

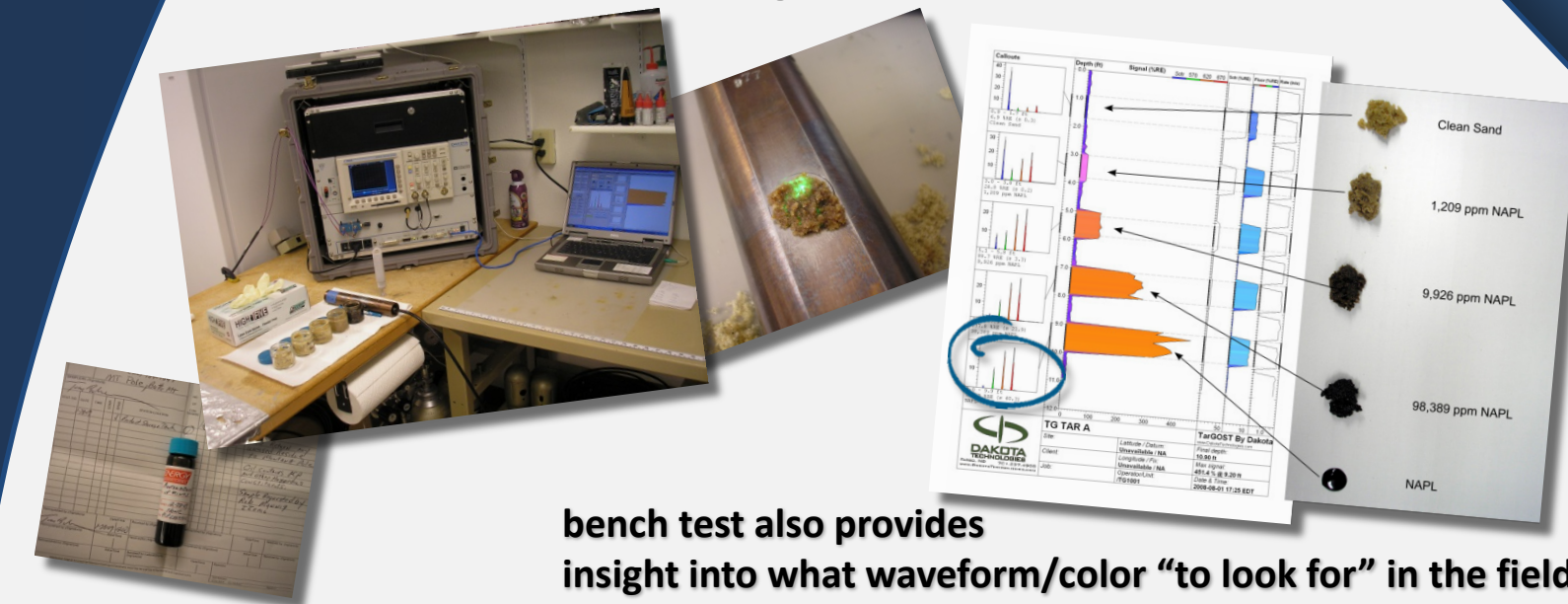
what is TarGOST®?

- Tar-Specific Green Optical Screening Tool – a direct push delivered probe that responds to coal tar and creosote NAPLs in real time
- laser light pulses exit a sapphire window in the probe near the tip
- polycyclic aromatic hydrocarbons (PAHs) in tar absorb the laser light
- PAHs emit that energy a few nanoseconds later in the form of light
- three laser-induced fluorescence (LIF) pulses are recorded every inch
- real time creation of highly detailed logs of coal tar, creosote (and other fluorophores like wood and peat) vs. depth
- typical production is 340 ft/day across 10-15 locations
- TarGOST surveys yield the information needed to create a conceptual site model (CSM) of the non-aqueous phase liquid (NAPL) body (the “source term”)
- does NOT respond to dissolved phase PAHs

