Criteria for Success

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Criteria for Sucess

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Criteria for Success

*** Understand how the plume is formed in the first place**

***Understand the rate of transport and the rate of attenuation**

***Understand the persistence of the contaminant mass**

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*** Understand how the plume was formed in the first place**

Understand the 3-dimensional distribution of the original source of contamination

Understand the movement of water and vapor through and from the original source

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*** Understand how the plume was formed in the first place**

Does existing ground water contamination make sense based on what is known about the original source material and the hydrogeology of the site?

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***Understand the rate of transport and the rate of attenuation**

What is the natural variation in ground water flow velocity and flow direction?

What is the seepage velocity of the lithology that actually carries the plume?

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***Understand the rate of transport and the rate of attenuation**

What is the mass flux of contaminants?

Is it decreasing along the flow path?

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What is the relative importance in understanding?

hydraulic conductivity

hydraulic gradient

dispersivity

rate of biodegradation

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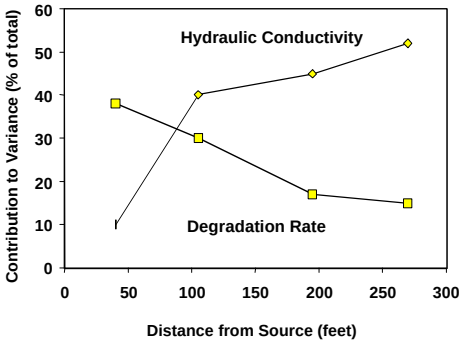
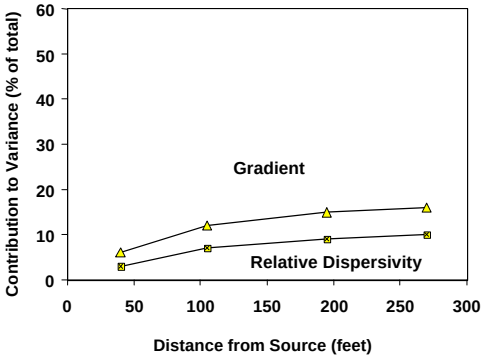
Uncertainty Analyses of Fuel Hydrocarbon Biodegradation Signatures in Ground Water by Probabilistic Modeling

W.W. McNab and B.P. Dooher

Ground Water 36(4):691-698 July August 1998





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***Understand the rate of transport and the rate of attenuation**

What is the confidence in the method used to estimate hydraulic conductivity?

Is the resolution of the monitoring well system defined and documented?

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***Understand the rate of transport and the rate of attenuation**

Will the current rate of attenuation be maintained?

Will an acceptable rate of attenuation be maintained?

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***Understand the rate of transport and the rate of attenuation**

Is there a sufficient supply of electron acceptors or donors to complete attenuation of the contaminants in ground water?

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The resolution of each well in the monitoring well system is the product of:

Lateral distance between adjacent monitoring wells in a transect

Vertical screen interval

Darcy velocity of ground water

Time between samples

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The resolution of each well in the monitoring well system has the units of volume.

Acre feet

Million gallons

Cubic feet.

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When the resolution of the permanent monitoring wells is predetermined, then the monitoring system can designed and scaled to meet that predetermined resolution.

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Evaluate the resolution of monitoring wells along with the concentrations of contaminants and geochemical indicators.

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***Understand the persistence of the contaminant mass**

Evaluate the effectiveness of source control measures

- **Is a new plume forming?**
- **Is the hot spot moving down gradient of the former source area?**

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***Understand the persistence of the contaminant mass**

Statistical estimate of the rate of attenuation of the hot spot, after source control

- **How fast is the old plume going away?**
- **How fast will other remedies approach cleanup goals?**

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***Understand the persistence of the contaminant mass**

Required are a statistical comparison of two rates of remediation, the rate of natural attenuation, and the rate of active remedy.

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***Understand the persistence of the contaminant mass**

The confidence in the comparison is limited by the confidence in the estimate of the two rates.

If the comparison is not expressed with an estimate of confidence, it is worthless.