Spoke to Vitthal — recommended we switch back to recycle mode overnight, and introduce GW in the morning.

1625 Return reactors to start-up mode
Add 131.3 g NaAc to I-1, I-3.

1630 Tietje offsite

1700 Goh offsite.

David Tietje

4/18/01

800 Tietje / Goh onsite.

810 Getting set to prime metering pumps

817 MP-1 primed OK — pumping into MX-1
Set stroke / speed @ 50%, 40% respectively
- reset speed @ 50%, stroke @ 30% to generate flows of 1-1.5 gph

825 MP-~~3~~4 priming
- prime OK @ 830, but check valve leaks → repair

835 MP-3 priming
MP-3 feeding nutrient solution into MX-1, MX-3 @ max rate
- again, check valve leaks (take out ball/spring from housing — to disable valve — SINCE NOT NEEDED)
preferentially metering soln into Tank MX-3 versus MX-1.
- Balance feed into MX-1, 3

- Flows balanced ok
Throttle pump MP-3 back - set
speed/stroke @ 40% ea
→ Balanced flows into MX-1,3
ok

900 ~~Start pumping from~~
Start MP-4 - pump

910 Start MP-1 - pump ok; check
valve ok → no leaks

Pump rate much higher now -
~ 4 gph @ 30% speed/stroke
~ 2 gph @ 20% speed/stroke
~ 1-1.5 gph @ 15% speed/stroke

915 MP-4
Suspect blockage in flow meter
Need to exchange w/ meter
for MX-2

935 Water treatment system started up
Balance flows into MX-1,3

1000 Pumping from Ea2 to Baker
Tank - cannot throttle back
Pump P-6 (to reduce outflow
through GAC, 1X into Baker Tanks)

[illegible] installing new flowmeter on
MP-4 discharge line + will wait
1-2 hrs for glue to dry

[illegible] flow into [illegible]

P1 discharge pressure has
dropped
- purged discharge line for
pump (shut off pump +
opened union + let water
drain out); pump dischg.
P better upon re-starting
pump; flows into MX-1,3
also have [illegible]
[illegible]

[illegible] to LOS1
- wants to [illegible]
[illegible]
[illegible]
- wants us to turn [illegible]
[illegible] diffuser & aerator

715 gallons – flow totalizer ~~setup~~ setting @ startup

1035 Turn on bubble diffuser in EQ Tank #1
Turn on heater in T-1

1055 Depart site to PU parts for plumbing vent for EQ Tank 2, adding valve downstream of pump P-6

1230 Return to site

1235 Turn on MP-4 – pumping into MX-3
MP-4 pumping ok @ initial (factory) setting
– set speed stroke settings @ 30%
– pumping @ ~5 gph (tr)

– Adjust speed stroke to 15%. – flow reading is ∅

Need to change-out pump P-5 (pumping out of EQ Tank 1); Pump pressure is too low to maintain system continuity. May replace w/ Pump in P-3 position (currently inactive)

Found pc of duct tape in pump formerly in P-5 position
– will put this same pump back in P-5 position

→ Reinstalled Pump P-5
Checking flow into MX-3 w/ MP-3 off; indicates MP-4 is delivering a small flow into MX-3; flowmeter is not working, however, at these low flows (pump settings)
MP-4
@ 20% settings, flow meter reads 3 gph (h) (pr)
at any lower pump setting, meter does not record flow

– will keep pump @ 15% settings
Use other substrate pump (MP-1)

1325 Work on installing valve on outlet side of P-6

1400 Finished installing valve on outlet of P-6 ; Waiting for glue to dry . . .

Mike working on vent piping for EQ Tank #2

1445 Finished installing vent piping for EQ Tank #2

1500 Checked T of water in Tank T-1 - 25°C (77°F)

- Prepare to re-start secondary treatment system
- Re-start P-5 → works much better much better flow into EQ Tank 2 ; pump down EQ Tank 2 below H-H bit throttling back P-5

1530 Turn down settings on nutrient metering (MP-3). Tot flow should be ~ 1 gph (0.67 gph x 0.5)

- Setting @ 20 % stroke
  20 % speed

1540 Stopped nutrient addition. Leak in feed line into MX 1.

[illegible]

Took cup + filled up w/ incoming flow - measured T - 20.[illegible]

[illegible] Spoke to Mark Lost. Confirmed we should start off heat (for T-1) tonight, and that it is OK to leave nutrient addition offline tonight.