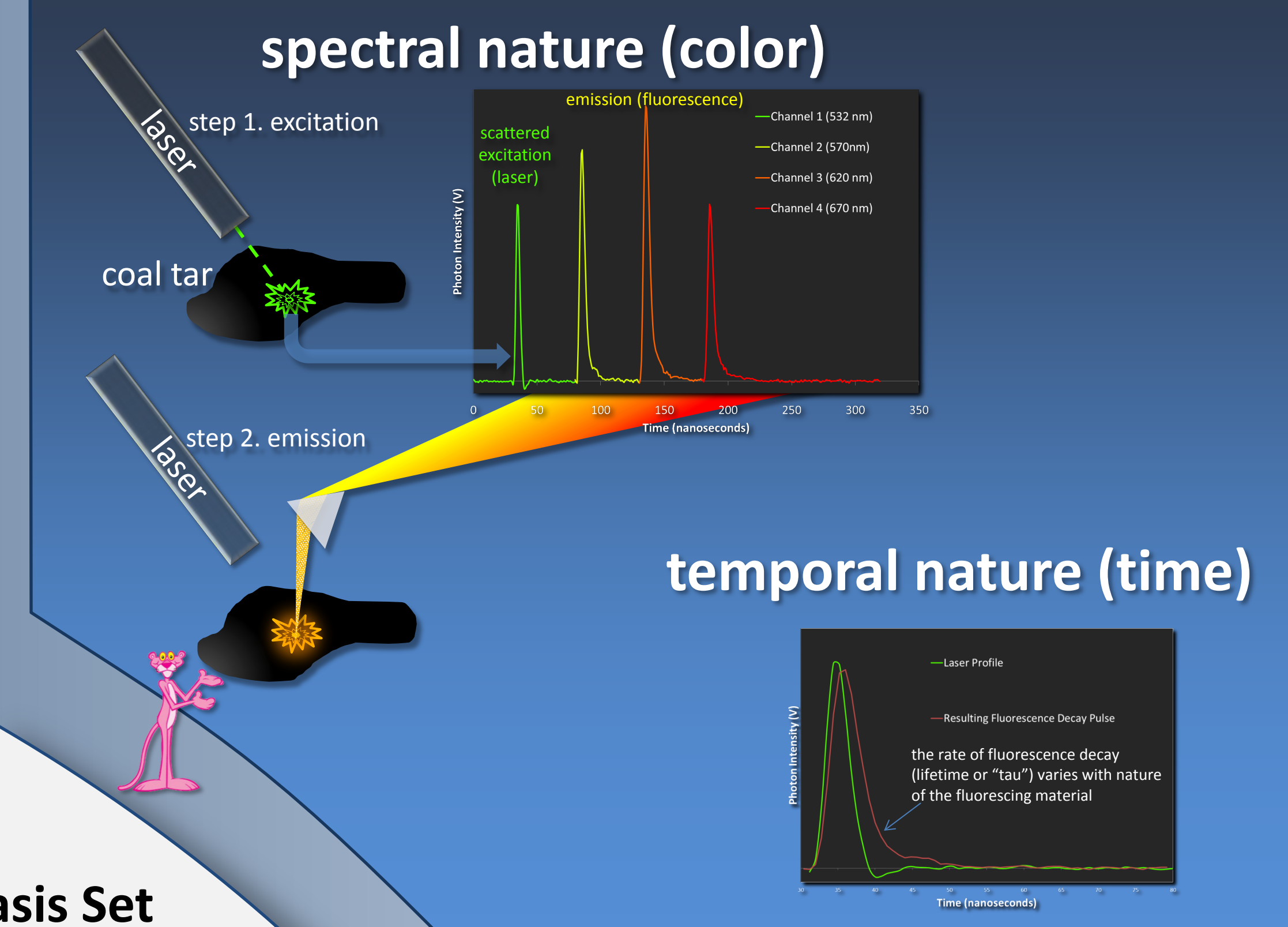
During the TarGOST survey any/all LIF waveform types are investigated to “ground truth” the waveforms and colors observed at the site



