



Ohio Administrative Code Rule 1501:14-5-01 Hydrology.

Effective: August 22, 2016

Except as provided in paragraph (C) of this rule, each application for a permit that proposes to dewater shall include the following:

(A) A hydrologic map consisting of a single map using the most recent USGS 7.5 minute topographic maps at a scale of 1:24,000 as a base or other approved format that shall show all of the following:

(1) The proposed permit area;

(2) A line identifying the area encompassing a four mile radius from the boundary of the proposed permit area, to be known as the hydrologic study area;

(3) The location of the cross-sections required under paragraph (B)(5) of this rule;

(4) The location of the selected water supply wells identified in paragraph (B)(4)(a) of this rule and other water sources used for domestic, agricultural, or industrial use including an assigned identification number; and

(5) Any well, well field, reservoir, river, water source used for a public water supply or facility registered under section 1521.16 of the Revised Code on or within the hydrologic study area.

(6) The chief may require additional information within or beyond the hydrologic study area be shown on the map if such identification is necessary based on site-specific conditions.

(B) A hydrogeologic description in sufficient detail to determine the hydrologic cone of depression for the proposed operation.

(1) The description shall include a general statement of the geology within the proposed permit and



hydrologic study area down to and including the deeper of either the first stratigraphic unit below the lowest mineral deposit to be mined or any aquifer below the lowest mineral deposit to be mined. It shall also include the areal and structural geology of the permit and hydrologic study area, and other parameters which may affect the occurrence, availability, movement, quantity, and quality of potentially affected ground waters and shall be based on information available to the applicant from test borings, core drillings, well logs, and geologic literature and practices.

(2) The description shall contain information available in the public domain related to the ground water hydrology for the proposed permit and hydrologic study area, including, at a minimum:

- (a) The elevation and the horizontal extent of the aquifer(s), intervening lithology, and overburden;
- (b) The lithology and thickness of the aquifer(s);
- (c) Known uses of the water in the aquifer(s);
- (d) The elevation of water in the mineral deposit(s), and each water-bearing stratum above and below the mineral deposit;
- (e) The transmissivity of the aquifer(s);
- (f) The storativity of the aquifer(s);
- (g) The hydraulic conductivity of the aquifer(s);
- (h) The specific yield of unconfined aquifer(s);
- (i) The location and elevation of any existing dewatering sumps (including state plane coordinates and north american datum (NAD) year); and
- (j) The rate of discharge of any currently registered water withdrawals shown pursuant to paragraph (A)(5) of this rule.



(3) The description shall include a listing of the published information and data used in preparation of the items in paragraphs (B)(1) and (B)(2) of this rule, and copies of the unpublished records and data used in preparation of these items including, but not limited to, core descriptions, cutting descriptions, stratigraphic descriptions, and pump or slug test records.

(4) The description shall contain a water supply inventory, representing all aquifers. The inventory shall be submitted in a format prescribed by the chief, and shall include, at a minimum:

(a) A listing of water sources in the proposed permit and hydrologic study area as shown pursuant to paragraphs (A)(4) and (A)(5) of this rule. The representative water sources selected shall be chosen to include recently drilled wells, represent all aquifers and producing zones within the aquifers, and reflect a uniform geographical distribution of wells within the study area. The inventory shall include all of the existing water wells if there are fewer than one hundred wells. If there are more than one hundred wells within the study area the inventory shall include one hundred wells plus twenty-five per cent of those wells in excess of one hundred but shall not exceed a total of three hundred. The listing shall include to the extent available the:

(i) Map identification number assigned under paragraph (A)(4) of this rule;

(ii) Ohio department of natural resources, division of water resources number assigned to the log form required to be filed under section 1521.05 of the Revised Code;

(iii) Township;

(iv) Year drilled;

(v) State plane coordinates (including NAD year);

(vi) Surface elevation of the well (feet);

(vii) Total depth of the well in feet below the land surface;

(viii) Depth to bedrock (feet);



