APPENDIX D

Fischer-Tropsch IV Run Chronology

Fischer-Tropsch IV Run - March/April 1998

2 March 1998

10:30 Installed shell's sparger and 5 erosion pieces (4 on ht exch. tubes, 1 on sparger)

9 March 1998

15:00 Nuke scan completed at 4 different N_2 pressures (calibration).

11 March 1998

12:00 Tracers completed gamma scan with low pressure N_2 and cold oil (2 scans at 90°for each condition).

13 March 1998

Operated unit at reduction flows and pressures.

21 March 1998

9:00 Started N_2 flow and heat-up.

17:30 Started Syngas for carbon burnout.

22 March 1998

11:30 Syngas stopped.
Tracerco condensing hot oil gamma scan.
cooled under N_2, drained the system.

23 March 1998

11:30 Durasyn-166 loading = 50 lbs

Wax loading:	Drum 1 = 201 lbs (4 bags)
(callista-158)	Drum 2 = 198 lbs (4 bags)
Wax temp = 95°F	Drum 3 = 199 lbs (4 bags)
	Drum 4 = 211 lbs (4 bags)
	Drum 5 = 201 lbs (4 bags)
	Drum 6 = 102 lbs (2 bags)
	Total = 1112 lbs (22 bags)

15:45 Catalyst loading:

Wax temp = 173°F)	Drum #5 = 235 lbs
	Drum #1 = 252 lbs
	Drum #2 = 14 lbs
	Total = 501 lbs

18:00 Transferred slurry to reactor
N_2 on at Rxt bottom
Rxt slurry level = 111~ 118" on tape
Loaded flash Durasyn - 164 = 210 lbs

18:40 Transferred flash oil to 2710
Rxt level now @ 142-154" on tape

19:00 Loaded 347 lbs of Durasyn -164 ~28.30 to prepare for product receiving.
Inspection of 28.30 after the flush indicated clean wall, thin film coating on the bottom but no lumps.

19:00 Drying started

20:00 Rxt @ 285°F, 145 psig
Rxt level = 157 - 166"

N_2 flow = 22,000 scfh

21:00 Reactor @ 284.5F, 132,1 psi, Nuke scan done
Reactor level → 157" - 166"

21:30 Zeolite tubes in place

22:00 Reactor 285 F 132 psi
level → 157-166"
Temp ramp started

23:00 Reactor level at 180". Temperature at 345°F. 128 psig panametrics on reactor outlet at 390 ppmv and climbing.

24 March 1998

00:00 Reactor level above 199". Temperature at 405°F. 134 psig panametrics on reactor outlet has leveled off at about 470 ppm_v.

01:00 Reactor level above 199". Temperature at 465°F. 128 psig panametrics on reactor outlet at 380 ppmv and drifting down.

01.30 Took zeolite tubes off-line for weighing.

02:00 Reactor level about 211". Temperature at 503°F. 126 psig panametrics on reactor outlet at 390 ppm_v and pretty steady.

03:00 Reactor level <211". Temperature at 512°F. 123 psig panametrics on reactor outlet at 370 ppmv.

03:30 Nuke scan. AJ swapped U.O. pumps because 10.53A seal was leaking oil, but 10.53B is smoking like crazy now, too. At 03:50, decided to drop temperature to 480°F to prolong seal life on 10:53B long enough to fix 10.53A in the morning.

05:00 Reactor temperature at 480°F. Pump seal leak has definitely improved. Reactor level <197". Panametrics on reactor outlet at 330 ppm_v and steady over the last ½ hour.

05:40 Weighed zeolite tubes. W.T.M. on 22.14 isn't working. Regulator plugged at 22.14.

06:00 Reactor level at 199". Panametrics on reactor outlet at 275 ppm_v.

07:30 Rxt level @ 190-197"
Rxt temp @ 479°F, Rxt Pr = 133.1
FI-187A = 21.75 mscfh, FI-126A = 21.73
SP1MW = 25, SP2MW = 27.8 now set to, SP4MW = 27.8 now set to 28

09:30 Rxt level @ 190"

11:00 Rxt level @ 186"
Increasing pressure (Rxt) to 203 psig to reduce wax loss.

