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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276 Mary A. Gade, Director

(217)524-6365

June 29, 1998

Ms. Nancy J. Rich
Katten Muchin & Zavis
525 West Monroe Street
Suite 1600
Chicago, IL 60661-3693

RE: L0971900047 Lake
Waukegan Manufactured Gas and Coke Plant
Superfund/Tech

Dear Ms. Rich:

Per our conversation this afternoon, please find enclosed a copy of the Illinois EPA's "Procedure For Determination of a Class II Groundwater".

If you have any questions please contact me.

Sincerely,

Gerald E Willman

Gerald E. Willman
Project Manager
NPL Unit
Bureau of Land

Attachment

cc: **Michael Bellot w/ attach.**
Division File w/ attach.

PROCEDURE FOR DETERMINATION OF A CLASS II GROUNDWATER

The Illinois Pollution Control Board adopted the Groundwater Quality Standards at 35 IAC Code 620, in November 1991. Included in this rulemaking are criteria for classifying groundwaters for purposes of determining the appropriate level of protection (i.e. applying the appropriate quality standards). Unless site-specific information demonstrates otherwise, the Bureau presumes that groundwater must meet Class I standards. The following is a procedure to demonstrate that groundwater beneath a facility does not meet the Class I criteria set forth in Section 620.210 and therefore, need only meet the Class II groundwater quality standards. The class of a groundwater is independent of its actual quality, except for certain Class IV groundwater.

Groundwater is classified in 35 IAC 620 as a Class II, general resource, groundwater when it:

1) Does not meet the provisions of Section 620.230 (Class III) or Section 620.240 (Class IV); (Determining whether the groundwater is Class III or Class IV is relatively straight forward, as is the requirement to determine if the groundwater has previously been classified as Class II groundwater by the Board.)

2) Has been found by the Board to be a Class II groundwater, pursuant to the petition procedures set forth in Section 620.260; (If a continuous zone containing groundwater begins within 10 feet of the ground surface and extends greater than ten feet below the ground surface it will not be considered a Class II groundwater if an additional criteria is met under 620.210, in this case it would be considered Class I groundwater. Although it may be possible, it is unrealistic to try and designate two distinct classes of groundwater within the same saturated hydrogeologic unit. But, if a facility can demonstrate that by cleaning the groundwater within ten feet of the surface to Class II specifications will not degrade the groundwater greater than 10 feet below the ground surface above Class I standards, the Agency may approve both Class I and II standards in accordance with the location of the groundwater.)

3) Is located less than ten feet below the ground surface; or,

4) Does not meet the provisions of Section 620.210,

which is further discussed in paragraphs (A) through (D) below.

Initially, the sources of information listed below should be considered to determine the appropriate classification of groundwater:

1. Published data concerning regional and local geologic and hydrogeologic conditions. (i.e. geologic surveys, former site investigations, etc.)

2. The locations of all potable water wells located within one mile of the site with the logs and/or dates of well completion attached.

3. Available on site boring logs which characterize the geology from ground surface to the first saturated unit or, if a perched zone is present, the first saturated unit below the perched zone.

If after collecting and reviewing the above information the groundwater is clearly not a Class II groundwater and one still wishes to pursue classification as Class II groundwater, further investigation including site specific information should be utilized to make a determination that the groundwater is subject to the Class II standards. If the site geology or hydrogeologic properties pass all criteria listed below, the groundwater is a Class II groundwater. The information requirements listed describe the minimum documentation which should be provided to IEPA.

A. Groundwater cannot be located within the minimum setback of a well which serves as a potable water supply and to the bottom of such well;

The minimum setback zone of a well extends from the land surface to the bottom of the well as determined by the screen depth. This establishes a three-dimensional zone of protection around the well.

Section 14.1 of the Environmental Protection Act establishes minimum setbacks of less than 200 feet for a private water supply well or less than 400 feet for a public water supply well unless the specified minimum setbacks have been expanded under the Wellhead Protection Program and the Illinois Groundwater Protection Act.

This requirement may be satisfied by the submission of a scaled map delineating the site and all potable water wells located within a one mile radius from the unit/s of concern. The Illinois State Water Survey and/or the Division of Public Water Supplies of the Illinois

Environmental Protection Agency should be contacted, as well as other appropriate state and federal entities, to obtain this information. A copy of the state or federal agencies response to an information inquiry should be included with the information submitted by the facility. Also, a visual inspection of the area within 200 feet of the unit/s of concern should be conducted when possible to detect unlogged private wells.

B. Formations beneath the facility cannot consist of unconsolidated sand, gravel or sand and gravel which is 5 feet or more in thickness and that contains 12 percent or less in fines (i.e. fines which pass through a No. 200 sieve tested according to ASTM Standard Practice D2488-84, incorporated by reference at Section 620.125);

This criterion is specific to the type formations listed. If a zone of saturation fails this Class I criterion, Class I may still apply pursuant to D below.

