

Long-Term Monitoring Strategies

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Compliance monitoring vs Long-term monitoring

- ✦ Current strategy is to ring the waste site with detection wells
- ✦ Is this by default the long term monitoring network?
- ✦ How can modeling be used to facilitate monitoring

Current Approaches to Long-Term Monitoring

- ✦ Optimization (ASME others)
- ✦ Data-Quality Objective (EPA)

Attributes of Long-term Monitoring

- **Passive**
- **Robust**
- **Flexible**
- **Utilize leading (failure) indicators**
- **Measure change from baseline**
- **Utilize indicator parameters**
- **Low maintenance**
- **Low cost**
- **Measures volume or flux**
- **Measures of ecological health**

Adherence to these attributes should promote development of non-traditional monitoring configurations

Essence of LTM

- ✦ Measure change from the baseline
- ✦ Establish a “performance envelope” during process monitoring
- ✦ Use indicator parameters
- ✦ If outside the envelope start assessment monitoring
- ✦ Have contingency plans in place

Explicit Use of Mass Balance

- ✦ Natural Systems Approach
- ✦ Understanding the system
- ✦ Model system with scenario testing capabilities

Better Monitoring Capabilities

- ✦ Flux
- ✦ Direct measures of critical parameters
- ✦ Volumetric approaches
- ✦ Indicator parameters
- ✦ Passive samplers
- ✦ Monitoring Configurations

Summary

- ✦ Advance the science of Monitoring
 - ✦ Natural Systems Approach
 - ✦ Contribution of natural attenuation of system
 - ✦ Better measures of Flux
 - ✦ Promote unconventional monitoring networks for Long-term monitoring