13:30 Rxt level @180", nuke scan done at 14:10. Dropping 22.16 temp to 194°F.

15:00 Rxt level @ 174"

15:40 Rxt level @ 170"

16:00 (22.14) Regulator cleared after 3 attempts
Both 27.10 and 22.14 samples now flowing @ 288 lit/hr

18:00 Zeolite tubes weighed
Download data from DEC 16:00 - 18:00
File: FT4DRTI1.TXT
Panametric average conc. From 16:00 - 18:00 → 90.71 for 22.14
Zeolite tube weight for 22.14 @16:00 @ 16:00 1718.89g
@ 18:00 @ 18:00 1718.97g
Δ = 0.08 g
flow meter @ 16:00 671.168 = 0.004444 grade H_2O
@ 18:00 671.628
460 lit. → 20.536 gmole gas

$$conc = \frac{0.004444\ gmole\ H2O}{20.536\ gmol\ gas}\ x10^6$$

$$= 216\ ppmv$$

216. x 531 = 233 ppmv (temp correction for 71F)
492

Correction factor = 233
90.7
= 2.57

target = 100 ppmv

corrected target (for panametrics) = 40 ppmv

20:00 Zeolite tubes weighed T = 66.5F

22.14 Δ weight = 0.13g between 18:00 and 20:00
Δ flow = 247 L

27.10 Δ weight = 0.12g
Δ flow = 631L

Regulators being cleared.

20:20 Reactor level @ 174-180" T=429

21:40 Zeolite tubes lined up.

21:50 Bringing in H_2. Very slow going at the start.

22:25 Rxt level at 182".

22:45 Panametrics on 22.14 at 695 ppm and appears to be topping out. H_2 analyses coming thru at 3.5 - 4.0% H_2.

23:15 Reactor level at 181". Panametrics on 22.14 at 730 ppm.

25 March 1998

00:15 Reactor level at 180". Panametrics on 22.14 at 770 ppm.

00:50 Drained 22.14 to prep tank 21 nuts to 16 ½ nuts. Also returned some inventory from 27.12 to reactor. Reactor level up to 190".

01:00 Did a brief test on N_2 to check panametrics response. Looks Good.

01:40 Weighed zeolite tubes:

22.14 flow = 675,700 - 674,545 = 1155 l with 1.05 g accumulation = 0.0583 gal H_2O

$$conc_{avg} = \frac{0.0583\ g\ mol\ H2O}{51.56\ g\ mol\ gas}\ x\ 10^6\ \ X\ \frac{524}{492} = 1200\ PPM$$

02:00 Panametrics response has been dropping for about an hour. Now down to 685 ppm. Reactor level >199".

02:50 Nuke scan. Reactor level at 212"!

03:10 Increasing H_2 flow. Panametrics responded in <10 minutes. Minimum was about 510 ppm.

03:35 Panametrics peaked out at about 565 ppm. H_2 concentration at about 8%, so still increasing slightly to try to get 10%.

04:00 H_2 concentration at 10.5%. Panametrics at 530 ppm and dropping.

04:15 Checked flows on panametrics. 27.10 is still just >5 l/min.
22.14 is still just <4 l/min.

04.30 Panametric down to 410 ppm. Increasing H_2 to 25%.

05:00 Panametrics reading finally bottomed out at 320 ppm. H_2 concentration up to 22.7%.

05:30 Panametrics topping out at about 550 ppm.

05:45 Weighed zeolite tubes:

22.14 flow = 1028 l w/ 0.51 g accumulation = 0.0283 gmol H_2O

$$conc_{avg} = \frac{0.0283\ gmol\ H2O}{45.89\ gmol\ gas}\ x10^6\ x\ \frac{525}{492} = 660\ ppm$$

(Panametric avg. = 518.6 ppmv)

Flows are still good thru the panametrics. H_2 contraction actually topped out at 29%.

06:30 Panametrics reading at 500 ppm and easing down slowly.

07:45 Rxt level @ 199 - 211" on tape

Rxt pressure drifted to 180 psig, increasing to 203 psig.

