Wastewater Experts, Inc.
Balancing Engineering Realities with Financial Necessities

Client: Large RV Camp and Resort Park, Pennsylvania

Services Requested:

- **Identify Cause of WWTP Failure**
- **Fix Operation,**
- **Identify Liability**

Type of Treatment:

1. Physical – Flow Equalization
2. Chemical – Alkalinity addition; Chlorination
3. Biological – SBR – Sequencing Batch Reactor Activated Sludge

This full-service Park hosts RV's, Cabin renters, and campers. Facilities include a full restaurant and various amenities. Wastewater is discharged to a buried treatment system designed and supplied by a small New England Manufacturer prior to final discharge to a receiving stream. However, the plant was unable to consistently meet effluent permit at flows over 35% of design. The Owner was paying prohibitive costs to supplement the poor operation of the plant. Meanwhile the effluent permit violations brought the attention of the State DNR (Department of Natural Resources) and carried the constant threat of Park shutdown.

The Owner repeatedly asked the System Supplier and the Consulting Design Engineer to fix the plant. After four years of consistent failure, the Owner turned to *Wastewater Experts, Inc.* for help.

The initial plant site visit allowed an extensive series of observations and tests to be completed. These revealed many issues; just a few are discussed here:

- ✓ Daily raw wastewater flow to the plant varied by a factor of 10 every week; there was inadequate capacity to handle this variation.
- ✓ The wastewater required alkalinity addition to neutralize the acidity produced by nitrification (ammonia oxidation). But the manual dosing of alkalinity caused unacceptable variations in pH levels.
- ✓ The Package Plant design assumed a rapid-settling biomass – this was unrealistic and destined for failure.

- ✓ The inherent logic of the Package Plant Automated Control System operated the process tanks only 40% full most of the time to allow flow equalization capacity – thus Hydraulic Retention Time was routinely too short for the microbes to complete treatment.
- ✓ Peak flow-handling control logic was seriously flawed.
- ✓ Recycle of Sludge Digester Supernatant introduced excessive ammonia loads.
- ✓ Flow Meter measurements were flawed by an inappropriate sensor design – the real flow rate was a guess.

Wastewater Experts reviewed the Design Calculations and found that the Manufacturer and the Design Engineer had both assumed unrealistically optimistic parameters of operation for the design basis. A complete system redesign was subsequently completed and major modifications and treatment capacity additions were initiated. System operation and effluent quality improved dramatically.

RESULT

There were many other flaws, failures, and action items identified and fixed; and finally the plant produced excellent effluent. Discharge violations ceased, the threat of fines and shutdowns stopped, and the Park's Owner was able to realize his wish to *"get out of the wastewater treatment repair business"*.

Wastewater Experts, Inc. ultimately prepared a detailed and extensive technical analysis report and provide support for potential litigation.