# Graphical Core Logging: Maximizing Your Opportunity to Observe Actual Subsurface Conditions

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**Background/Objectives.** Borehole logs provide an elementary and critical piece of data which must not be neglected during a high-resolution site characterization program. They are one of a project teams' primary links to the reality of a site's subsurface geologic conditions. Yet, because drill rigs and drillers' time are often the primary cost for a field program, we sometimes neglect the importance of detailed logging as a means of capturing this important snapshot of conditions in the detail that it deserves. Unfortunately, our industry has accepted a high degree of variability in log quality and resolution as the norm for this critical geological data. Improving log quality and resolution of observations through the log form and practices presented here will positively impact all other facets of site characterization, conceptual site model development, and remediation system design.

**Approach/Activities.** Traditional logging forms provide three basic data tracks: 1) a record of analytical sample collection, 2) a Unified Soils Classification System-based lithic description and notes column, and 3) drilling observations column (blow counts, etc.). Traditional forms capture geologic data in paragraph format where the description of important parameters is often inconsistent. Additionally, writing text descriptions is time consuming and consequently inhibits the collection of high resolution logs. Our revised approach focuses on using graphical methods for data capture resulting in an efficient, consistent, and higher resolution alternative to traditional logging formats. Our logging sheets use discrete data tracks to capture detailed sediment characteristics such as visual percentage estimates of grain-size fractions, sorting, composition, cementation, and color. Each data track provides a visual cue to field staff that information is required, improving the consistency of the data collected. Our form also includes a graphical scaled stratigraphic column which documents the vertical relative grain size trends, nature of geologic contacts, sediment moisture, physical and biological structures, and other observations, all of which are necessary when developing correlations based on depositional morphology. Working together, the detailed visual sketch and discrete data tracks provide a system of checks and balances that ensure a robust and accurate representation of sediment observations.

**Results/Lessons Learned.** Progressing from a brief stratigraphic sketch to filling in the geologic data tracks, this technique is efficient and promotes high resolution observation and standardized data quality across multiple teams/loggers. Our form functions like a SOP immediately present in front of staff and is a useful reminder and field aid regarding the type and quantity of data to be captured during drilling. Graphical logging formats make digital capture of the geologic information easy; ideal for integration with field computers/tablets. Digital data sets that place geologic observations into 3D space along with analytical and hydrologic data are critical when considering contaminant fate and transport, or optimizing remediation system design and are an increasingly important component of site CSM development.