09:00 Rxt level @ 199-211" on tape

09:45 Weighed zeolite tube

22.14 wt gain = 1721.30 - 1720.30 - 1720.66 = 0.64g

22.14 vol. of gas = 677,809 - 676,757 = 1052 ft

$$\therefore H_2O \text{ conc. by tube} = \frac{\frac{0.64/18}{(1052\ x\ \frac{492}{531.1})/22.4}\ x\ 10^6}{= 817.2\ ppmv}$$

22.14 Avg. H_2O conc. by panametric = (491.2 + 434.3 + 376.3 + 343)/4 = 411.2 ppmv

11:10 Rxt level @ 199 - 211" on tape.

11:15 Increasing H_2 conc. from ~30% to 50%.

13:00 H_2 conc. @ 55%.

13:30 Reactor level between 190" and 197" on tape. T = 430, P = 204.6

14:00 Zeolite tubes weighed.

22.14 Δ weight = 1721.42 - 1721.30 + 0.12g = 0.00667 gmol H_2O

Δ flow = 678.955 - 677.809 = 1.146 M3 = 1146 L, T = 76.4

$$1146L\ \frac{492}{536.07} = 1051.8\ sl$$

= 46.95 gmol

$$H2O\ conc = \frac{0.00667}{46.95} = 141.99\ ppmv$$

27.10 Δ weight = 1712.79 - 1713.24 = -0.45g = 0.025 gmol H_2O

Δ flow = 2200 - 710 = 1490 L -

1490 L $\frac{492}{536.07} = 1367.5\ sl$

H2O conc. $= \frac{0.025}{61.05} = -409.5\ ppm$

panametrics

	27.10	22.14
10:00 - 11:00	-9.4373	279.4081
11:00 - 12:00	-8.9556	305.0084
12:00 - 13:00	-8.7628	313.5583
13:00 - 14:00	-8.7632	311.5132
	-8.9797	302.370 avg.

H_2 concentration being increased to 65%

14:45 Reactor level @ 186", P = 198, T = 430.1

15:00 Panametrics @ 260 ppmv

15:20 Testing 22.14 panametrics w/ nitrogen flow, fast drop to 44 ppmv

22.14 panametric put back on line

15:45 Reactor level at 136", P = 203.9, T = 430.1

Cut back H_2 flow to reduce H_2 conc. from 69^+% to 65%

16:00 Did nuke scan.

16:15 Temp ramp started (10F/hr) to 464 F, H_2 at 68%

17:00 Panametrics (22.14) up to 240 (from 225 ppm)

17:15 Reactor level at 186", P = 207.6 T = 438.6

18:00 Zeolite tubes pulled and weighed, T = 69.0

22.14 Δ flow = 680.546 - 678.955 = 1591 L = 1480.6 sl = 66.1 gmol

Δ weight = 1721.90 - 1721.42 = 0.8g = 0.0267 gmol H_2O

$H_2O = \frac{0.0267}{66.1} = 404\ ppmv$

2710 Δ low = 3988 - 2200 = 1788L = 1664.0 sl = 74.3 gmol

Δweight = 1712.66 - 1712.79 = 0.13 g = -0.00722 gmol H_2O

$H2O\ conc = \frac{-0.00722}{74.3} = -97.22\ ppmv$

18:15 Reactor level at 188", P = 207.8, T = 448.7

22.14 panametric 14:00 to 15:00 273.3 ppmv

15:00 to 16:00 233.7 ppmv

16:00 to 17:00 229.5 ppmv

17:00 to 18:00 254.5 ppmv

Avg. 247.8 ppmv

18:50 Rxt level = 190" on tape, P= 206.8 psig T = 454.2 °F

19:30 Methane in 22.10 vapor (G02004) = 0.2, Reactor T = 463, P = 210.4

20:00 Reactor T = 463.5, P = 211.6, Reactor level = 140", CH_4 in 22.10 vapor = 0.28

Panametrics 22.14 = 321 ppmv (peak, beginning to decrease).

21:15 Reactor level 185", T = 463.5, P = 208.6, Nuke scan done, CH_4 conc. = 0.55%

22:00 Reactor level 183", T = 463.5, P = 209.1, CH_4 = 0.62%

26 March 1998

00.10 Methane concentration up to 1%. Reactor level at 174".

00:45 Starting to bring in recycle flow.

