

Objection to the proposed McPhillamys Gold Project at Kings Plains:

Gold mining poses significant risks to human health by introducing contaminants from the mining process and by enhancing concentrations of minerals. Industrial methods for processing gold ore use mercury to separate gold from crushed rock, with consequent release of mercury into the surrounding air, tailings, soil, sediment, and water (reference 1). Once in the environment, mercury persists (2). Among naturally present minerals, elevated arsenic concentrations are also found in surface water and sediment in gold mining watersheds, and as multiple researcher's will attest, these have been found in surface soil as far as 14 km from the gold mining sites.

The township of Blaney is just 7kms from the mine site with many of its residents collecting drinking water from the roof of their homes and growing their own fruit and vegetables. There are also a large number of primary producers in the area, whose stock may be unsafe for human consumption. This may extend to the stock who pass thorough the Central Tablelands Livestock Exchange which is just 10mks outside of Blayney. Contamination occurs through the metal contaminants in tailings that disperse through soil, water, and river sediments many kilometres from the mining site, and even farther via airborne travel of volatilized particles (14,15). Mercury, used in gold ore extraction, biomagnifies in the food web and becomes methylated into more toxic forms (16). As such, potentially hazardous levels of mercury have been detected in higher order fish (17,18) and in other edible animals and plants (19).

A study assessing the neurotoxic effects associated with exposure to lead and mercury in borehole, tap and surface water found that children were showing neurologic effects associated with exposure to mercury and lead such as increased nervousness, loss of memory and/or decrease in concentration, impaired writing ability and tremors.

Metals emitted from mining processes represent an important source of environmental contamination; especially for the local children. Gold mine tailings often contain concentrated levels of elements that are naturally present in gold-containing rock, including arsenic, aluminium, antimony, cadmium, copper, chromium, iron, lead, manganese, selenium, and zinc (1,20). Elevated arsenic concentrations are also found in surface water and sediment in gold mining watersheds,(3,4) including at appreciable distances from gold mining sites (5). Studies have also found elevated levels of lead (3,280.5 g/g) in the soil surrounding the mine sites, and elevated levels of manganese. Elevated mercury concentrations have been found in hair (14,15,19,21–34) urine, (19,21,22,24,32,35) and blood samples (14,19,21,27,35–39) of individuals living near mines or people occupationally exposed such as miners (7, 40).

Arsenic levels in soil surrounding gold mine sites have been found to exceed the normal range (13). A case-control study to investigate the association between chemicals in maternal drinking water consumed during pregnancy and congenital heart disease in the offspring found that arsenic exposure at any detectable level was associated with a threefold increase in occurrence of congenital heart disease of the foetus (8,9).

Research assessing safe drinking water found arsenic concentrations to exceed the current World Health Organisation guidelines of 10 g/l for drinking water. In several cases, these water samples were taken up to 14kms away from the mine site. Blayney Township is just 7kms away and is home to over 7,342 people; many of whom collect rain water for drinking.

Coombing Creek is within the catchment area for the Lake Rowlands and is approximately 16kms from the proposed mine site; with some smaller creek beds even closer. Lake Rowlands serves as the water drinking source for over 14,000 residents. The Belubla River is a part of the Lachlan catchment within the Murray Darling basin and flows into Carcoar Dam. The Belubla flows alongside the proposed mine site. The NSW Government has made a commitment of \$850,000 to conduct a study for a pipeline to pump excess water from Lake Rowlands to Carcoar Dam. The pipeline will be a two way pipe line. If the mine is to go ahead, not only will the water source of 14,000 people be at risk, it will render Carcoar Dam unsafe for human contact, and as such, also limit future water saving plans and initiative, such as connecting Carcoar Dam to Lake Rowlands. Whilst Carcoar dam is a recreational dam, the impacts of it having contaminated water and soil will be significant.

Once the water is contaminated we will be unable to treat the water sufficiently to render it safe for human contact or usage. The Browns Creek Goldmine is a practical example of this. The mine closed in Blayney when the mine filled with water. Wanting to utilise the large body of water and maximise its close proximity to the township, Central Tablelands Water, along with Orange Water and Sewer Authority conducted studies independent of one another to investigate the possibility of utilising the water. Due to the contamination they were unable to use the water.

In many research studies, mercury exposure occurs through drinking water, soil, and artisanal mining. For arsenic, drinking water concentrations predicted poorer health outcomes among adults who consumed water with higher arsenic levels. Several other studies have correlated drinking water arsenic concentrations (7,43–46) and food arsenic concentrations (41) with high levels in human tissue, and therefore associated health implications. Additionally, as with mercury, soil exposure appears to be an exposure pathway for children. Hinwood et al.(43) found a strong correlation between soil and arsenic in humans a study of 83 Australian individuals exposed to high arsenic in their residential environment.

There is increasing evidence that mercury and arsenic are neurotoxic and carcinogenic, even at very low exposure levels. This suggest that there may be detrimental health effects in Blayney and surrounding villages as a result of toxic metal contamination should the proposed mine go ahead. The evidence of human uptake of mercury via drinking water and occupational exposure, and via soil exposure among children should be of concern to all. Studies have shown that human uptake of arsenic occurs in communities around gold mining sites via drinking water exposure and via soil exposure among children. These findings highlight the need to consider the likelihood of toxic metal exposure when managing drinking water sources in this community, and the need to better understand the potential role of soil as a pathway for arsenic and mercury exposure, particularly among children.

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