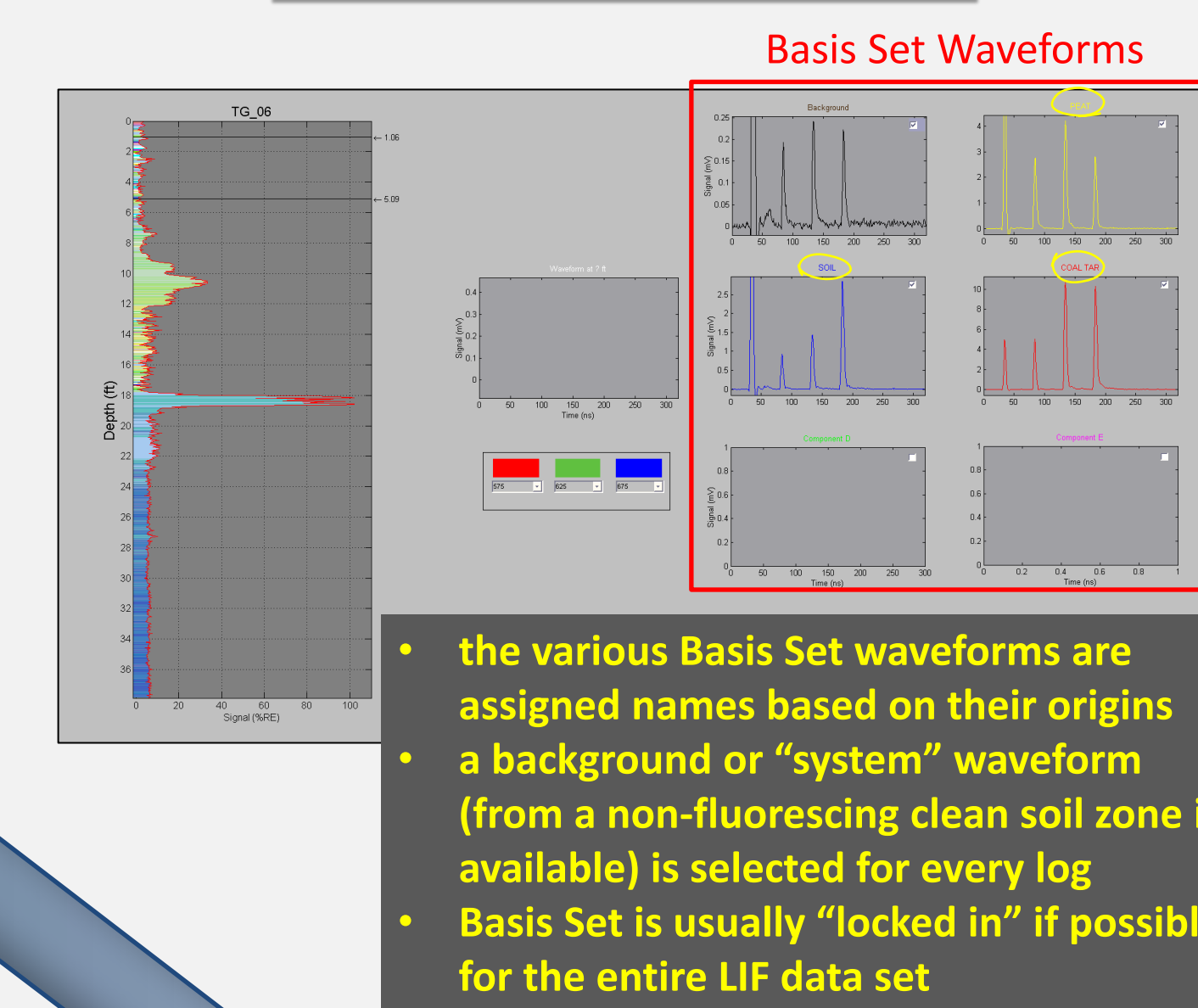
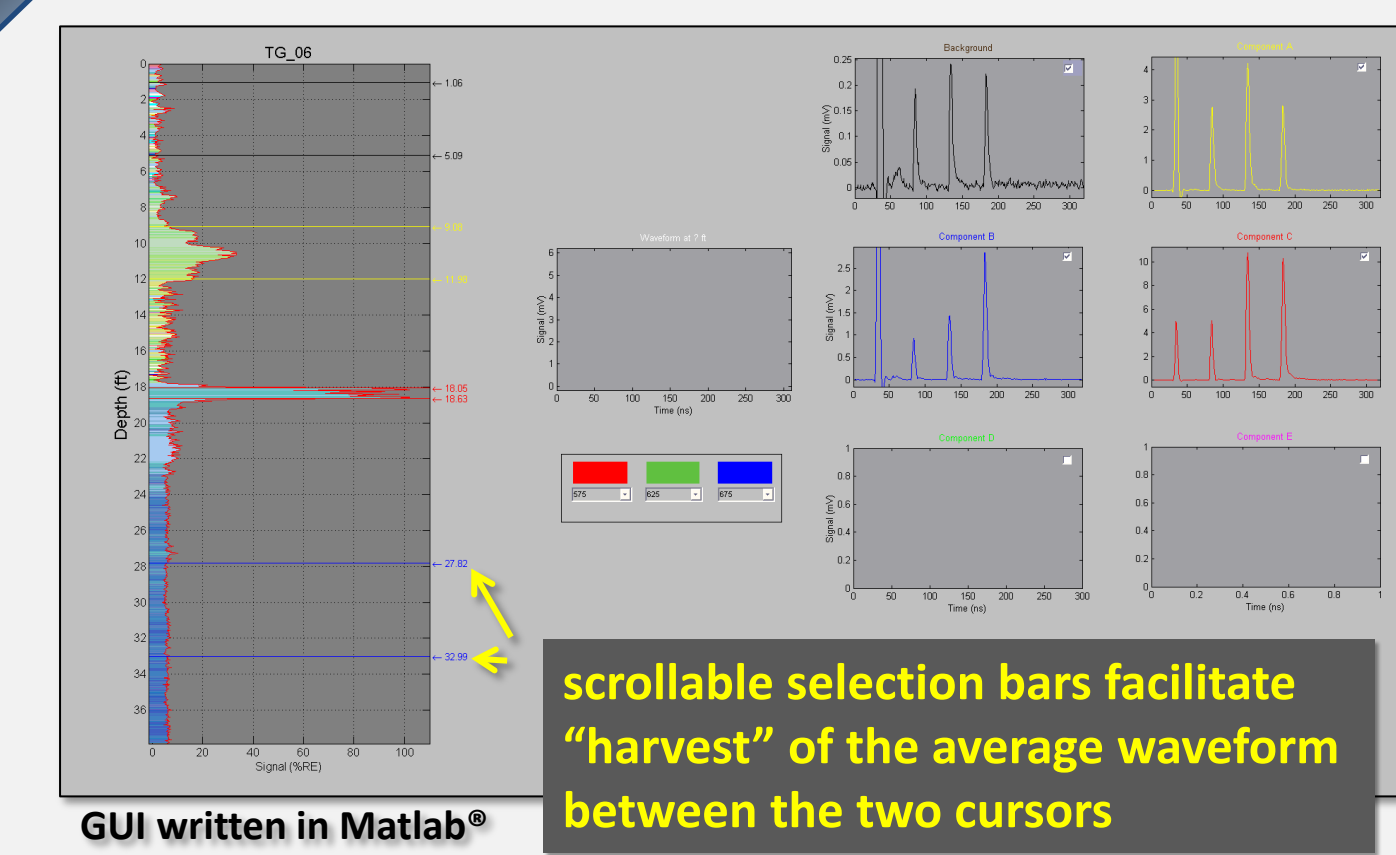
Bench test of site NAPL confirms appropriate monotonic response - let's LIF!