02:00 Weighed zeolite tubes. Flow had stopped on 22.14, but probably only recently. Henry and AJ cleaned out the regulator, and flow returned to just >4 l/min.

03:30 Reactor pressure at 750 psig. Total flow is about 108 KSCFH and reactor level is about 198". We'll hold flow here to keep level from going any higher.

04:30 Checked flows on panametrics. 22.14 had dropped to just >3 l/min, so adjusted rotameter to increase flow to > 4 l/min.

04:35 Ramping temperature at 10°F/hour.

04:50 First response on 22.14 panametrics.

06:00 Weighed zeolite tubes. Flows still OK.

07:00 Increasing Rxt flow from 104,000 to 128,000 SCFH, Rxt level at 190"

10:00 Rxt level at 184", Added oil from 27.12 first (not much oil), then from 27.15

Rxt level at 190 - 197" on tape

13:30 Nuke scan done, level at 188", Reactor P = 747.8, T = 509.5

14:00 Tubes weighed

22.14 Δ weight = 1727.57 - 1726.23 = 1.34 g

Δ flow = 686.051 - 685.195 = 856 L

27.10 Δ weight = 1714.43 - 1713.55 = 0.88 g

Δ flow = 1446 - 10 = 1436 L

22.14 meter barely moving (<1 L/min), clearing regulator

16:00 Reducing the Rx feed rate from 129,000 to 86,000 SCFH.
16:45 Reactor T down to 488 due to trip in U.O. system. When unplugging line between 22.14 and 28.30.
17:15 Reactor feed at 85.55 MSCFH.
17:50 Nuke scan - level at 190", T = 507.9, P = 750.3
18:00 Zeolite tubes weighed

		Panametrics
21.14	Δ weight = 1728.77 - 1727.57 = 1.2 g Δ flow = 678018 - 686051	(474.5 + 293.5+ 264.5 + 233.5)/4 = 316
27.10	Δ weight = 1715.34 - 1714.43 = 0.91 g Δ flow = 3714 - 1799 = 1915 L T = 70.1F	(256.2 + 250.3 + 216.4 + 164.5)/4 = 221.9

20:00 Reactor T = 506.9, P = 751.3, Level = 182"

27 March 1998

00:00 Checked flow on zeolite tubes. Looks like just <4l/min.
Still raising reactor level from 180" to 198" about once/hour.
Methane level holding pretty steady at 2% for the last hour.
00:35 For some reason, SP-4MW updated to ~28 which caused "flow" on F1-187 to drop. We corrected back about 5 minutes later.
02:00 Weighed zeolite tubes. Flows look good. Methane still at 2%.
06:05 Weighed tubes again. Flows still look good.
06:30 Cracked open U.O. to 28.30 again. Fired up U.O. system beforehand to minimize the temperature loss, so reactor went to 511°F before dropping as low as 499°F. Methane temporarily spiked above 3% and then dropped back.
09:50 Weighed zeolite tubes.
14:10 Tubes weighed, Continuing hourly transfers from 27.15 to 27.10
18:10 Tubes weighed, Panametrics tested w/ N_2
Transfers from 27.15 to 27.10 every 30 minutes
22:00 Weighed zeolite tubes. Just as we were finishing (about 22:10) compressor tripped on high level in 22.10. After a few aborted attempts to restart, finally got going again about half hour later. Dumped level from 22.10 to 22.15 but high level trip on 22.10 is still disabled.
23:45 Reached high flow condition. Will hold here for two hours before checking back to the pre-shutdown condition.

28 March 1998

02:00 Dropping recycle back to 86 KSCFH on F1-187 to check back against pre-upset conditions.
02:30 Back at 86 KSCFH on F1-187.
06:00 Weighed zeolite tubes. Still holding pre-upset condition.
07:30 Moving to standby condition in preparation for start-up.
07:50 Plant trip. 01.20 compressor discharge temperature high.
08:20 Cause of trip may have been 22.10 switch. Flow was reestablished after about 1 ½ minutes and have spent past half hour moving towards standby condition. Now waiting for GC results.
08:30 Flows: 5.1 MSCFH H2, 10 MSCFH N2; 14% H2
12:30 Clearing plug between NV-1758S and bottom of 27.15
13:15 Plug cleared, Bypassing 22.62 A and B
13:30 Slurry sample taken.

