Mines Safety Bulletin No. 168

Subject: Management of safe drinking water at mine sites

Date: 26 November 2019

Background

Safe and accessible drinking water (potable water) is important for health and must be supplied to all employees at mining operations in Western Australia.

The Department has recently been investigating contamination of water supplies with process water or microbial pathogens that have the potential to cause serious and disabling conditions. Such conditions can lead to severe, debilitating diseases that may cause death in susceptible people.

Known contaminants that render drinking water unsafe for human consumption include:

- microorganisms (pathogenic bacteria, viruses, and parasites that exist in human and animal faeces)
- dissolved minerals or chemicals (e.g. arsenic, cyanide, uranium, lead, salts)
- chemical residues from nearby mining, agricultural and/or industrial activities, or radiological contaminants.

Potential for contamination of mine drinking water supplies may occur:

- at the source (borefields, dams, streams and rivers)
- in pipework (damaged and/or corroded pipes resulting in leaching lead, copper or organic materials; cross-connections with process or sewage sources)
- in storage tanks (nesting birds, decomposing animals, cross-connections)
- in treatment equipment (breakdowns, inappropriate or inadequate capacity of disinfection systems or damaged components)
- at supply points (personal drink containers touching taps and/or used to retrieve ice).
- due to maintenance personnel or their tools contaminating pipe work and filters (e.g. dirty hands or tools touching water filter during change out).

The Department reminds principal employers and managers of their responsibility to develop and implement a site-specific Drinking Water Quality Management Plan (the Plan) to provide direction on management strategies (control actions) and monitoring regimes (control validation) to ensure the supply of safe drinking water at all times. The Plan shall outline procedures for protecting water sources from contamination, ensuring integrity and effectiveness of all components in the system and the routine inspections, maintenance and

regular monitoring that will occur to ensure safe water supply. The Plan shall also specify actions required in the event that contamination is identified or the health of personnel are affected.

The Plan should be referenced in the site's Health and Hygiene Management Plan (HHMP).

Summary of hazard

Following a contamination incident, the severity of outcomes is dependent on toxicity of the chemical(s) or the ability of microbiological contaminants to cause disease, their concentration(s) in the water, the dose, and individual worker susceptibility to the contaminant.

Common symptoms of contaminated drinking water include, diarrhoea, vomiting, abdominal cramping, loss of appetite, fever, fatigue, joint pain, dark urine and skin irritations or yellowing of the skin. A person may experience one or more of these symptoms with mild to severe effects. Water-borne diseases have the potential to be very serious and include cholera, typhoid, dysentery, hepatitis A, botulism, and parasitic infections – giardiosis, cryptosporidiosis and cyclosporosis. Many of these diseases are highly contagious and can be easily transferred by person-to-person contact, eating food handled by a person with the disease or further consumption of contaminated water.

Contributory factors

Contamination of reticulated drinking water systems can occur from:

- animal defecation in or near the drinking water source
- contaminating materials (chemicals, faeces, decomposing animals) in or near damaged pipes
- infrastructure failures:
  - system-derived back pressure, such as when pumps are switched on and off
  - faulty plumbing or cross-connection of sewage or process water lines with the reticulated drinking water supply
  - poorly designed or modified water reticulation systems resulting in "dead legs"
  - elevated temperatures that promote bacterial growth, or lack of treated water at the supply point
  - soiled water system components (tanks, pipework, taps) with slime and algae build-up that supports growth of pathogens
  - faulty, inadequate or no disinfection treatment installed in the system (examples include filters, chlorine dosing equipment, ultra-violet sterilisation units, or ozone)
  - incorrect or inadequate labelling of supply points
  - persons not competent to design, install and maintain drinking water systems.

Actions required

The Department recommends mining operations implement the following actions.

- Develop and implement a site-specific Drinking Water Quality Management Plan.
- Carry out regular monitoring and report compliance with the Department of Health's requirements (refer to "Mine sites and exploration camps" for details on what contaminants to monitor and the frequency of sampling).
- Ensure maintenance and monitoring of water supply systems is conducted by competent persons.
- Maintain vigilance on reports of worker ill health to ensure early detection of, and response to, emerging issues.
- Promptly isolate any person suspected of having a waterborne disease; in particular, the person shall not enter any food preparation or serving area.
- Ensure a very high standard of disinfection for persons required to service rooms occupied by an infected person.
- Ensure a supply of known, safe water until the source of contamination has been identified and rectified.
- Immediately notify the Department of Health at dwalert@health.wa.gov.au in the event of detection of any indicator organism (e.g. *E. coli or Naegleria spp.*) or contaminant that exceeds any water quality parameter defined by the *Australian drinking water guideline*.

Generally, if more than two cases are suspected, it is considered potentially serious and is required to be notified to the relevant district inspector pursuant to s. 79 of the *Mines Safety Inspection Act 2016* (MSIA).

If a worker has been identified as experiencing symptoms of poisoning, it shall be reported pursuant to s. 78(i) of the MSIA.

Note: It is recognised that personal hygiene factors can result in isolated cases with symptoms similar to water borne disease.

Further information

- Department of Mines, Industry Regulation and Safety

  Preparation of a health and hygiene management plan – guide

  www.dmp.wa.gov.au/Documents/Safety/MSH_G_HHMP.pdf

- Department of Health

  Mine sites and exploration camps

  ww2.health.wa.gov.au/Articles/J_M/Mine-sites-and-exploration-camps

  Contact details for population/public health units

  healthywa.wa.gov.au/Articles/A_E/Contact-details-for-population-public-health-units

- Department of Water

  Water quality protection note 41 – Private drinking water supplies

  www.water.wa.gov.au/__data/assets/pdf_file/0006/5955/82330.pdf

- National Health and Medical Research Council

  National Water Quality Management Strategy – Australian drinking water guidelines 6 2011

  www.nhmrc.gov.au/about-us/publications/australian-drinking-water-guidelines

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