Characterization of Field Experimental Sites at Hanford's 300-Area IFC Site

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Office of Science
U.S. DEPARTMENT OF ENERGY

Environmental Remediation Sciences

April 16-19, 2007

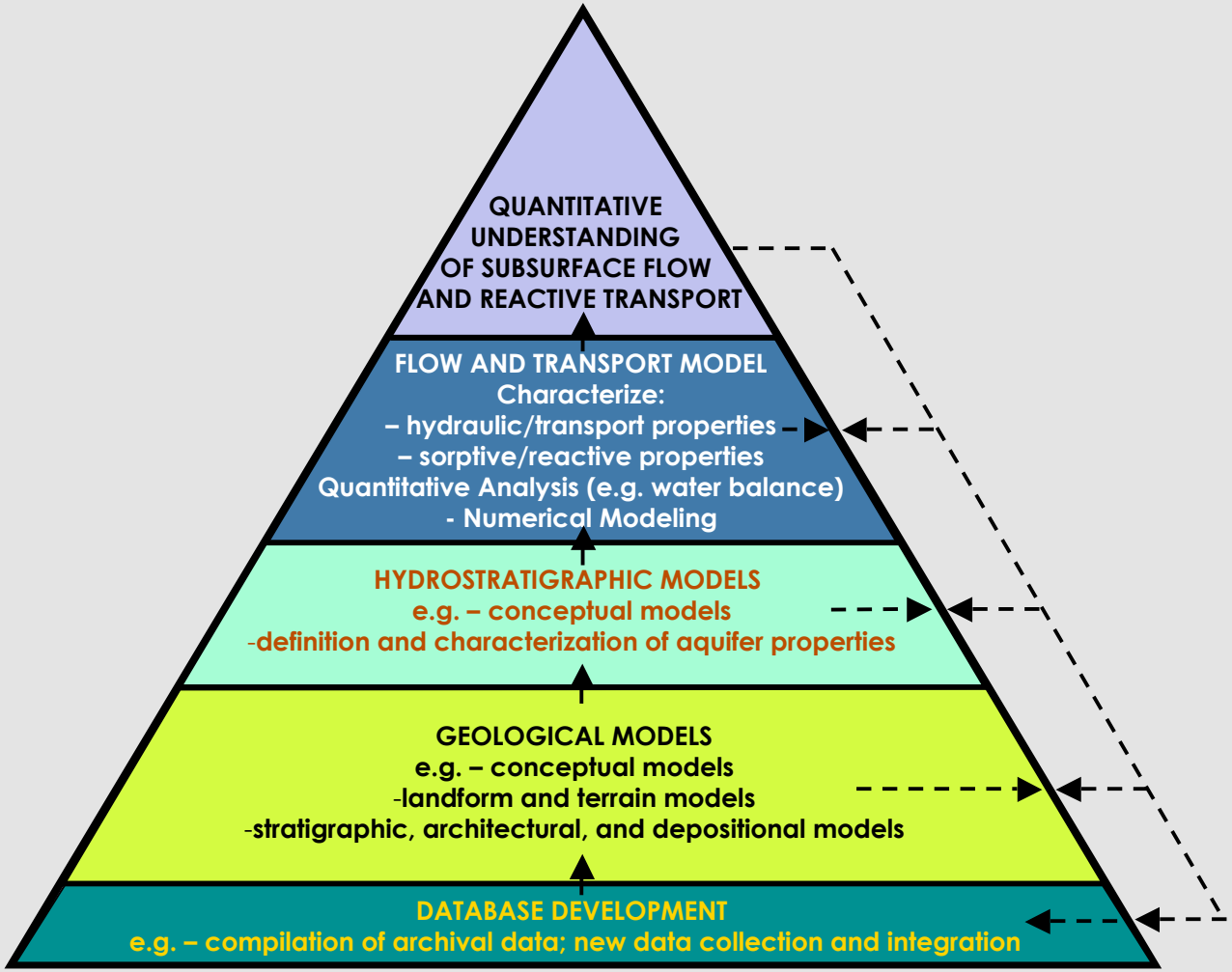
Pacific Northwest National Laboratory

U.S. Department of Energy

Primary Goal

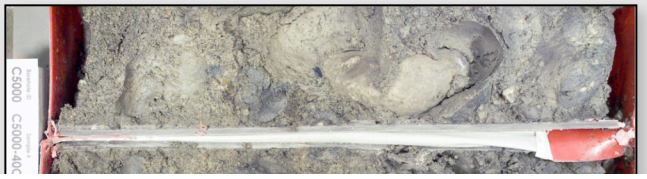
- Develop quantitative model of heterogeneity that incorporates dominant features at the significant scales, and
  - reflects geologic variability
  - reflects multi-scale nature of stratigraphy
  - honors core and well log data
  - forms basis of conceptual hydrostratigraphic models

