Dam Seepage Models - Tool, Rules & Guidance (From a Regulatory Perspective)

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Engineers often propose a seepage model as part of a dam evaluation. However, the goal of a seepage model is often not well-defined, and the model output is nothing more than an expensive, colorful picture in an appendix without much insight into the dam. Often, the information needed can be determined by a careful review of the piezometric data. Often, the dam owners don't know what questions to ask of their engineers when a seepage model is proposed. Often, the regulatory agency can't afford the software required to provide careful review and evaluation of a submitted model. Often, a 2-dimensional, steady-state model just flat out won't work for the situation at hand. Often, there is simply not enough information to justify the expense of developing a model. Often, the modeler underestimates the billable hours it takes.

Nonetheless, seepage modeling can be the secret to understanding gradients and flow through a dam and often provide key information needed to plot a path forward. So, what things should regulators and dam owners consider when reviewing an engineering proposal that involves a seepage model? What should engineers consider when proposing a seepage model to a dam owner/regulator? What options do regulatory agencies have when they believe a seepage model will assist them with a regulatory decision?

This paper and presentation will discuss the following:

1. Rules of thumb and guidance to help with the decision of whether to pursue a seepage model.
2. Cautions and advice to avoid the modelling effort from becoming an expensive time sink.
3. A basic seepage modeling software program that the Montana Dept. of Natural Resources and Conservation has found to be an excellent cost-effective aid for the state dam safety regulator.