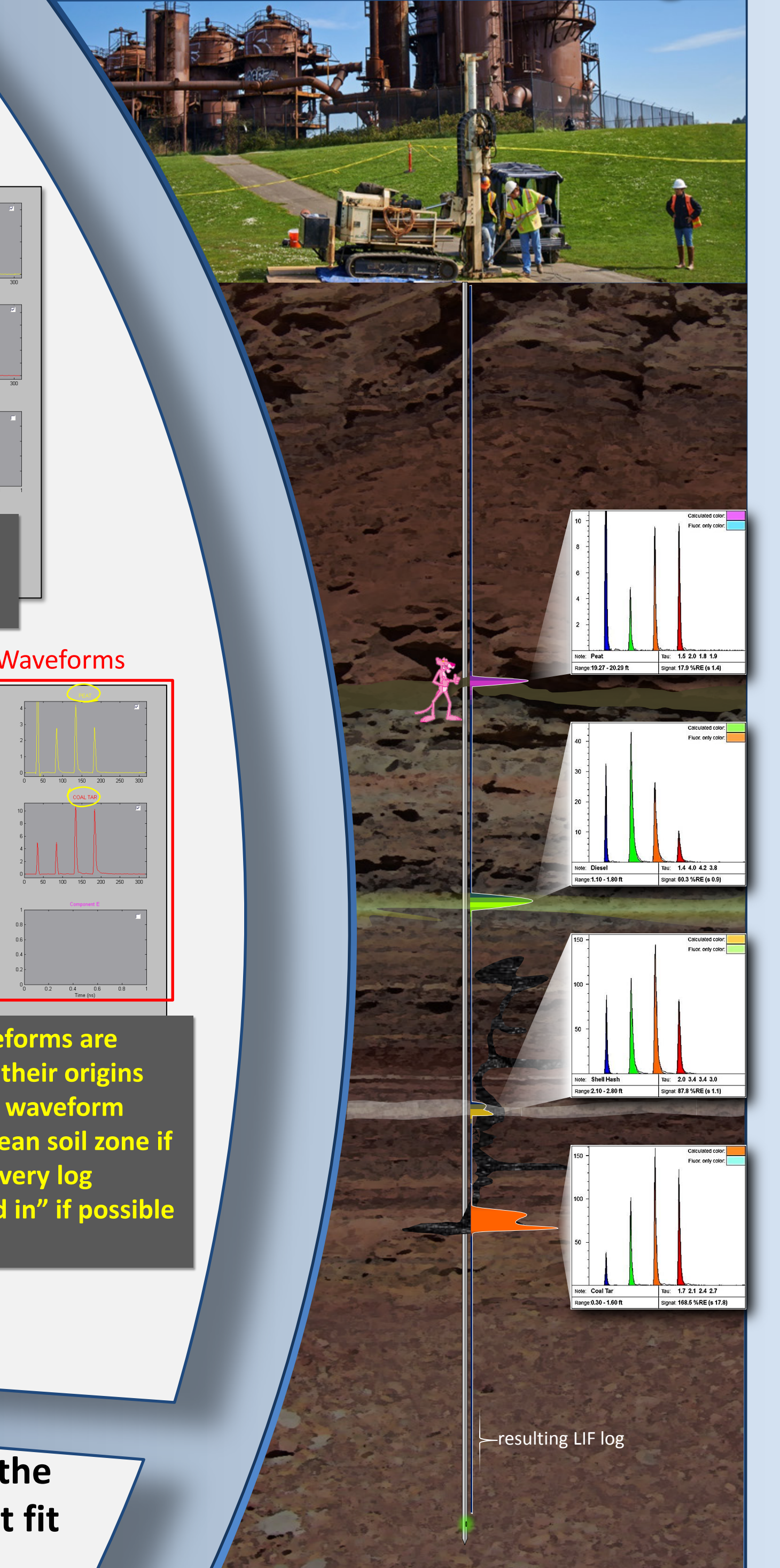
what is time-resolved fluorescence?