14.15 Reactor T = 349, P = 705.9, CO brought in.
15:00 Reactor T = 375 P = 713.7
feed CO 4.2 MSCFH fresh
H2 7.5
Total 22
17:00 Field log done.
18:30 Moving to startup condition #4.
20:00 Blew rupture disk on 21.20, Sending cooling water to the flare → resulting to 01.10 trip.

29 March 1998
02:00 Discovered that FI-246 (01.20 flow) and FI-245 (vent flow) have referenced SP-8MW which is being updated with the SP1 MW instead of SP2 MW.
03:15 AJ caught a slurry sample and wax sample. Plant is pretty well lined out on intermediate startup condition #5.
06:00 Put reactor temperature control into cascade.
07:15 Took plant logs
09:05 Changing CO and reducing recycle to reach startup condition #6.
10:00 Changing control to get #7 opening high pressure H_2.
13:00 Transferred wax to the wax bin, Field logs taken.
13:15 Changing to control to go to #8.
13:30 Changing to control to go to #9.
14:15 Changing to control #10.
14:30 Bringing filter 22.62 C into service.
14:50 Reactor temperature excursion. HP H2 valve in manual operation let too much flow in. Maximum reactor temperature hit 538°F.
16:15 22.16 transfer to trailer #1516.
Start level = 82.5" 1348.5 gal
End level = 18" 212. gal
1136.5 gal
density reading ~0.58
16:30 Trying to stabilize at startup condition #7.
20:30 Field logs taken.
22:50 Switched reactor temperature control over to cascade and started making 1°F increases in set point. Control performed well up thru 250°F.

30 March 1998
04:40 Reactor temperature steady at 454°F. Starting to cut back on recycle flow.
05:30 Small decrease in recycle not having much effect. Going back to 1°F temperature increases.
07:15 Day tank transfer to trailer. Starting level 58 ¼". Ending level 0" - they blew it dry to maximize trailer volume.

09.20 Took field readings. Sight glass on 22.10 valved out so reading is 0. Should be temporarily valved in before future readings.
10:00 Took nuke scan.
10:20 Moving flows to start-up case #7. Leaving reactor temperature in control.
10:40 Took slurry sample #10.62-6. Looks good. Previous "slurry" sample at 01:00 probably really heavy wax from wrong sample point.

15:15 Raising reactor temperature 1° to reach start-up case #7. Backed out some LP H2 earlier to help reactor feed reach target composition, temperature set-point 457°F.
16:00 Increasing temperature to 458°F.
16:45 Increasing temperature to 459°F.
17:30 Increasing temperature to 460°F.
18:00 Increasing temperature to 461°F.
18:30 Moved valve 166A bypass from 74.5 to 74.0
18:40 Increasing temperature to 462°F.
19:00 Increasing temperature to 463°F.
19:25 Increasing temperature to 464°F.
20:00 Increasing temperature to 465°F.
21:00 Moved valve 166A bypass from 74.0 to 73.5.
21:20 Another 0.5% on fin fan to 73%.
21:50 Moved fin fan again to 72.5%. 0.5% moves don't seem to do much anymore.
22:15 Increasing reactor set point to 467°F.
22:45 Moving to 468°F.
23:30 Moving to 469°F. Reactor feed composition: 45.0% H_2, 7.0% N_2, 41.4% CO, 4.6% CH_4