- Turned down settings for MP-4 to ~ 10 % speed / stroke
- flow into MX-3 appeared higher than into MX-1.

[illegible] Cleanup & depart site

[illegible] Tier

4/19/01

820 Tietje onsite.

830 Equipment check
P-4 (for MX-3 → R-3)
pumping but dischg. P
very low — need to
inspect

835 Check T in T-1
— 22.4°C
will monitor hourly throughout
day
• turn on heater for T-1;
set thermostat @ 80°F

840 Start-up / prime MP-3 pump —
for nutrient feed
- pump primed OK —
equalize flows OK

855 Discharge P for P-4 ~18
psi after shutting off pump,
opening line + re-starting

Flow incoming to MX-1,3 @
1.25, 1.47 gpm, respectively

910 Cleaning flow balancing
btwn MX-1,3; Float for
pump start could be raised
slightly in MX-3 — but 2 pumps
start @ pretty similar levels
(+ both are coming on @ almost same
time)
flow through R1, R3 pretty good;
flow into EQ Tank 1 (through
R1, R3) exceeds flow into
MX-1,3 [@ 1.25 - 1.5 gpm per
tank] flow already pretty
restricted through R1, R3; ∴
ΔP high.

915 Pump stop in EQ Tank 1
pretty low ~ 25 gal remaining
in tank.

Closed valves on outlet of
R-1, R-3 to create back pressure,
reduce flow through into
EQ Tank 1.

923 EQ 2 Pump Through to
Baker Tank
P @ outlet of P2 — 23
" of GAC — 17
P @ of IX — 8.5

930 EQ Tank 1 Pumping down too far... PS pumping seeming to bypass float – bumped float switch + pump shut off

1000 Observed similar phenomena w/ EQ Tank 1 – pump running w/ low water level (below float low level) ; again, bumped float switch + pump shut off

1010 Concerns about Nalc feed into MX-3 via MP-4 – very intermittent, appears to have stopped – recheck – OK

1013 Testing nutrient feed rate – preferentially flows into MX-3, and is excessive – reduce pump speed / Stroke to 10% for MP-3 – feed rate still on high side

TIME	TEMP.	COMMENTS
0835	22.4°C	TURNED ON HEAT, SET @ 80°F
0935	22.7°C	COLLECT GW SAMPLE – TEMP. = 20.3°C
1030	23.0°C	COLLECT SAMPLE FROM PILOT – TEMP. 22.3°C
1130	22.3°C	GW PULLED FROM EQ TANK FOR MWCAP
1235	22.9°C	OC PERIOD
1335	23.6°C	GW NOT FLOWING UNTIL FINAL ~10 MIN OF PERIOD
1435	22.7°C	
1530	22.3°C	GW INFLOW DURING PERIOD

1030 Balanced out nutrient feed addition into MX-1,3

1045 Spoke to Mark Losi
- Scientific + Discharge sample Friday / Tuesday, then put system in recycle mode Tues. through the following Monday.
- Monitor heat throughout the day today

1115 Remove can of glue, rag from inside Baker Tank

P-2 (~~which pumps through R-2~~) pumpout rate through R-1 pretty close to MX-1 incoming flow (~2 gpm);

1140 P-4 pumpout rate through R-3 is slightly higher.

1195 Depart site to PU parts/lunch.

1230 Return to site.

1250 - 1315 Work on changing out bag filter

1335 - 1405 Working on replacing R-5 pump start/stop float switch

1410 Checked flow totalizer readings
→ MX-1 : 1291 gal
→ MX-2 : 1345 gal
(compare w/ setting @ 715 startup yesterday ~10:30 AM)

1440 Working on adjusting height of float in MX-3 so mixer will always be submerged.

1450 Spoke w/ M. Losi - wants me to pick up COC + revised sampling ~~schedule~~ schedule tomorrow b/f coming to site. Also, I can hit the heat on overnight.