- (ix) Description of unconsolidated material;
 - (x) Static water level of the well in feet below the land surface;
 - (xi) Casing length (feet);
 - (xii) Lithology of the screen interval/open borehole;
 - (xiii) Length of any well screen (feet);
 - (xiv) Test rate (gallons per minute);
 - (xv) Duration of test; and
 - (xvi) Drawdown (feet);
- (b) A listing of the location and type of any public water supply sources on the permit and within the hydrologic study area; and
- (c) A copy of the division of water resources well logs for the selected wells.
- (d) An applicant may, prior to submission of an application, request in writing, a reduction of the number and/or extent of the submittals required in paragraph (B)(4) of this rule. The request may be granted only if the chief makes a written determination that this reduction will not diminish the level of accuracy in the ground water model. If there is a disagreement as to the amount or extent of the water resources information necessary, the chief shall consult with the chief of the division of water resources prior to determining the final extent of data necessary. If the chief grants a reduction, the written request and determination shall be submitted with the permit application.
- (5) The application shall contain a minimum of two perpendicular hydrogeologic cross-sections of the same scale for the study area based on available information and at a minimum shall:



- (a) Be of uniform horizontal scale;
 - (b) Be of uniform vertical scale;
 - (c) Depict the information required in paragraphs (B)(2)(a), (B)(2)(b), (B)(2)(d), and (B)(2)(i) of this rule;
 - (d) Intersect the center of the proposed operation; and
 - (e) Include the data points used to construct the cross section.
- (6) Where information required in the water supply inventory of paragraph (B)(4) of this rule is unobtainable, a statement to that effect shall be submitted, giving the reasons therefor.
- (C) Ground water model submitted by the applicant.

An applicant for a permit may choose to submit a ground water model with his or her application for a permit that defines the projected cone of depression for the proposed operation. The model must accurately reflect the ground water flow conditions associated with the hydrologic study area and be consistent with ASTM international standards. The website for ASTM international is <http://www.astm.org/>. The submission shall include detailed explanations of the hydrologic and geologic parameters used to construct the model and the model results must be submitted in a format prescribed by the chief.

A ground water model submitted to the chief must be a three-dimensional ground water flow model utilizing finite difference modeling software such as MODFLOW. MODFLOW is available from the U.S. geological survey at the website <http://water.usgs.gov/nrp/gwsoftware/modflow.html>. An applicant may request the chief to accept a two-dimensional ground water flow model using finite difference software, provided the chief determines, based on written justification submitted with the request, that the model will accurately represent the ground water flow in the hydrologic study area.

- (D) Staging of the projected cone of depression.



(1) An applicant for a permit may request the chief to establish the projected cone of depression in stages to reflect the development of the dewatering operations over the life of the proposed permit. Such staged cone of depression shall reflect a maximum of four vertical or horizontal sump locations within the proposed permit area. For each stage, the applicant shall identify the sump location and elevation and the part of the permit to be dewatered.

(2) If the applicant submits a staged ground water model under paragraph (C) of this rule, the projected cones of depression shall be depicted on the map(s) submitted under paragraph (A) of this rule. The responsibility for water replacement within the cone of depression provided in division (B) of section 1514.13 of the Revised Code will be based on the cones of depression established by the chief at the time of permit issuance. For the purposes of division (B) of section 1514.13 of the Revised Code, where horizontal staging of the cone of depression is accepted for a proposed permit area, the cone of depression applied to water replacement responsibilities will be based on the cumulative boundary of the cones of depression of the permit area affected at the time of the complaint.

(3) If the projected cone of depression is staged, the permittee must identify the exact location, elevation, and pumping rate of the dewatering sump(s) for the surface mining operation on each annual map required under section 1514.03 of the Revised Code. The permittee must notify the chief in writing at least sixty days prior to altering the horizontal or vertical location of the dewatering sump.

(E) For applications that include a ground water model submitted under paragraph (C) of this rule and meet all other permit requirements of Chapter 1514. of the Revised Code, the chief may issue a surface mining permit conditioned on final review and approval of the ground water model, provided the applicant submits a ground water model pursuant to paragraph (C) of this rule that also contains a preliminary regulatory ten-foot cone of depression map based upon guidelines established by the chief. The permittee shall comply with the final cone of depression as established by the chief.