31 March 1998
00:00 H_2/CO in reactor feed at 1.07
00:15 Moving to 470°F. Reactor feed H2/CO pretty steady at 1.07.
00:30 This last move has caused more of a swing than before. The heaters fired down to 30-40%, and temperature overshot the set point by a full °F.
01:15 H_2/CO in reactor feed at 1.01. Consider this condition #7. Moving fin fan bypass to 72% to get heater firing up before adding flow.
01:45 Light rain starting.
02:20 Light rain doesn't seem to have much effect. Decreasing fin fan bypass to 71.5%.
02:40 Moving fin fan to 71%.
03:10 Moving again to 70.5%.
03:20 Moving fin fan bypass to 70%. Small moves no longer having much effect.
03:30 Moving again to 69%.
03:40 Wind shifted and rain got heavier - front coming thru. Definitely having an effect on U.O. circuit; heaters firing up to compensate.
04:10 Moving FIC-104 (CO) from 10.5 to 10.7 and FIC-1200 (HP H_2) from 6.5 to 6.8.
04:35 Duplicated previous move on fresh feeds. CO + 0.2 to 10.9 and HPH_2 + 0.3 to 7.1.
05:05 Moved CO + 0.4 to 11.3 and HPH_2 + 0.6 to 7.7.
05:40 Moved CO + 0.4 to 11.7 and HPH_2 + 0.6 to 8.3.
06:10 Last move on flows to startup condition #8 (before fine tuning):
CO + 0.4 to 12.1 and HPH_2 + 0.6 to 8.9.
06:15 Moved fin fan bypass to 68.5%.
06:50 Increased reactor setpoint to 471°F.
07.25 Increased reactor setpoint to 472°F.
08:15 Increased reactor temperature setpoint to 473°F.
08:55 Increased reactor temperature setpoint to 474°F.
09:50 Increased reactor temperature setpoint to 475°F.
Reduced 166A setpoint to 66.54.
10:45 Increased reactor temperature setpoint to 476°F.
11:10 Increased reactor temperature setpoint to 477°F.

11:15 Transferred 91.5” to 21” from 22.16 to trailer 1514,
= 1243 gallon from 22.16 → 1243 gallon in trailer.
11:40 Increased reactor temperature setpoint to 478°F.
11:20 166A to 66.04.
12:06 Increased reactor temperature setpoint to 479°F.
12:30 Going to condition #9.
CO 12.1 → 12.2 MSCFH setpoint
HPH_2 8.9 → 9.1
12:40 CO 12.2 → 12.4, HPH_2 9.1→ 10.1.
13:10 CO 12.4 → 12.7, HPH_2 95 → 10.1.
13:40 CO 12.7 → 13.0, HPH_2 10.1 → 10.7.
13:50 166A to 65.5%.
14:15 CO 13.0 → 13.3, HPH_2 10.7 → 11.3
14:30 166A to 65%
14:55 CO 13.3 → 13.6, HPH_2 11.3 → 11.9.
15:15 166A to 64.5%
15:50 166A to 64%
16:00 D filter valve position changed to 26 - 28,
Increasing recycle to get Rx flow = 96,000 SCFH
17:40 Increasing Rxt temperature to 480°F
18:20 Increased Rxt temperature to 481°F
18:50 Increased Rxt T to 482°F
19:23 Off gas H2/CO = 0.64
19:30 166A to 63.5%
19:50 166A to 63.0%
21:00 166A to 62.5%
21:20 166A to 62%
21:50 Increased CO 13.6 to 13.8 KSCFH, HPH_2 11.9 to 12.3 kscfh
22:20 Moved CO + 0.2 to 14.0 and HPH_2 + 0.4 to 12.7
22:50 Moved CO + 0.2 to 14.2 and HPH_2 + 0.4 to 13.1
23.25 Moved CO + 0.2 to 14.4 and HPH_2 + 0.4 to 13.9
23:55 Moved CO + 0.2 to 14.6 and HPH_2 + 0.4 to 13.9
This should be the last major flow move to startup condition #10.

1 April 1998
00.40 Increased reactor setpoint to 483 F.
01:00 Moved fin fan bypass to 61.5%.
01:20 Moved fin fan bypass to 61%.
02:00 AJ caught samples of heavy wax and water/hydrocarbon
02:05 Increased reactor setpoint to 484 F. H_2/CO in reactor effluent at 0.69.
03:45 H_2/CO in reactor effluent at 0.66 for the last 2 shots. Moving to AF-R16.1.
CO + 0.2 to 14.8 and HPH_2 + 0.4 to 14.3
04:25 Moved CO + 0.2 to 15.0 and HPH_2 + 0.4 to 14.7.
04:55 Moved CO + 0.2 to 15.2 and HPH_2 + 0.4 to 15.1.
05:25 Moved CO + 0.2 to 15.4 and HPH_2 + 0.4 to 15.5.
06:05 Moved CO + 0.2 to 15.6 and HPH_2 + 0.4 to 15.9.
06:30 Day tank transfer to trailer #1514. 110” to 50”
= 1057 gallons x 1.08 density factor = 1142 gallons

Increasing recycle flow to get F1-187 up to 102.5 KSCFH. 1% move got it to about 101.8 KSCFH.