1540 Checking to see if MX-3 is compatible w/ mixer - mixer action may interfere w/ float operation — mixer action hinders operation of float - will keep offline

1515 Checked flow totalizers — based on readings, flow rate has been averaging ~ 1.4 gpm for past hour into the mixing tank

1525 Checking pumping operation of P-5 w/ newly installed float — pump shuts off OK at low level setting ✓

1545 Checking Pump Cycling For Mixing Tank

Pump down — MX-3

~ 2 minutes

Time to fill to pump start @ 1.3 gpm

~ 7.5 min

$$\frac{7.5 \text{ min} \times 1.3 \frac{\text{gal}}{\text{min}}}{2 \text{ min}} = \text{pumpout rate}$$

≈ 4.9 gpm

1610 Spoke to Losi — confirmed tomorrow's agenda — except that I will be coming to the site first thing tomorrow AM. Also I explained that I believe the lower flow over the last 24-hr period was due to the malfunctioning of pump P-4 — which triggered a high-high shutoff of P-1.

1620 Depart site.

David Tech

4/20/01

745 Tietje onsite

Equipment check –

– P1 online, but discharge pressure low (~ 5 psi)

Flow into ~~P-1~~ MX, ~~P-3~~ MX

~ 0.35 – 0.45 gpm

– All other pumps offline

800 – Totalizer readings –

MX-1 – 2023.7

MX-3 – 2021.7

Yesterday @ 1400 hrs,

MX-1 rdg – 1291 gal → Δ 732 /16

MX-2 rdg – 1345 gal → Δ 671 /16

Flow avg. computes to 0.7 – 0.76 gpm

– Check T in T-1 – 26.4°C (an increase of ~ 4°C)

805 Shut off P-1; open up outlet line / drain; re-start pump

→ discharge pressure @ 30 psi – ok; open up inlet valves to MX-1, 3 + balance flows

[illegible] MX-1, 3 [illegible]

[illegible] respectively

P-2, 4 discharge pressures OK ✓

[illegible] discharge pressures OK

Spoke to Vitthal yesterday on drive home – told me not to be concerned w/ the flow rate through the bioreactors or that water is cycling through them – that the impt. thing is the flow rate into the mixing tanks – this will equal the overall flow into the bioreactors. – *

Spoke to Lost said he will be leaving in ~ 10 min + [illegible] here 9:30 – 10:00. He asked me to pick up ice before ~~I leave the~~ he gets [illegible] the site.

[illegible] also concurred w/ me that [illegible] moving is not needed for [illegible] due to the low volumes [illegible] + the fact that we are basically [illegible] water

$V_{tank} = 150\ gal = 20.05\ ft^3$

$D = 31.62'' \cong 2.64\ ft$

$H = 4'$

h – 150 gal

$20.05\ ft^3 = \frac{\pi (2.64)^2}{4} \times h(ft)$

$h(ft) \cong 3.66' = 44''$

h – 140 gal

$18.72 = \frac{\pi (2.64)^2}{4} \times h(ft)$

$h(ft) \cong 3.42' = 41''$

Tank Volumes – Substrate Tanks

(R-1)
T-1: $\boxed{41''}$ (compare on Monday)
T-4: $\boxed{39.5''}$ " "
(R-3)

If we started @ 43" in each tank, then we've depleted only about 7 gal from T-1 & 18 gal from T-4 [over 24 hr + 14 hr]

– Compare to existing pump settings for MP-1 (R-1), MP-3 (R-3). They are 15%/15% + 15%/10% – these were based on flow meter reading on Ac feed for R-1 (MP-

