



**Wellhead Protection Issues Related to Mining Activities**  
**Minnesota Department of Health**  
**August 2009**

**Purpose** - This document has been drafted in response to requests from local units of government to provide *guidance* in revising local government land use comprehensive plans, rules or regulations as they may apply to aggregate mining in drinking water supply management areas in Minnesota.

The use of this document by a local unit of government prior to final review by the Minnesota Department of Health (MDH) is the responsibility of the user and should be reviewed by a local unit of government's legal representative prior to use or adoption.

**Background** – The impacts that aggregate mining or other mineral extractive land uses may have on the quality of drinking water are a public health concern where the aquifer exhibits sensitive geologic conditions. Here, there are no protective layers of fine-grained material such as clay or shale to prevent the movement of contaminants into the aquifer. Contamination of the aquifer and drinking water wells could result in the need to install expensive treatment equipment or to greatly limit future capabilities to construct additional wells. Furthermore, contamination of water supply wells may result in expensive legal and remediation costs to the owners of the properties that contributed the contaminants.

Mining of materials within vulnerable portions of a drinking water supply management area (DWSMA) may occur if care is used to ensure that: 1) the mining operations, 2) management of the mining area, and 3) reclamation efforts do not present a serious risk to groundwater quality. *The following issues should be considered when conducting mining within vulnerable portions of a drinking water supply management area.*

Following each issue statement is a bulleted list of suggested measures that could be adopted as ordinance language to address a specific drinking water concern.

**1) Issue - The movement of disease organisms into the aquifer within the time period that they remain viable in groundwater.**

The United States Environmental Protection Agency (U.S. EPA) states that human pathogens may remain viable in groundwater for one to two years. Therefore, sewage treatment systems and/or surface water runoff into aggregate or mineral mining areas that are located in the one to two year times of travel for a water supply well should be viewed as a potential source of pathogen recharge to the aquifer.

- Surface water runoff shall be controlled to avoid infiltration within all vulnerable portions of a DWSMA of a public water supply well.
- Onsite sewage treatment systems shall be excluded from the one-year time of travel area of a DWSMA.

**2) Issue - Contamination related to fuel and fuel-breakdown products.**

Fuel storage should not occur in areas where geologic cover has been removed and in mining areas. If equipment is fueled in areas where aggregate or minerals are exposed or being mined, it should be done over an impervious pad or other surface where spills can be contained and cleaned up.

Accidental releases of fuel, oil, or automotive liquids may create a contamination plume that could reach a water supply well. A spill emergency response plan should be in place that identifies how a response to a spill will be implemented, the parties that will be involved, and how the public water supplier will be informed.

- Fuel storage and refueling operations shall not occur in areas where geologic cover has been removed or in mining areas unless conducted on an impervious pad with spill containment.
- Only above ground storage tanks shall be allowed with approved containment.
- All tanks, regardless of size, must meet county and/or Minnesota Pollution Control Agency rules or regulations that apply to tanks with capacity greater than 1,100 gallons.
- An emergency spill response plan shall be in place that identifies: 1) how a response to a spill will be implemented, 2) the parties that will be involved, and 3) how the public water supplier will be informed.

**3) Issue - Contamination related to storage of equipment, wastes and hazardous materials.**

Equipment should not be stored or serviced in areas where protective cover has been removed or in mining areas to reduce the potential for leaking oil, fuel, hydraulic fluid, antifreeze or other automotive fluids.

- Equipment shall not be stored or serviced in vulnerable portions of a DWSMA unless conducted on an impervious pad or similar surface.
- Waste materials shall not be stored and processed within vulnerable portions of a DWSMA unless conducted on an impervious pad with secondary containment.
- Explosives or other materials used in extractive mining processes shall not be stored or processed within the vulnerable portions of a DWSMA unless conducted on an impervious pad with secondary containment.
- All generated wastes shall be processed in accordance to state and local requirements.
- Storage and processing of recycled bituminous materials shall not be allowed within the vulnerable portions of a DWSMA unless conducted on an impervious pad with secondary containment.
- Land spreading of animal manures, industrial wastes or municipal sludge shall not be allowed within vulnerable portions of a DWSMA.
- Landfills shall not be located in vulnerable portions of a DWSMA.



**4) Issue - Operation of a bituminous batch plant.**

An asphalt batch plant should not be located where aggregate is exposed or in mining areas to help prevent contamination from entering the aquifer resulting from this activity. This is particularly true if recycled motor oil is used to fuel the plant and if the sludge obtained from asphalt production is not removed or properly managed.

Also, the spraying of truck boxes with oil should not be conducted in areas where aggregate is exposed or in mining areas. This will reduce the risk that spills, over application of oil, or leaking oil storage tanks present to aquifer contamination.

- An asphalt batch plant shall not be located within the vulnerable portions of a DWSMA unless located on an impervious pad with secondary containment.
- Spraying of truck boxes with oil shall not be conducted within the vulnerable portions of a DWSMA unless located on an impervious pad with secondary containment.