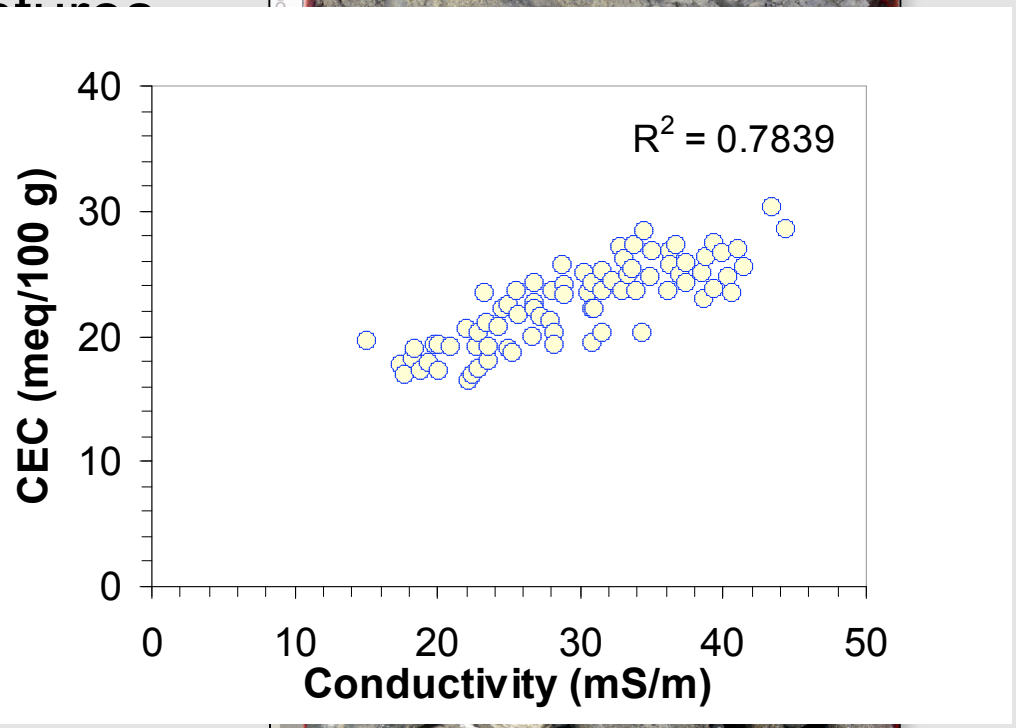
Approach


QUANTITATIVE UNDERSTANDING OF SUBSURFACE FLOW AND REACTIVE TRANSPORT
FLOW AND TRANSPORT MODEL
Characterize:
– hydraulic/transport properties
– sorptive/reactive properties
Quantitative Analysis (e.g. water balance)
- Numerical Modeling
HYDROSTRATIGRAPHIC MODELS
e.g. – conceptual models
-definition and characterization of aquifer properties
GEOLOGICAL MODELS
e.g. – conceptual models
-landform and terrain models
-stratigraphic, architectural, and depositional models
DATABASE DEVELOPMENT
e.g. – compilation of archival data; new data collection and integration

Sedimentary Facies Concept

- Classifies formation using primary sedimentary fea
  - No need to identify textur
  - Size statistics, surface ar mineralogy, fabric
- Sediment properties pri controlled by granulome
- Sedimentary facies
  - Electrofacies
  - Lithofacies
  - Hydrofacies
  - Chemofacies
  - Biofacies





Subsurface Characterization Workflow

Mapping
Surface Geophysics
Interpret Geophysical Images

Data input
Information management
GIS database

Borehole Logging
Log Interpretation
Transition Probabilities
Well Correlation
Surface Identification and Mapping

Calibration
History Matching
Sensitivity Analysis
Management Decisions
Design, Implement Remedy

