ZOEI, a Computer Model to Calculate the Zone of Endangering Influence of Class 11 Injection Wells

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    Abandoned or improperly plugged oil and gas wells can constitute an endangerment to underground sources of drinking water by acting as conduits for injected or formation fluids to enter shallow groundwater aquifers. Area of Review is the collation of plugging and well construction details for all boreholes within a specific radius of an injection well. Typically the required radius is one-quarter mile around the injection well, but it can be calculated from site specific data as the "zone of endangering influence" with a modified Theis equation defined in US EPA regulations.

    CH2MHILL developed the ZOEI computer model for the Underground Injection Control Department of the Kansas Corporation Commission, which calculates and graphically plots the pressure and head differences between groundwater aquifers and the injection zone after a predicted period of injection. The ZOEI program was constructed to address requirements of Federal regulation through the calculation of the zone of endangering influence.

    The Kansas Corporation Commission utilizes the ZOEI program for the protection of the State's groundwater resources as part of its Class 11 injection well approval process. Data elements, model limitations, conclusions, and recommended use of zone of endangering influence in the Kansas Class 11 injection program demonstrate the usefulness of the model and its ability to save operators and the KCC time and money.