850 Adjust (increase) feed rates for MP-1,3
– adjust settings to 30%/30%, respectively (for both pumps)

855 – Nutrient Feed Pump – Cannot Determine Avg. Pump Rate – Had Leak + Pump Did Not Operate Wed. PM – Thur. AM
– current water level in tank is ~ $\boxed{112\ gallons}$

Temp. in T-1 – 27.1°C (~80°F)

900 Depart site to PU ice for sampling.

930 Rtrn to site.

Temp. @ 27.7°C in T-1; Consider turning off heat

Noticed P5 was still running after water was far below low level shut down – tapped float + kicked off pump.

0935 GW begins pumping into T-1.

1000 Tried to connect P7 to receptacle #57 – no juice (check w/ Mike Cobb)

1010 M. Losl onsite. Prepare to collect samples.

1100 Begin collecting "discharge" samples – from Baker Tank.

1130 Finished collecting samples. Took 2 samples going into Baker Tank from port # 15.

1145 Depart site to drop off samples, get lunch.

1305 Return to site

1310 Temp. check
Influent Tank – 25.4°C
R-1 Effl. – 25.1°C

1315 Noticed discharg. P low on R-3, R-4 – Flow rate into mixing tanks only ~ 0.4-0.5 gpm

Shut off pumps, open union valves (R-1), re-start pumps → pressures OK

1320 – Checked level in Feed Tanks 1,4
39.5" – T1
38" – T4
Δ level – 1.5" / 5 hrs
5 gal/5 hrs – 1 gph
– therefore these flow settings seem to be working well

1325 Increase feed rate of MP-3 – nutrient feed pump (set @ 30 Y., 30 Y.)
level ~ 112 gallons

1335 Shut off mx-1 per Losl's instruction – due to too much agitation.
Need to install inlet pipes in mixing Tanks to direct flow below water surface.

1340 Taking T reading in T-1 → 25.9°C
Losl / shut off heat tape.
Will want to re-start Monday am.

1400 Spoke w/ Charlie Galloway —
Pumps are heating up, causing bubbles to form, which creates cavitation +
- Pressure switch on ~~motor~~ causes loss of pr
- turns motor off/on
- Put in bypass line w/ PRV that will relieve discharge P - vent (connect to tank)
- operation @ higher flows will help eliminate problem

1400 Float on EQ Tank 1 still getting hung up + not shutting pump off @ low level

- May want to consider opening valves 100 %. on inlet to bioreactors

→ Trying this
P on ~~inlet~~ dischg. of P-2 -
~ 18 psi ; on outlet of R-1
0 psi
~ 20 psi - 0 psi for P-4
Q into the EQ tank is slightly higher.

1415 S/W Vitthal about cavitation of the centrifugal pumps, particularly P-1. He said I can put in a bypass line (using smaller D pipe) + direct it from the pump discharge into the tank T-1 (this way I can recycle some of the flow, which will help reduce the back pressure on the pump). For P-2,4, for now it is satisfactory to minimize the throttling of flow through the bioreactors (by opening the valves on the inlet + discharge 100 %.)

- Plumbing — 1/2" pipe - 20' section
1/2" 90's - 4-6
1/2" 45's - 2-4

1445 Collected samples for PCR analysis from R1 eff, R5 effl.
Put in refrigerator (freezer section).

1500 Clean up / depart site.

4/23/01

820 Metje onsite.

830 Equipment Check

R1 on but low discing. P due to cavitation (~ 8 psi)
Flow into = MX 1,3 0.42 gpm each.