Data Spatial Analysis
Facies Modelling
Transition Probabilities
Borehole Testing

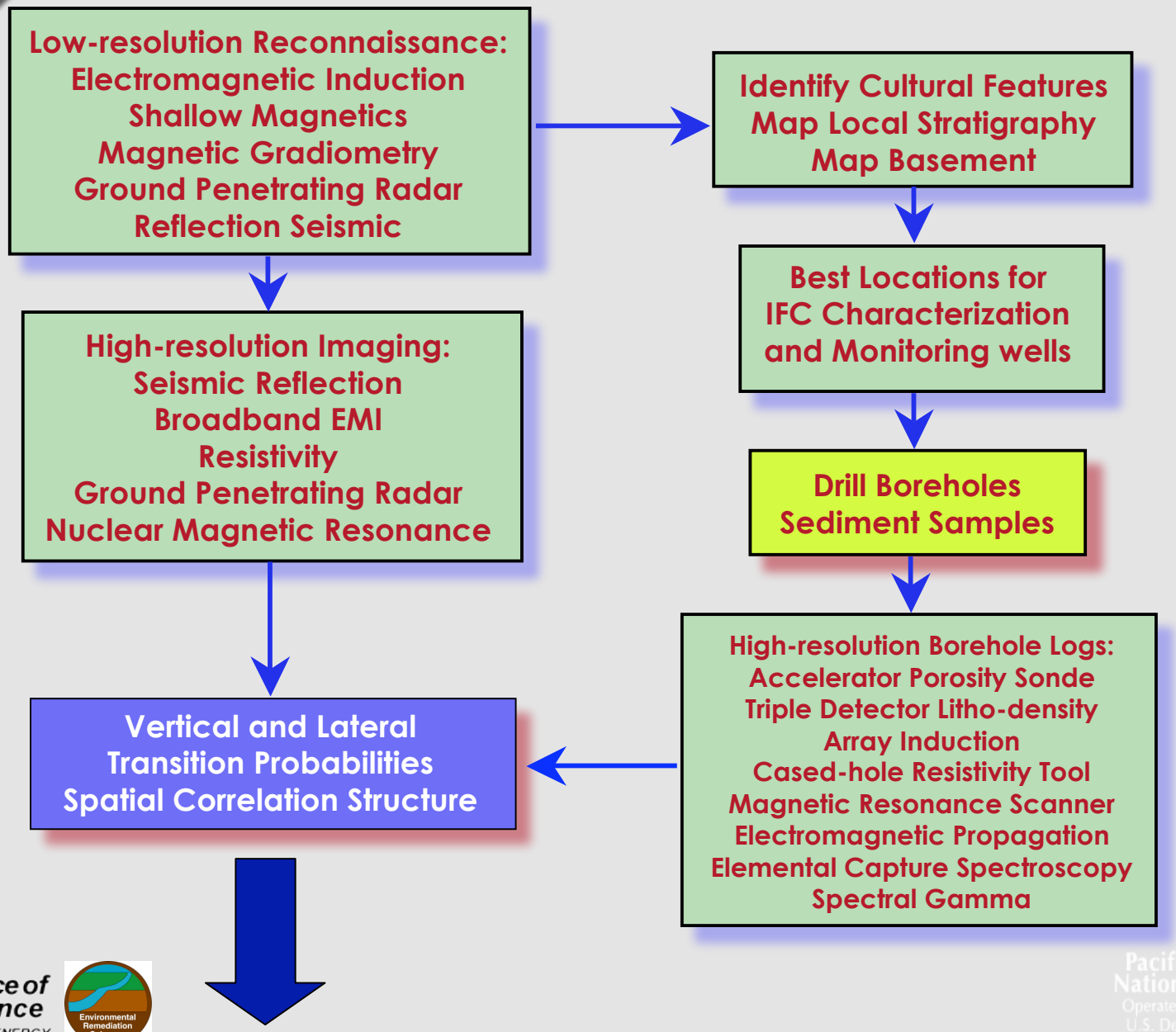
STOMP

3D Flow and Transport simulation
Multi-phase, Density-dependent Flow
Fully-coupled Energy Equations
Modeling of Geochemical Reactions

3D Geological Model
Geological Conceptual Model
3D Flow/Transport Property Model
Upscaling to Simulation Grid

Uncertainty Analysis
Upscaling of Processes
Flow/Transport Property Population

Hydrogeophysical Workflow 300 Area IFC



Workflow for Quantitative Hydrostratigraphy