This criterion may be satisfied by the submission of, at a minimum, one site specific, continuously sampled boring log which clearly identifies the saturated interval from which a representative sample was obtained. Sieve test analysis should be conducted on several samples from each saturated interval which is at least five feet in thickness and composed of sand-sized grains or greater. In addition, the facility should submit the sieve data sheet, plot and a scaled map which identifies the location of each boring.

C. Formations beneath the facility cannot consist of sandstone which is 10 feet or more in thickness, or fractured carbonate which is 15 feet or more in thickness; or

This requirement may be satisfied by the submission of, at a minimum, one site specific, continuously sampled boring log with a description of the geologic material present. This boring log should extend from the ground surface to a depth which is 10 feet into the uppermost water-bearing unit subject to Class I standards or bedrock, whichever is shallower. The boring(s) should be continuously sampled and located on a scaled site map. A representative sample, as used previously, is a sample obtained from each distinctive saturated unit within the boring. Also, a literature search of regional and local geologic conditions should be conducted with the results submitted to the Agency.

D. Any geologic material which is not capable of a:

1. **Sustained groundwater yield, from up to a 12 inch borehole, of 150 gallons per day or more from a thickness of 15 feet or less; or**

   This requirement may be satisfied by the submission of continuously sampled boring logs which demonstrate aquifer thickness. In addition, as-built well construction diagrams should also be submitted to the Agency for review. Furthermore, a pump test or equivalent must be conducted to determine the yield of the geologic material. Methodology, assumptions and any calculations performed should also be submitted to meet this requirement. If the aquifer geometry and transmissivity have been obtained through a site-specific field investigation, an analytical solution may be used to estimate well yield. The facility must demonstrate the appropriateness of an analytical solution to estimate well yield versus an actual field test. Well yield should be determined for either confined or unconfined.

2. **Hydraulic conductivity of 1 X 10^{-4} cm/sec or greater using one of the following test methods or its equivalent:**

   This requirement may be satisfied by performing field and/or lab tests such as a permeameter, slug test and/or pump test.

   An appropriate method of evaluation should be chosen based on the type of wells, the length of time over which data may need to be collected and, if known, the characteristics of the targeted aquifer. Such methods and the suggested information to be submitted to the Agency are outlined below and include:

   i. Permeameter;

      If this method is chosen, samples of unconsolidated materials should be left in the field-sampling tubes which then becomes the permeameter sample chamber. Proceeding in this manner should allow as little disruption to the sample as possible. Unconsolidated samples should not be repacked into the sample chamber. An outline of the laboratory test method used and a description of the steps followed including any calculations should be submitted to the Agency for review.

ii. Slug tests; or

The information to be submitted to the Agency should include a description of the slug test method utilized and a discussion of the procedures followed during the tests, including any calculations performed.

A significant drawback to performing a slug test is that it is heavily dependent on a high-quality intake. If a well point is clogged or corroded, measured values may be inaccurate. Also, if a well is developed by surging or backwashing prior to testing, the measured values may reflect increased conductivities in the artificially induced gravel pack around the intake (Freeze and Cherry, 1979). If slug tests are chosen, a sufficient number of tests should be run to ensure that representative measures of hydraulic conductivities have been obtained and that lateral variations at various depths are documented (TEGD, 1986).

iii. Pump tests.

Preliminary or short-term drawdown tests should be performed initially to assess the appropriate pumping rate for the constant-rate tests. Several methods and/or equations may be used in evaluating data generated from pump tests such as Theis, Hantush-Jacob, Hvorslev and/or Theim equations. The method(s) of evaluation selected should be provided to the Agency with justification for their use, explanations of any assumptions made and examples of all calculations performed along with a description of the physical tests performed including the type of pump used.

Two problems that should be considered are (1) storage of potentially contaminated water pumped from the well system and (2) potential effects of groundwater pumping on existing waste plumes (TEGD, 1986). Any groundwater pumped from wells in an area where there is a potential for contamination during either a yield test or hydraulic conductivity test should be containerized and tested to determine whether its contents would be a special waste . This will aid the facility in determining whether any special permits are needed for disposing of the

groundwater properly. Caution should be used when performing groundwater yield tests for extended periods of time, so that any contaminant plume present or suspected is not significantly altered.