08:30 Significant pressure fluctuation during tuning of PIC-201.
09:40 Increased reactor temperature to 485°F.
11:15 Increased reactor temperature to 486°F.
12:60 Increased reactor temperature to 487°F.
12:30 HIC-166 (fin fan bypass) at 57.2%, Moved gradually between 11:14 and 12:30.
14:00 Day tank transfer.
14:00 Increased reactor T to 488 F.
14:25 Increased reactor T to 489.
Day tank transfer complete, level down from 90" to 22"
= 1481 gal - 282 gal = 1199 gal * 1.08 = 1295 gal
into trailer 1515 → trailer level at 1295 gal
Density meter began at 1.0 (fluctuating between 0.9 and 1.1) then moved to 1.1 (1.06 to 1.16) at 80" then moved to 0.95 (0.953 to 0.958) at 57" → hydrocarbon phase.
14:55 Increased reactor setpoint to 490F, Moved fin fan bypass to 57%
15:40 HPH_2 15.9 → 16.5 MSCFH, H_2/CO in Rx feed = 1.09, H_2/CO in outlet = 0.63.
17:55 HPH2 16.5 → 17.1 MSCFH
19:15 Move fin fan bypass to 56.6% (from 56.8%).
19:25 Move fin fan bypass to 56.4%>
19:40 Move fin fan bypass to 56.2%.
19:42 Move fin fan bypass to 56%.
22:48 Increased reactor setpoint to 491°F.
23:20 Dean is switching GC's over to pre-planned sequence.

2 April 1998

00.10 Day tank transfer to trailer #1515. 79.5" to 21"
= 1032 gallons x 1.08 density factor = 1115 gallons.
04.30 AJ caught heavy wax and water/hydrocarbon samples.
06:10 SD-2 on high temperature to 22:10.
10:50 21.65 cooling water had vapor-locked, causing no CW flow and high T on 22.10. After restarting compressor and stabilizing plant, slurry loop plugged. Have spent the morning restoring flow in the filter loop, now lowering slurry level in the reactor before bringing recycle flow and productivity back up. Target is start-up condition #6.
12:00 Nuke scan done
12:15 Increased LP H2 10 to 10.2.
12:25 Took C-filter off line (was on-line to bring down reactor level).
12:30 Increased LP H2 10.2 to 10.5
CO @ 7.6
13:00 Increased LP H2 to 11.0.
13:20 Increased LP H2 to 11.5.
13:35 Reactor temperature setpoint at 458F.
13:50 Reactor temperature setpoint at 459F.
14:00 Reactor temperature setpoint at 460F, Fin fan bypass @ 74%.
14:20 Reactor T @ 461F.
14:30 Reactor T @ 462F.
14:40 Reactor T @ 463F.
14:45 Increased CO to 7.9.
14:50 Reactor T @ 464F.