**5) Issue - Groundwater withdrawal related to mining operations.**

Locating a well that may be used to provide wash water or to dewater the site should address the impacts that pumping may have on changing the capture zone for the public water supply well(s). Altering the capture area may require changing the boundaries of the wellhead protection area, add potential contamination sources, and increase the rate of vertical recharge to the aquifer used by the public water supply well.

- Prior to locating a well that may be used to provide wash water or to dewater the site the applicant shall address the impacts that groundwater pumping may have on altering the DWSMA boundary or vulnerability of the public water supply well(s).
- A groundwater appropriation permit is required from the Minnesota Department of Natural Resources prior to any use of a high capacity well associated with a mining operation.

**6) Issue – Wells in mining areas.**

Wells that are constructed into or through the aquifer(s) used by a public water supply well(s) may become direct pathways for contaminants to enter the aquifer if: 1) they were not properly constructed, 2) they are not adequately maintained, or 3) contaminants are stored or used too close to them. Therefore, all wells within proposed mining areas should: 1) be accurately located, 2) be constructed according to MDH standards, and 3) determine status of use.

In 1999, the U.S. EPA finalized the *Underground Injection Control Regulations for Class V Injection Wells*, known as the Class V Rule, Phase 1. The Class V Rule establishes minimum federal standards for two types of Class V wells that are of concern in a DWSMA: *large-capacity cesspools* and *motor vehicle waste disposal wells*. These types of wells are also known as *shallow disposal systems*. The Class V Rule also established an inventory and permitting process for large capacity septic systems.

- Prior to mining, an inventory of all wells, including shallow disposal systems, shall be conducted within the portions of a DWSMA proposed for mining activities.
- Prior to the start of mining operations, all water supply wells located within the proposed area to be mined shall be reviewed by a licensed well driller to determine if the well(s) require repair or sealing in accordance to MN Chapter 4725.

- All potential contaminant sources shall meet state required setbacks to all wells.
- Construction of new large-capacity cesspools and/or motor vehicle waste disposal wells are prohibited within a DWSMA.
- Existing large capacity cesspools and/or motor vehicle waste disposal wells must be permitted by the U.S. EPA.

**7) Issue - Illegal dumping or other uses of mining areas.**

Mining areas should be managed by controlling access to prevent the public from using mining areas to dispose of waste or other unwanted material or for recreational activities. Without proper access controls, mining areas can become a disposal area for materials such as old vehicles and equipment, demolition debris, industrial/commercial waste, household wastes, tires and similar types of wastes. This can create nuisance conditions that may be detrimental to human health.

- Mining areas shall be managed to prevent the public from using mining areas to dispose of waste, vehicles and equipment, demolition debris, industrial/commercial waste or other unwanted material.
- Mining areas shall not be used for recreational purposes such as off-road vehicles, discharging firearms or other similar types of land uses unless specifically allowed as part of the mining permitting process.
- Mining areas shall not be used for stockpiling or spreading of animal manures.

**8) Issue - Site reclamation.**

Plans for reclaiming land that is mined or stripped of geologic cover should address how future land use or the surface-water drainage will be controlled to reduce the direct infiltration of contaminants into the aquifer. Proposed land-use practices other than open space should be evaluated for their potential risk to groundwater quality. Also, surface drainage from adjacent properties must be diverted away from the mining area so that it does not infiltrate into the ground or directly enter groundwater in areas where aggregate or minerals are exposed or where the water table is exposed in a former pit.

- Plans for reclaiming land that is mined or stripped of geologic cover shall address how future land use or the surface-water drainage will be controlled to reduce the direct infiltration of contaminants into the aquifer.
- Site reclamation plans shall use a minimum of two (2) foot contours.
- Proposed land-use practices shall be evaluated for their potential risk to groundwater quality.
- Surface drainage from adjacent properties shall be diverted away from the mining area so that it does not infiltrate into the ground or directly enter groundwater in areas where aggregate or minerals are exposed or where the water table is exposed in a former pit.
- Reclamation shall be phased in as mining progresses, with public water supply well time of travel areas having the highest priority for reclamation.
- Topsoil shall be replaced over all portions of a vulnerable DWSMA to a depth sufficient to support vegetation.
- Vegetation used for reclamation shall be native species or similar species that do not require regular or seasonal applications of nutrients or pesticides.

**Definitions:**

Drinking Water Supply Management Area (DWSMA) – See MN rules, Chapter 4720.5100, Subp. 13.

DWSMA Vulnerability - See MN rules, Chapter 4720.5100, Subp. 14.

Groundwater - See MN rules, Chapter 4720.5100, Subp. 17

Public Water Supply Well - See MN rules, Chapter 4720.5100, Subp. 29

Time of Travel - See MN rules, Chapter 4720.5100, Subp. 36

Well Vulnerability - See MN rules, Chapter 4720.5100, Subp. 42