

DESIGN ASSIGNMENT – Crystal Violet Functional Analysis
Complete Functional Analysis DUE -- WEDNESDAY, SEPTEMBER 10, 2008

Project Problem #4. Part B.

Based on the functions identified in part A: diagram side view of layout =
underground pipe, surge sump, pump up to reactor, feed NaOH, temperature
control, gravity overflow to sewer. NaOH delivery, storage, dilution mixing.
Control: waste feed rate, NaOH feed rate, effluent quality measure & feedback.

- A) Determine how to move fluids into reactor = single or multiple sources?
open channel? gravity sloped partially full “sewer” pipe? pump in pressurized pipe?
variable flow rate? maximum & minimum? = 10 -to- 75 GPM, ave. 25, and
off 12 hours/day. then pipe and pump sizes? surge tank sizes?
- B) Meter waste flow rate? & control = stabilize near average flow rate; reduce spikes?
variable concentration? maximum & minimum? = 2 -to- 8 PPM, ave. 4.5
- C) Neutralize or alternatives to separate or destroy? Activated carbon absorption?
other separation techniques, Determine the reactor size and configuration,
agitation, temperature control, level control, etc..
- D) Determine the NaOH storage tank size and handling equipment. Delivery & storage
inventory to keep on hand, re-supply frequency, purchase in larger quantity
discounts vs. cost of storing more, purchase concentrated and dilute to 0.005N vs.
purchase dilute and ship water?
- E) How is the NaOH flowrate metered and controlled?
- F) How is the effluent concentration monitored and controlled?