Basis Set selection using multiple lines of evidence – previous boring logs, sampling, site history, analytical data



LIF waveforms offer insight



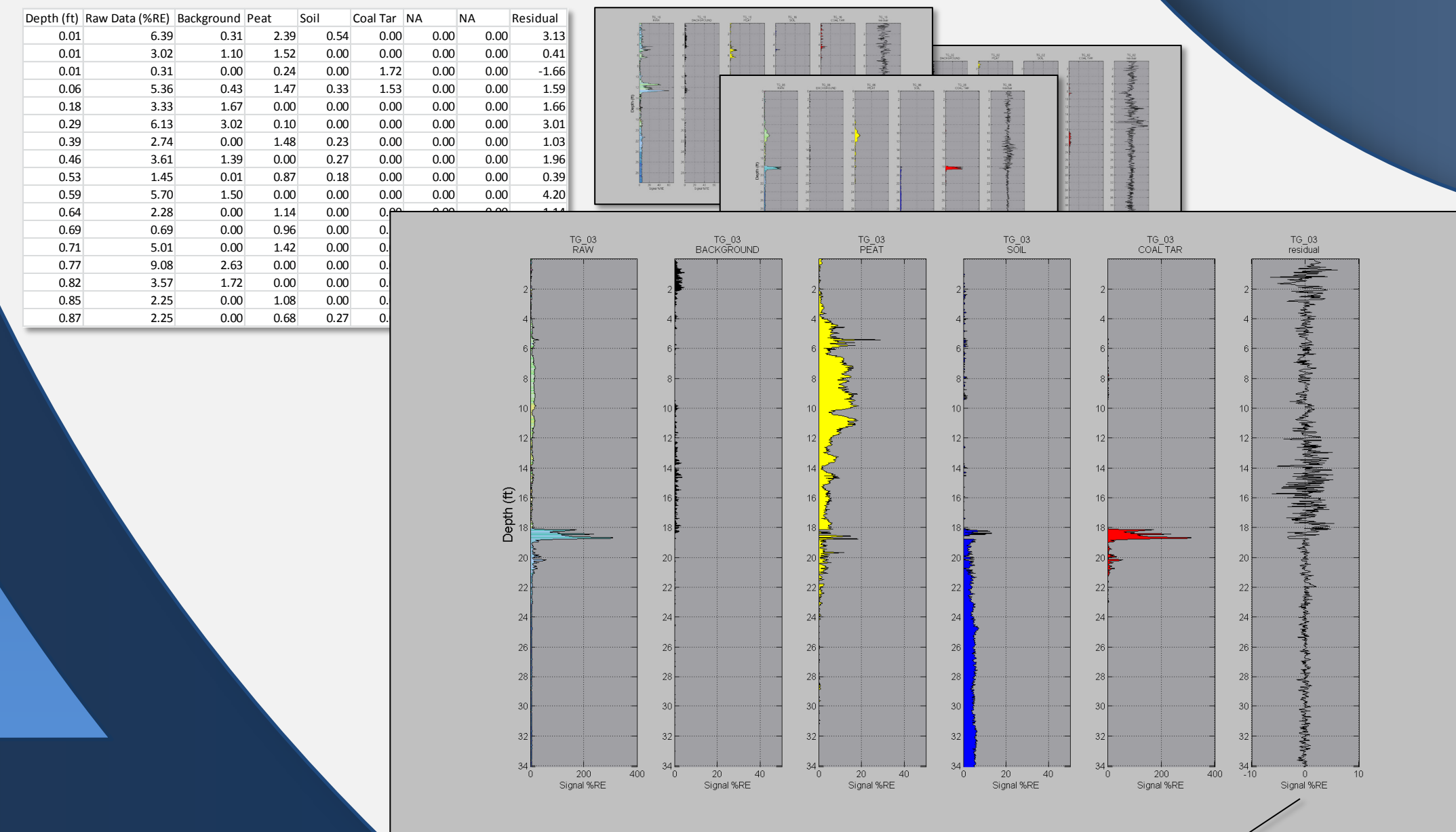
Eliminating Natural Organic Interference from TarGOST® Data Using Advanced Waveform Analysis