Total Flow, FM-1 3091.2 gal
FM-3 3118.6

P-3 running but ~2 psi discharge pressure (due to cavitation)

P-3 online w/ ~0 psi (due to cavitation)

Levels in substrate feed tanks, nutrient feed tank

Subst. v. low

(Tank 1) S#1 (R-1) — approx. 3" water
(Tank 4) S#2 (R-3) — approx. 3" solution
Subst. (Tank 3) Nutrient (R-1,3) ↓ 5.75" solution

Checking H_2O temp. in T-1 - 20.0°C

Δ water processed - for. PM to Mon. AM

R-1 system — 1067.5 gal
R-2 system — 1096.9 gal
Time: 72.5 hours
∴ Avg. Flow ~ 0.25 gpm / reactor

Nutrient / Substrate Tanks

Tank #1 — Δh = 39.5 - 3 = 36.5"
in 67.5 h
→ 1.03 gph
(24 gal)

Tank #4 — Δh = 38 - 5.75 = 32.25"
in 67.5 h
→ 1.63 gph
(10 gal)

Nutrient Tank (#3) — 112 gal - 12 gal
67.5 h
= Should be ~0.7 gph = 1.48 gph

Turn down speed / stroke settings by ~ 1/3 to 20% / 20% for ST-1 (R-1)
20% / 20% for ~~ST-2~~ NT, and 20% / 20% for ST-2 (R-3)

910 Performed pumps P1, P2 P5 — discharge pressures OK for each

— Accidentally reset FM-3 totalizer to 0.0 gal

920 Spoke to Lori — told me it would be a priority today to install the inlet pipes in MK-1, MK-3.

925 Noticed some bridging in R-2; will need to keep an eye on this today.

930 — Filling SF-1, 3, Nutrient Supply Tanks to 150 gal w/ tap water (cannot circulate water through carbon)

1010 Spoke w/ M. Lori — he explained we have a project progress mtg. tomorrow from 9 AM to 3:30 PM during which we will discuss the project progress, do a site walk, + discuss the system enhancements.

1020 Added 2442 g $(NH_4)_2HPO_4$ to 150 gal water to make up nutrient feed tank

1025 Begin measuring / adding 9003.7 g NaNO3 to ST-1

— weighing out 100 g increments — IIII IIII IIII IIII IIII IIII IIII IIII

— 1 @ 103.7 g

1115 Begin measuring / adding 9003.7 g NaNO3 to ST-3.

— weighing out 100 g increments — IIII IIII IIII IIII IIII IIII

∴ Realized I had an 8 kg container initially, less 3.7 g = flakes, I could add the rest of the contents + then 2x 3.7 g from a new bag.

— 8 kg NaNO3 supply remaining; will need additional by next Monday

1210 Depart site for lunch + to PK PVC fittings / pipe.

1340 Return to site.

1345 - Shut off P-1; Begin installation of inlet piping for MX-1, 3
- Shut off MP-1, 3, 4

1355 Noted P-5 seems to be cavitating again - shut it off for interim repairs.

1530 Restart P-1 - OK
MP-1, 3, 4 - OK

Turn on P-5 - OK

1600 T in T-1 - 20.7°C

1610 Checked fluid levels in substrate injection tanks -
ST-1 - 43"
ST-2 - 94"
Nutrient - 42.5"

1615 Tietje offsite.

David Tietje

4/24/01

745 Tietje onsite. M. Losi already onsite, working on prepping to sample.

Equipment check

P-1 offline due to H-H in MX-1; P-1 is running but dischg. P is ∅ (pump cavitating)

755 Shut off P-2, opened up union / closed union, re-started P-2 — dischg. P ok

P-1 back online — P low (~11 psi) + flow into MX-1,3 low (~0.5 gpm/each)

- Shut off P-1; opened up union; re-started P-1, opened throttle valves — P ok; adjusted flow into MX-1,3 to ~1.0 gpm/ea

Totalizer readings

- MX-1 : 3810 (compare to 3091)
- MX-3 : 3764 (compare to 3118)

@ 0830 yesterday

$Q_1 = \frac{3810 - 3091}{24 \times 60} = 0.5$ gpm

$Q_3 = 0.45$ gpm

- Check levels in substrate / Nutrient Feed Tanks

- ST-1 - 42"
- ST-2 - 43"
- NT - 40.75" - 148 gal
- last readings were taken @ 1610 yesterday / ~16 h ago

Δ h, ST-1 = 1" — ~3.4 gal

h, ST-2 = 1" — ~3.4 gal

h, NT = 1.75" — ~6 gal

3.4 gal/16 h — 0.21 gph

6 gal/16 h — 0.375 gph

- Check pumping on metering pumps
- Turn up settings to ~25 % stroke/spd.

