

SUBJECT:	Geo-hydrology
DATE:	November 1, 2001 - Revised 09-01-06

Legal Authority: 22-4-5(c)(9), 22-4-8, 38-3-9.3.1, 38-3-10.b

Overburden Analysis and Toxic/Acid Material Handling

22-4-5(c)(9), 22-4-8 and 38-3-10.b authorize overburden sampling and analysis and special handling of toxic overburden strata.

The predominant and preferred method for collecting overburden samples is through “hollow-stem” core drilling. “Highwall sampling” or similar methods can be approved on a case-by-case basis. “Air rotary” drilling and collection of “chip” samples is an inaccurate and imprecise method of sampling and is not accepted.

“Acid-Base Accounting” is the widely used method for determining the acid-producing potential of strata. This overburden analysis procedure shall be performed in accordance with standard procedures outlined in Environmental Protection Agency Manual No. 600/2-78-054 (Field and Laboratory Methods Applicable to Overburdens and Minesoils) or other approved methods by the Department of Environmental Protection. DEP recommends that Acid Base Accounting be conducted using the Hydrogen Peroxide Rinse Method. Not all quarry operations (especially limestone quarries) contain acid-producing overburden, therefore acid-base data is not always a requirement.

The spacing and number of overburden test holes or sites shall be determined at the discretion of the permit reviewer. Previous experience and correlation from existing data can also be utilized at the discretion of the permit reviewer.

The adequacy of toxic strata handling plans are to be determined at the discretion of the permit reviewer. The following are requirements in the Rules:

38-3-8.3 Treatment of Toxic material

- 1) Any acid-forming, toxic-forming, combustible materials, or any other waste materials that are exposed, shall be covered with a minimum of four (4) feet of non-toxic and non-combustible material.
- 2) Where necessary to protect against the upward migration of salts, exposure by erosion, to provide an adequate depth for plant growth, or to otherwise meet local conditions, the director shall specify thicker amounts of cover using non-toxic material.

38-3-9.3.b.1 Durable Rock Fills

- 1) The durable rock shall not consist of acid-producing or toxic-forming material.

Acid-forming or toxic-forming material must not be placed in any valley fills, whether durable rock or “conventional” valley fills.

SUBJECT: Pre-Quarry Water Assessment

DATE: June 11, 2001 - Revised 09-01-06

Legal Authority 22-4-5(b)(7), 38-3-3.5.a

Pre-Quarry Water Assessment

Title 38 Series 3 Section 3.5.a. states that “Each new application for a quarrying permit shall contain a pre-quarrying water assessment. A water assessment shall also be required for a permit modification which has the potential to affect the hydrology in a manner which was not addressed in the original permit.”

Six months of baseline data (within a 12 month period) is required for this assessment prior to permit approval or denial. This shall be provided for surface and groundwater monitoring sites that are deemed necessary by the permit reviewer. This data should be fairly recent (within the past 2 years), or if the data is older, some supplementary data may be required to update the data with current conditions. In addition to the water quality parameters listed in 38-3-3.5.a.2 and the water quantity parameters listed in 38-3-3.5.a.3, total depth measurements and static water levels may be required of water wells and measured flow rates may be required of flowing springs.

The Department of Environmental Protection encourages the use of existing groundwater sources for groundwater monitoring points, but may require, when deemed necessary, the drilling, casing, and development of monitoring wells.

Groundwater Inventory – A Groundwater Inventory shall also be conducted as part of the pre-quarry water assessment. At a minimum, all groundwater sources within 1,500 feet radius of the bonded permit area shall be inventoried, although, a larger area may be required at the discretion of the permit reviewer. This Groundwater Inventory shall contain, at a minimum, the following information and data:

- One baseline quality sample of all groundwater sources identified. The parameters listed in 38-3-3.5.a.2 must be analyzed.
- A measurement of static water level and total depth must be taken for all wells identified (unless physically impossible), and a measurement of flow rate must be taken for all springs identified (unless physically impossible).

A recommended questionnaire form “Groundwater Inventory Questionnaire” (MR 43) for conducting a Groundwater Inventory can be found on our DMR web site.

**SUBJECT: Quarrying Surface Water and Groundwater
Monitoring Plan**

DATE: November 1, 2001 - Revised 09-01-06

Legal Authority 22-4-14(a)

Quarrying Surface Water and Groundwater Monitoring Plan

The Director shall require as a condition of a new permit, groundwater testing prior to and during quarrying. During quarrying surface water monitoring, as well as groundwater monitoring, shall be required.

Quarterly quality and quantity sampling shall be required of surface and groundwater monitoring sites during the first year of quarrying, and annual sampling shall be done for the next four years.

Water quality analytical parameters shall include total suspended solids, total dissolved solids, specific conductance, pH, acidity, alkalinity, sulfates, total iron, total manganese, and aluminum.

Water quantity measurements shall include total depth and static water level measurements for wells, and flow rate for springs.