Reviewing LTMO Evaluations

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Purpose

- Specifically Discuss Approach to Review of LTMO Results, Since Many Will not Perform Analyses.
- LTMO Studies Require Quality Control/Assurance Review
  - As Client – Perform What was Asked?
  - As Regulator – Appropriate for Site, Consistent with Requirements and Objectives?
- Discussion for Regulators, Applicable for Clients
Overview

Will Cover:

- General Considerations in Review
- Data Amount, Quality, and Comparability
- Evaluation of Recommendations Relative to Hydrogeology and Plume Behavior
- Comparison of Recommendations to LTM Objectives and Regulatory Requirements
- Personnel Qualifications
- Logistical Impacts of Recommendations
- Verification of Estimated Cost Impacts
General Considerations in Review

- Inevitably Requires Some Qualitative Evaluation of LTM Program by Technical Staff
- Review LTMO Recommendations for
  - Adequate Consideration of Subsurface Conditions
  - Adequate Considerations of Objectives, Requirements, Constraints
  - Balance (Look for Both Redundancy and Gaps)
- Documentation (Rationale, Output of Computer Programs)
Data Review

• The LTMO Evaluation Hinges on Historical Data
• Require Some Familiarity with Data
  – Were Samples Collected in Valid Way?
  – Were Analytical Methods Valid?
    • Detection Limits Adequate
    • Dilutions, Qualifiers
  – Errors in Transcription for Use in LTMO?
Data Review, Continued

• Sufficient Amount of Data?
  – More than 6 Past Sampling Events for Temporal Study (including appropriate seasons)?
  – 20-30 Monitoring Point for Quantitative Spatial Analysis?
  – Appropriate Time Frame for Data (e.g., Only Since Start of Remedy)

• Data Comparability
  – Sampling and Analytical Methods
Data Review, Continued

• Red Flags
  – Questions about Data Set
    • Poor Quality (Field or Lab)
    • Elevated Detection Limits Relative to Standards/Goals, Differences in Dilutions
    • Mixed Data
    • Non-Representative Conditions
      – Pre-Remediation
      – Drought, Flood, etc.
  – Insufficient Data
LTMO Recommendations and Site Hydrogeology

- Review Requires Technical Knowledge of Site Conditions and Hydrogeology
- Have Well Developed Conceptual Model
- Consider
  - Speed of Contaminant Transport (Does Proposed Frequency Account for Time to React?)
  - Definition of Preferred Pathways (e.g., Fractures, Channels, Pumping Wells?)
  - Vertical Distribution of Wells (Retain Wells in All Applicable Contaminated Aquifers, Levels?)
  - Plume Behavior (Degradation/Dispersion, Burial by Recharge)
- Assumptions in Methods Consistent with Site Conditions?
Review of Recommendations Relative to Monitoring Objectives

• Verify Real LTM Objectives were Stated in Report

• Compare Recommended Frequency and Network (and Analytical Changes) to Objectives
  – Adequate to Assess Migration Outside the Current Plume Boundaries?
  – Adequate to Assess Progress toward Remediation
  – Adequate to Assess Unexpected Behavior (e.g. Rebound, Outside Contaminants)
  – Adequate to Provide Early Warning to Exposure Point
  – Meet Stakeholder Concerns?
Review of Recommendations for Other LTM Aspects

- Recommendations of LTMO May Address other Aspects
  - Proposed Changes to Sampling Methods
  - Proposed Changes Analytical Methods
- Proposed Methods Must Provide Data of Adequate Quality
- Adequate Steps Should be Taken to Assess Comparability of Past, Future Data
- Are there Plans for Documentation of Changes to LTM Program in Revised Sampling and Analysis Plan?
Review for Regulatory Compliance

- Do Recommendations Meet Minimum State and Federal Regulatory Requirements?
  - Permit Requirements (or Propose Changes in Manner Consistent with Regulatory Program)
  - Minimum Sampling
    - Upgradient and Downgradient
    - Spacing of Perimeter Wells
    - Point of Compliance Wells
    - Within Plume
  - Analytical Parameters (Long List is Unchanged by LTMO Process, but is Monitored Less Frequently)
Review for Regulatory Compliance, Continued

• Do Recommendations Meet Minimum State, Federal Regulatory Requirements (Continued)?
  – Minimum Number of Sample Rounds and Seasonal Sampling Required by Regulation
  – Appropriate Statistical Analysis
  – Applicable Regulatory Monitoring Program
    • Corrective Action Monitoring Program
    • Detection Monitoring Program after Corrective Action Complete
Other Review Considerations

• Personnel Qualifications
  – Look for Qualifications in Workplan
  – Adequate Technical Competence of Preparer
    • Hydrogeology
    • Statistics
    • Professional Registration
  – If not Qualified, What Next?
• Logistical Considerations
  – Sample Timing (Weather Conditions)
  – Combining Sampling Rounds, Avoid Multiple Mobilization, Require Different Equipment
  – Availability of Wells for Sampling (e.g., Seasonal Homes, Irrigation Wells)
Verification of Cost Impacts

• Particularly for Managers, Clients
  – Verify that Baseline Costs Appropriately Stated
  – Evaluate Assumed Hourly Rates, Analytical Costs
  – Evaluate Reasonableness of
    • Time and Analytical Savings
    • Crew-Size Changes (Maintain Safety)
    • Include Mob Costs and Preparation/Coordination
  – Assess Impact on Reporting and Data Management
  – Assess Costs for Additional Monitoring Wells in Light of Past Costs for Similar Wells
Summary

• Some Qualitative Assessment Needed
• Requires Understanding of Site Conditions
• Clear LTM Objectives a Must
• Assure Adequate Data Amount and Quality for Site Decisions
• Reality of Cost Projections
• Now Better Prepared to Assess the Adequacy of the LTMO