845 Finish changing out bag filter. Changed out filter collected more solids than initial filter changed out.

- Checking influent T - 20.1°C

- Noticed small leak developing in R-1

910 Noticed problem in MX-1 when float does not shut off pump @ pre-set level, flow into tank is not beneath H_2O surface.

930 Depart site to meet w/ R. Zurowski, E. Nyer.

1205 Return to site.

1230 Shut off flow through R-1 due to bulging (health & safety issue). Flow continuing through R-3 @ 1 gpm avg.

1300 ~~Restart~~ feed concentrations for MP-3 [$(NH_4)_2PO_4$] & MP-4 (NaAc) into MX-3.

- Desire 25 mg/L [Na^Ac] in final flow — ∴ cut flow rate in half to ~ 31.5 mL/min feed rate

- used cup & stopwatch to confirm flow is ~35 mL/min @ pump settings 25%. /25%., for MP-4

- Adjust feed of $(NH_4)_2PO_4$ due to reduced flow w/ only one reactor running. New feed rate should be ~ 21 mL/min (1/5 gph). Confirmed MP-4 flow is 20-21 mL/min into MX-3 w/ cup/stopwatch @ ~ 15/20 %.)

1340 Estimating pump rate for P-4

Vol. fill — MX-3 (@ time pump starts)

Vol. empty — MX-3

Δh = 8 in.

$V = \pi r^2 h$

$V = \frac{\pi d^2}{4} \times h$

$= \pi \frac{(20.06)^2}{12} \times h$ (ft)

$= 2.2 \times h$ (ft)

$= 1.46$ ft^3

~11 gal

- timed pump-down cycle - 50 sec

→ 13.2 gpm flow

07:30

1400 Add dye (~1 mL) (right after completing pump cycle)

1405 - Begin closing down back half of system; also testing P-6 / bag filter for leakage

- Shut off MP-3, 4

1410 Shut off P-6 - bag filter leaked initially, then OK

1419 Pump cycle started - assume start of residence time (dye did not enter reactor until start of pump cycle).

1430 - Hint of dye detected in Eq T. #1 (will confirm on next cycle)

- Shut off MW-7 pump

1440 Untreated water inside Eq-Tank is colored - confirm breakthrough of dye

1445 Shut off P-1 (feed into MW-3. Will re-start P-1 tomorrow AM, and feed Ac @ 1/2 rate, then sample for NO_3^-, Ac, Cells on the influent/effluent of the reactor @ day's end.

Lost offsite.

1500 Tested offsite.

Picture

4/25/01

840 Tietje onsite. System ↑ down.

850 - Turn on P-1, reconnect (electrical for) MW-7 pump
- Reconnected (electrical) for P-5/P-6 and MP-3,4

910 - will keep MP-3,4 settings the same as yesterday in order to reduce Ac feed by 50%. (MP-4)
MP-3 : 15% (stroke); 20% (speed)
MP-4 : 20% / 20%.

- Verify ~~one~~ feed rates of MP-3, 4
① Shut off MP-4, test MP-3
- collected 18 mL / 60 sec [desire 20-21 mL/min ✓]
② Shut off ~~MP-4~~ 3, test MP-~~3~~ 4
- collected 31 mL / 60 sec [desire 31 mL/min ✓]

945 Temp in T-1 - 21.3°C

Begin working on plumbing bypass for MX-1

1115 Finish plumbing bypass for MX-1

1125 S/W Vitthal — told me
① I need to focus on plumbing the bypass loops for P-1-4,
② I need to check the rentals vs. the P.O.'s vs. the budget ASAP ; ③ that they found vessels that can be rented for $200/mo. that are rated for 75 psi & can be equipped w/ internals as needed

