifers, but this is an essential part of the production requirement.

It is my viewpoint that all coal seam gas brine should be returned to the seam, and that no permission should be given for well drilling unless this is part of the design of the well system.

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