TECHNOLOGY PERFORMANCE EVALUATION AND VALIDATION

To assure any of our technologies properly produce desired outcomes and end-products for any given water, solid, or waste stream, YBT recommends a technology viability, optimization, and performance evaluation program where actual materials are processed with equipment and systems. This is of particular importance for PFAS when performance requirements are measured in the parts per trillion (ppt) concentration range. This program includes treatability studies to determine technology viability and process optimization studies at bench and engineering-scales. Where up-scaling performance requires verification or data gap closure for process system design, onsite pilot trials and demonstrations may be required. An important
feature of the program is to mitigate risk in a controlled graduated process to support
controlled expenditures of time, resources, and capital.

- Viability and Optimization Treatability Studies
    - Viability (Bench-scale) studies are performed on small quantities of target materials to be processed to evaluate material and parameter response to a treatment technology and base-formulations or operating platforms of the respective process. Sample masses or volumes materials targeted for treatment might include, for example, 40# of GAC, 5-20 gallons of water, or 2-10 lbs. of soils or solids for YBT's various technologies. Samples will be collected and analyzed by YBT, and sample splits can be provided to customers for their independent evaluation. Prior to the performance of any viability studies, YBT will require analytical data and other historic information from the customer related to each specific material to be evaluated.
    - Optimization (Bench/Engineering Scale) studies are performed once treatment viability has been established. These studies consist of a series of treatments, and possibly phased process runs, to optimize processing variables, reagent blends and dosing, production rates, etc. for final system design or selection, production scaling, and cost refinement purposes. Material masses or volumes needed may require only the unused portions from the viability runs, or up to 100 lbs. of GAC 50 lbs. for solids, and up to 20 gallons of fluid. Larger engineering studies are possible; however, they will need to be performed at the customer's site. As with viability studies, samples will be collected and analyzed by YBT, and split duplicates can be provided to customers for their independent evaluation.
- Field Pilot Trials (Engineering to Full-scale)

    - On-site field demonstration and/or pilot trials are performed to further validate technology efficacy for parameters of concern in targeted fluids and to gather additional design information related to full-system design. Field trial processing equipment may range from engineering to full-scale equipment based on treatability study results and the desires of the customer. Importantly, onsite applications allow for prolonged production runs on a single or multiple materials to assure processing performance over a specified duration, or for evaluation of technology efficacy of a broad-spectrum of operating conditions and/or types of target materials. YBT will be responsible for sample collection and analyses as these apply to technology performance, and system operation and control. Customers will be responsible of any process efficacy validation sampling and analyses.