- Begin working on bypass piping for MX-2

1130 Turned on aquarium pump in EQ Tank 1

1200 Taking equipment inventory —
Need to buy PVC fittings to plumb bypasses
- ~~2" x 1" reducer, SOC~~,
- ~~1/2" Male Adapters, 2~~
- ~~1/2" PVC ball valve, FT, 2~~
- ~~1/2 PVC check valve, FT, 2~~

- 3/4" male Adapter 2
- 3/4" x 1" BSC reducer 1
- teflon tape
- primer
- vinyl gloves

1215 Depart site to PK PVC fittings & lunch

1300 Departed Home Depot

1345 Picked up ice for sampling.

1900 Back onsite.

1405 P1 dischg. P low — note flow into MX-1 is approx. 0.6 gpm; Resume P1

1410 Resume working on plumbing for MX-2

1500 ☆ Noticed nutrient pump offline - turned on nutrients pump (MP-3)

1510 Begin preparation for sampling

1520 Slw Lost + confirmed days sampling schedule=

SP# 1 Cl^-, NO_3^-
SP# 7 TOC, Ac
SP# 10 Cl^-, TOC, Ac, NO_3^-

- Use TOC bottle, 125 mL, as substitute for 40 mL 2nd acetate bottle
- Ephram will transfer contents into a new container @ the lab.

1600-1615 Collecting samples for various analyses (Cl^-, NO_3^-, Ac, TOC)

- For SP#7, used 1/4" tubing which had some residual food coloring (cleared out b4 sampling).

1620 Turned off MP-3, 4, P-1, P-4 and MW-7 pumps.

1625 Depart site

Pond Tests =

4/26/01

900 Tietje onsite. Stopped @ Home Depot en route to site to pk PVC fittings.

- Last night, pk 30 x 40 mL Acetate bottles from MW laboratories.
- Slw Mike Cok enroute to site about plumbing bypass to T-1 — he said it is ok to bring line in to inlet w/ incoming GW, as long as I have backflow protection

WHY NOT R-1 ?

915 Re-start system w/ R-3 operating only (note: did not plug in MW-7 pump — enough water in EQ Tank run w/ tri...

- Manually adjust feed from MP-4 (Ac feed) — want to reduce feed rate again to 31.5/2 mL/min (15.75)
- Adjust speed/stroke to 15% each → feed rate too low — increase to ~ 20%/20%.
- feed rate is ~ 13 mL/min
- Increased speed to 22%.
- feed rate ~ 18.5 mL/min
- reduce speed back to 20%.

~~900~~ → feed rate ~ 16.5 mL/min — OK

- turn on MP-3 (nutrient feed)
- Keep on same setting as yesterday

995 Check flow rate into MX-1 → 1.2 gpm

1000 S/W Losi — told me to operate the system today w/ half the Ac. feed, as we had discussed yesterday, and depending on these results may opt to run during the daytime next week.

1005 - Continue working on plumbing bypass line for MX-2

- Adjust flow into MX-1 to ~ 1.00 gpm

1045 Finished P-3/MX-2 bypass line

→ 1120 Working on reviewing notes from mtg. earlier this week.

☆ Noticed on P-4 pump cycle, ΔP through R-3 is only ~ 12 psi lvs. ~ 20 psi when initially opening up valve @ inlet to R-3 (not throttling the flow)

1200 N Begin working on plumbing bypass for P-1.

1215 Depart site to pre lunch / ice / plumbing parts for bypass

1300 Return to site.

1310 P1 offline
pump shut off due to float low level - will bypass float + run pump in manual

1315-35 Break for lunch

1335 Resume working on bypass piping for P-1

1450 Check FM totalizer readings
FM-1: 3963 gal
FM-2: 4030 gal

1515 Spoke w/ Mark Losi
- recd results from Tuesday's sampling - which indicated breakthrough from both reactors.
- told me to sample today the same as yesterday, w/ influent NO_3^-/ClO_4^-, R-influent TOC + Acetate and NO_3^-/ClO_4^-/TOC/Acetate in R-effluent.