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Many natural geologic materials fluoresce. In order to effectively interpret TarGOST logs we sometimes need to separate NAPL fluorescence from false positives such as peat, meadow mat, algae, crushed limestone, wood, and shell hash. Non-negative least squares (NNLS) analysis provides an effective solution.

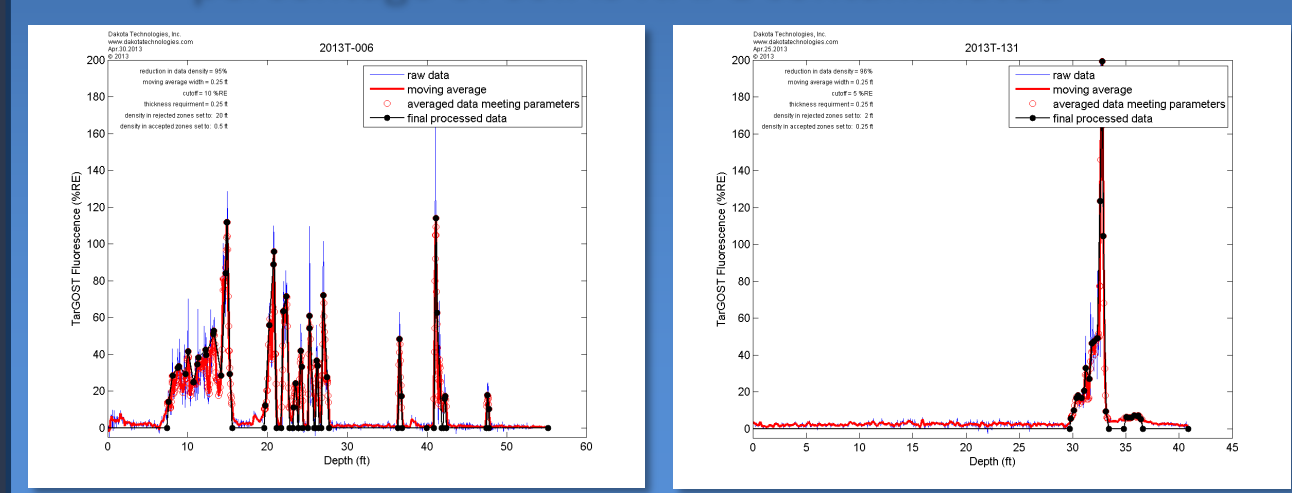
The final results are a graphics and txt data files representing the contribution of each Basis Set waveform to the entire LIF log. The results can be mixed/matched to isolate, combine, or separately visualize the various fluorescent materials encountered.



