**Section 730.106 Area of Review**

The area of review for each injection well or each field, project, or area in Illinois must be determined according to either subsection (a) or (b). The Agency may solicit input from the owners or operators of injection wells within Illinois as to which method is most appropriate for each geographic area or field.

a) Zone of Endangering Influence.

1) The zone of endangering influence must be the applicable of the following:

A) In the case of an application for a well permit pursuant to 35 Ill. Adm. Code 704.161, that area the radius of which is the lateral distance in which the pressures in the injection zone may cause the migration of the injection or formation fluid into an underground source of drinking water; or

B) In the case of an application for an area permit pursuant to 35 Ill. Adm. Code 704.162, the project area plus a circumscribing area the width of which is the lateral distance from the perimeter of the project area, in which the pressures in the injection zone may cause the migration of the injection or formation fluid into an underground source of drinking water.

2) Computation of the zone of endangering influence may be based upon the parameters listed below and should be calculated for an injection time period equal to the expected life of the injection well or pattern. The following modified This equation illustrates one form that the mathematical model may take.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| r | = | √ |  | 2.25 kHt |
| *S* x 10x |

 where:

|  |  |  |
| --- | --- | --- |
| x | = | 4 π KH (hw -hbo x SbGb) |
| 2.3 *Q* |

|  |  |  |
| --- | --- | --- |
| r | = | Radius of endangering influence from injection well (length) |
| k | = | Hydraulic conductivity of the injection zone (length/time) |
| H | = | Thickness of the injection zone (length) |
| t | = | Time of injection (time) |
| S | = | Storage coefficient (dimensionless) |
| Q | = | Injection rate (volume/time) |
| hbo | = | Observed original hydrostatic head of injection zone (length) measured from the base of the lowermost underground source of drinking water |
| hw | = | Hydrostatic head of underground source of drinking water (length) measured from the base of the lowest underground source of drinking water |
| SpGb | = | Specific gravity of fluid in the injection zone (dimensionless) |
| π | = | 3.14159 (dimensionless) |

3) The above equation is based on the following assumptions:

A) The injection zone is homogenous and isotropic;

B) The injection zone has infinite area extent;

C) The injection well penetrates the entire thickness of the injection zone;

D) The well diameter is infinitesimal compared to "r" when injection time is longer than a few minutes; and

E) The emplacement of fluid into the injection zone creates instantaneous increase in pressure.

b) Fixed Radius

1) In the case of an application for a well permit pursuant to 35 Ill. Adm. Code 704.161, a fixed radius around the well of not less than 402 meters (one-quarter mile) may be used.

2) In the case of an application for an area permit pursuant to 35 Ill. Adm. Code 704.162, a fixed width of not less than 402 meters (one-quarter mile) for the circumscribing area may be used.

3) In determining the fixed radius, the following factors must be taken into consideration: the chemistry of injected and formation fluids; the hydrogeology; the population and groundwater use and dependence; and historical practices in the area.

c) If the area of review is determined by a mathematical model pursuant to subsection (a), the permissible radius is the result of such calculation even if it is less than 402 meters (one-quarter mile).

(Source: Amended at 42 Ill. Reg. 24145, effective November 19, 2018)