1525 Begin preparation for sampling.

1550 Slw Vitthal and confirmed that I will shut down the system today after sampling; the aerator for the Baker Tank will be left online.

1615 Complete sampling. Shut down PBR R-1. Clean up.

5/17/01

1100 Tietje onsite. HazPak, Inc. already onsite & working since ~ 10 AM - called @ 10:30 AM to confirm).

1100-1130 Drop off drums at site, 11 closed top 5 open top

1140 Depart site to PU hose / lunch.

1250 Return to site.

1300 Set up pump / hose to transfer NaAc & nutrient solutions into closed top drums

1315 Begin transferring solution from substrate tanks into drums.

1410 Finished pumping out NaAc soln. into drums. Left ~ 20 gal in 2nd tank for sampling. Will transfer into 5th drum, which is ~ ½ full.

1420 - to 1455 Pump out nutrient soln into closed top drums. Leave about 10 gal inside tanks for sampling & diluted w/ ~ 15 gal tap water (due to crystals on bottom of tank)

1455 Manually pump ~ 50 gal GW in Eq Tank 1, ~ 40 gal GW in Eq Tank 2 through secondary treatments into Baker Tank.

Added tap water into Eq Tank 1 to remove (wash out) some bacterial growth on sides + bot of tank; likewise for Eq Tank 2...

1500 JE repr. stops by site to inform me he will be shutting down power for ~ 15 - 30 minutes.

1600 Completed work on transferring NaAc in unused "bioreactor" drum (only used w/ tapwater) into open top drums. Cleaned out bioreactor drum & portable-

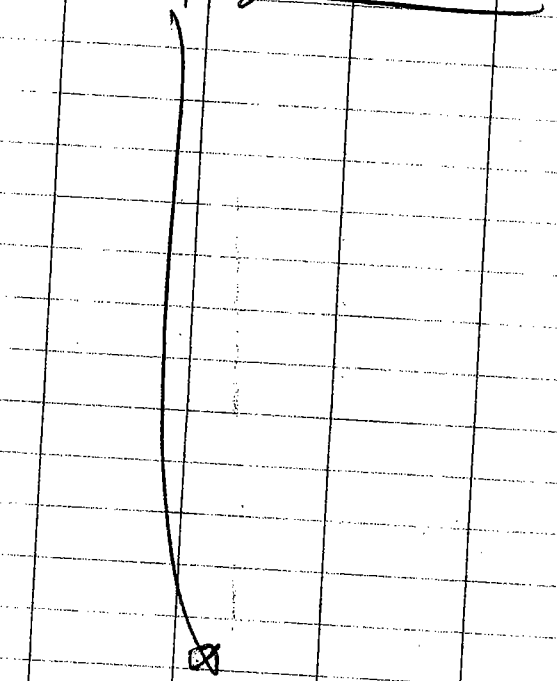
- will dispose as non-RCRA "empty"

1600

- Shw Vitthal - confirmed I will be onsite tomorrow AM to continue work on the waste disposal.

1620 Cleanup & depart site.

D. [illegible]



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5/18/01

JPL PBR

835 Tietje onsite.

850 Set up pump to transfer water inside inocula tanks (3) into drum.

855 - 900 Transferring water inside inocula tanks into drum

Add fresh water to break up some of the slimy growth on tank walls

There is a layer of "sludge" on bottom of inocula tanks

950 Begin working on 4 bioreactors — separating liquid & solid

— Cake has consistency of wet sand

1350 Completed waste segragation for R-1 & R-2

2 Empty Drums

2 Drums w/ D.E. & Internal Piping

2 Drums w/ Wastewater

☆ will need 1-2 additional closed top drums to complete 2 remaining waste drums.

1410 Offsite