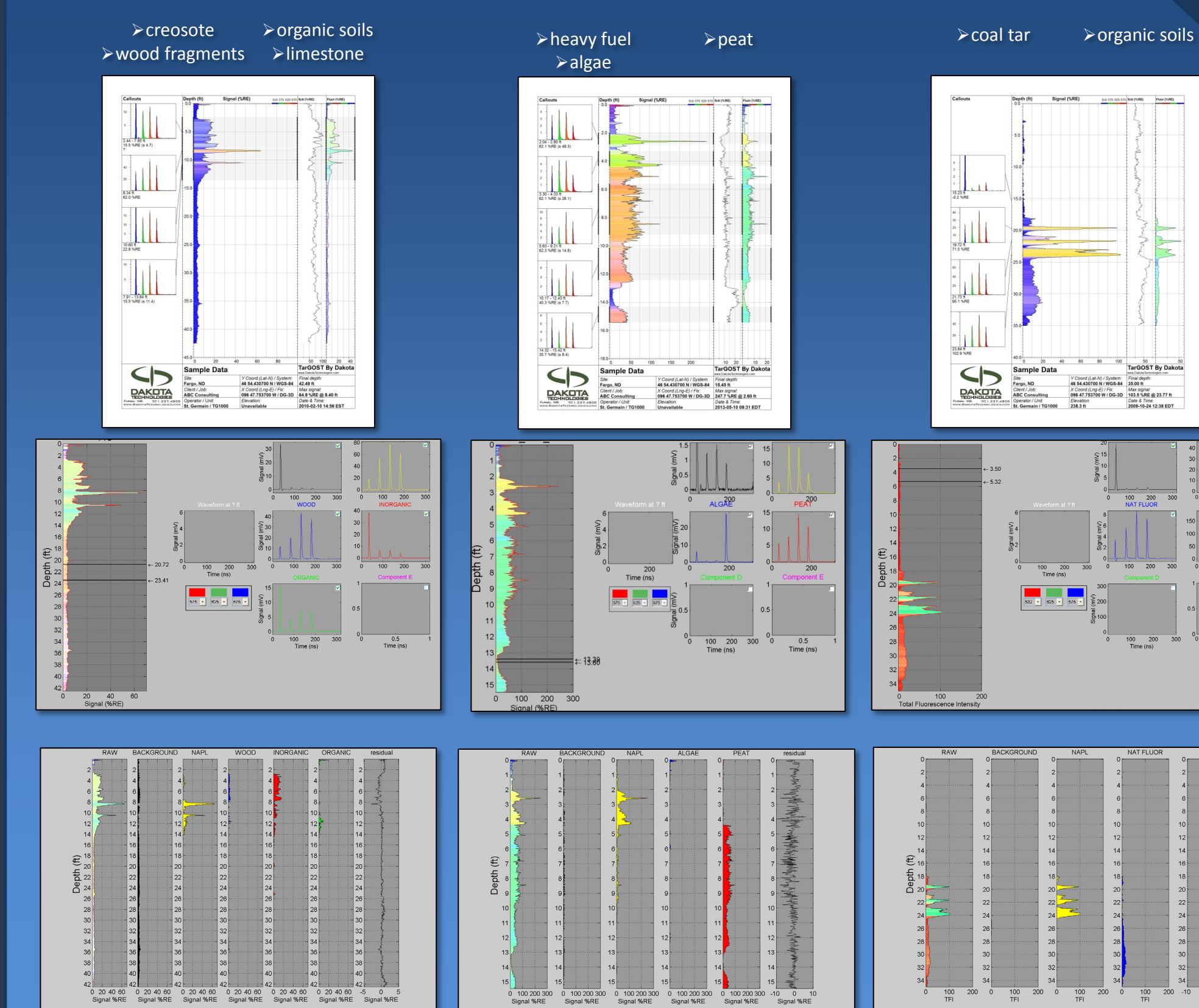
why keep all those ‘zeroes’?

post-processing reduces the size of your TarGOST data set for 3D visualization.

95% reduction in size is typical because only a small percentage of soil is NAPL contaminated