NOTE: It may be beneficial to use laboratory evaluation methods to further support results of field tests; however, field methods provide the best definition of the hydraulic conductivity in most cases (TEGD, 1986). The most appropriate method to determine hydraulic conductivity for most sites will be the pump test provided proper evaluation of the data obtained from the test is utilized. Pump tests provide in-situ measurements that are averaged over a large aquifer volume and are preferred since they are able to characterize a greater portion of the subsurface compared to the other aquifer tests. Slug tests provide in-situ values representative of a small volume of porous media in the immediate vicinity of a piezometer tip, providing point values only, and may be more appropriate in very low-permeability materials in which conductivity is too small to conduct a pump test.

WRITTEN BY: KENN LISS
HEATHER YOUNG
FEBRUARY 19, 1993
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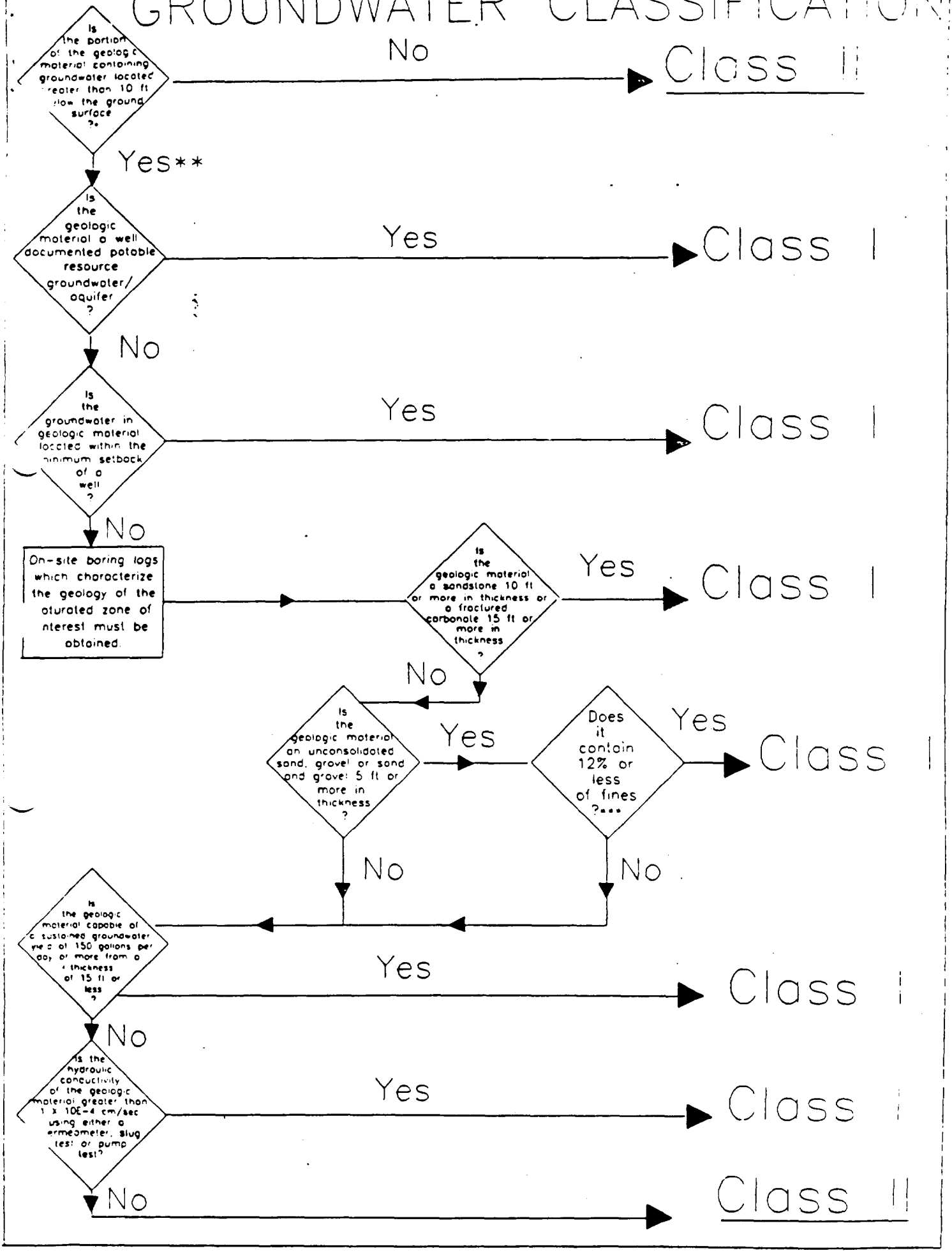
GROUNDWATER CLASSIFICATION



*See Board interpretation on the "10-foot" rule on page 12 of rulemaking R89-14(B).

**For each zone of saturated geologic material to a depth which is 10 ft into the uppermost water-bearing unit subject to Class I standards or bedrock whichever is shallower, the following criteria must be evaluated.

***Multiple representative samples obtained from the geologic material beneath the facility must fail to meet this criteria.