examples of various challenging data sets

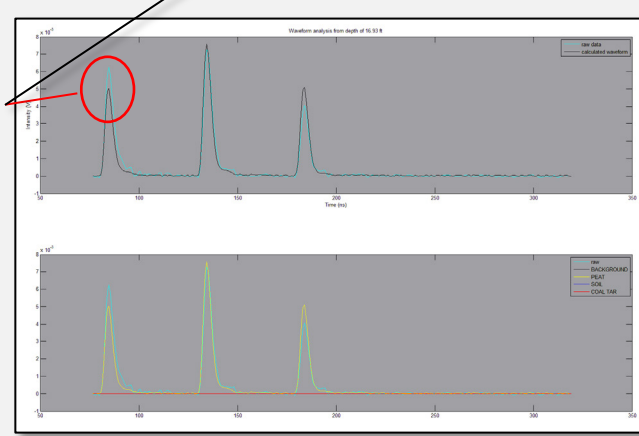


field logs

NNLS Basis Sets

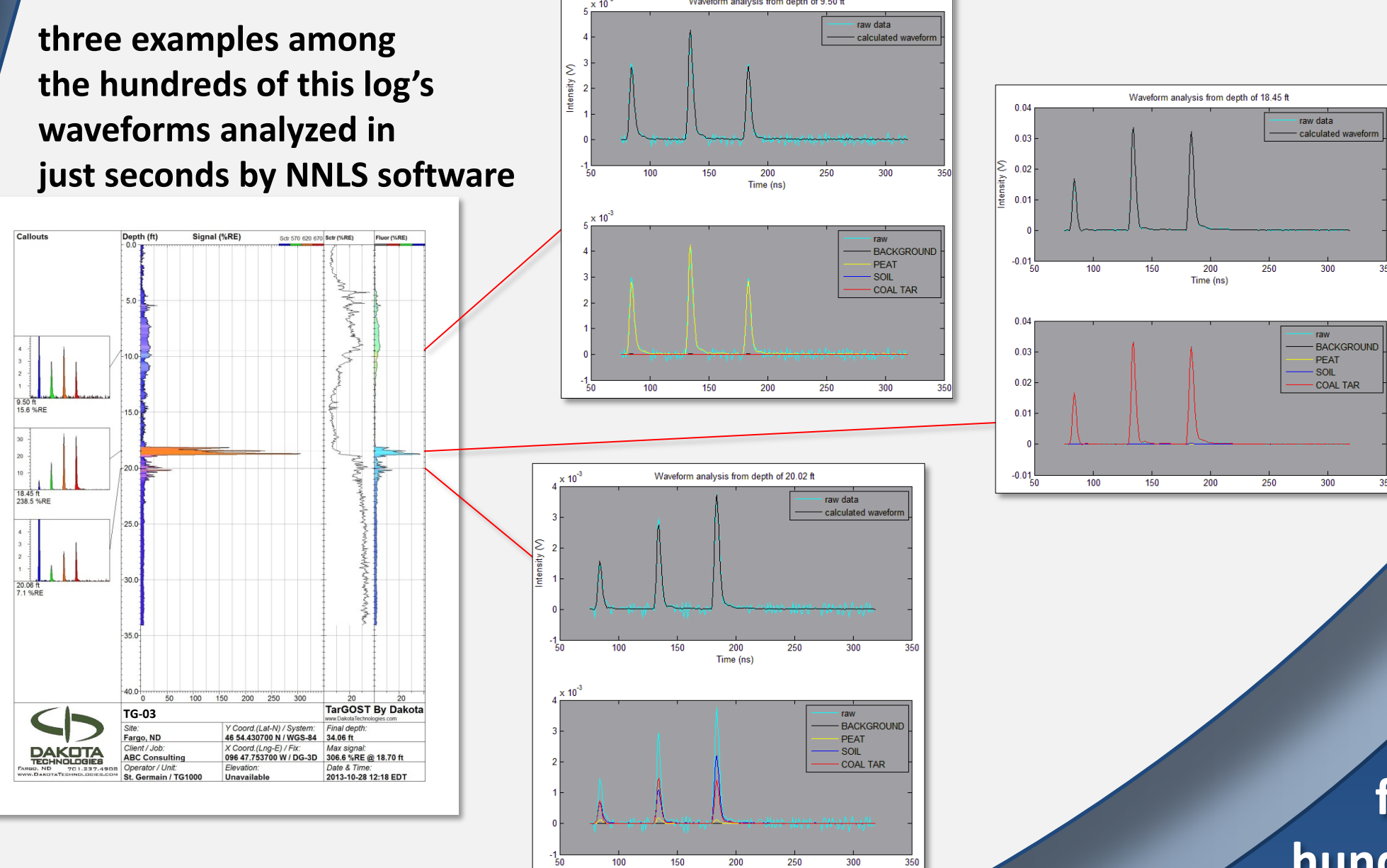
NNLS Results

differences between the synthetic NNLS waveforms and the original waveforms are summed and plotted to indicate goodness of fit vs. depth (high residuals indicate poor Basis Set selections or other QA/QC issues)



The NNLS software processes the TarGOST log, analyzing each and every waveform in the log to determine the contribution of each Basis Set waveform necessary to achieve best fit

three examples among the hundreds of this log's waveforms analyzed in just seconds by NNLS software



what's with all the crazy colors?

log colors are based on relative strength of each of the four peaks in the fluorescence waveforms collected at hundreds of depths during the 10-30 minute probing event