15:15 Reactor T @ 466F.
15:20 CO to 8.2 MSCFH.
16:07 CO to 8.5, H2 to 12.1.
16:17 Swapping out some LP H2 to bring HP H2 on-line.
16:30 Day tank drain (22.16)
16:17 LPH2 @6.6
HPH2 @ 5.5
16.23 HPH2 @ 5.8
16:28 HPH2 @ 6
16:33 HPH2 @ 6.2
16.55 Completed transfer of 22.16 to trailer 1516 level from 77" to 21", hydrocarbon reached at 35": 1251 gal - 264 gal = 987 gal. Trailer @ 0 + 987 (1.08) = 1066.
17:03 HPH2 @ 6.4 MSCFH.
18:00 $\left.\begin{matrix} CO\ 8.5 \rightarrow 8.8\ mscfh \\ HPH2\ 6.4 \rightarrow 7.0 \end{matrix}\right] 2{:}1$ moving to start up condition #7
18:20 $\left.\begin{matrix} CO\ 8.8 \rightarrow 9.1 \\ HPH2\ \ 7.0 \rightarrow 7.6 \end{matrix}\right] 2{:}1$
18:35 $\left.\begin{matrix} CO\ 9.1 \rightarrow 9.4 \\ HPH2\ \ 7.6 \rightarrow 8.3 \end{matrix}\right] 7.3$
19:00 $\left.\begin{matrix} CO\ 9.4 \rightarrow 9.6 \\ HPH2\ \ 8.3 \rightarrow 8.8 \end{matrix}\right] 2.5{:}1$
19:20 $\left.\begin{matrix} CO\ 9.6 \rightarrow 9.8 \\ HPH2\ \ 8.8 \rightarrow 9.2 \end{matrix}\right] 2{:}1$
19:50 $\left.\begin{matrix} CO\ 9.8 \rightarrow 9.6 \\ HPH2\ \ 9.2 \rightarrow 9.6 \end{matrix}\right] 2{:}1$
20:05 $\left.\begin{matrix} CO\ 10 \rightarrow 10.2 \\ HPH2\ \ 9.6 \rightarrow 10 \end{matrix}\right] 2{:}1$
20:20 $\left.\begin{matrix} CO\ \ 10.4 \\ HPH2\ \ 10.4 \end{matrix}\right] 2{:}1$
20:35 Increased reactor setpoint to 468F
20:45 Increased reactor setpoint to 469F
21:05 Increased reactor setpoint to 470F
21:20 Increased reactor setpoint to 471F
21:40 Increased reactor setpoint to 472F.
22:15 Reactor feed H2/CO is 1.02 @ 2154. Moving to startup condition #8.
Increasing CO + 0.3 to 10.7 and HPH_2 + 0.6 to 11.0
22:35 Increasing CO + 0.3 to 11.0 and HPH_2 + 0.6 to 11.6
22:55 Increasing CO + 0.3 to 11.3 and HPH_2 + 0.6 to 12.2
23:15 Increasing CO + 0.3 to 11.6 and HPH_2 + 0.6 to 12.8
23:40 Increasing CO + 0.3 to 11.9 and HPH_2 + 0.6 to 13.4

3 April 1998
00:00 Moved reactor setpoint to 473F.
00:15 SP1 and SP8 got a "0" MW, which screwed up the flow calculations on F1-126 and F1-245 momentarily. The DEC "messages" screen shows a bad file received from HP at 00:13. There's been a message like this every hour or so for the last several days.

00:20 Moved reactor setpoint to 474F.
00:40 Decreased fin fan bypass to 71.5%.
00:50 Moved fin fan to 71%.
01:00 Moved fin fan to 70.5%.
01:10 Moved fin fan to 70%.
01:20 Moved fin fan to 69.5%.
01:30 Moved fin fan to 69%.
01:40 Increased reactor setpoint to 475°F.
02:05 Increased reactor setpoint to 476°F.
02:20 Increased reactor setpoint to 477°F.
02:35 Increased reactor setpoint to 478°F.
02:50 Moved fin fan bypass to 68%, AJ caught heavy wax and water/hydrocarbon samples.
03:05 Increased reactor setpoint to 479°F.
03:55 Increased reactor setpoint to 480°F. Reactor effluent H_2/CO = 0.74.
04:15 Increasing CO + 0.3 to 12.2 and HPH_2 + 0.6 to 14.0.
04:25 Increasing CO + 0.3 to 12.5 and HPH_2 + 0.6 to 14.6
04:35 Increasing CO + 0.3 to 12.8 and HPH_2 + 0.6 to 15.2
04:50 Increasing CO + 0.3 to 13.1 and HPH_2 + 0.6 to 15.8
05:00 Increasing CO + 0.3 to 13.4 and HPH_2 + 0.6 to 16.4
This should be the last major move to startup condition #9, although F1-187 hasn't increased at all, so recycle might have dropped off.
05:10 Moved fin fan to 67%.
05:25 Increased reactor setpoint to 481°F.
05:45 Increased reactor setpoint to 482°F.
06:05 Increased reactor setpoint to 483°F.
06:15 Moved fin fan to 66.5%.
06:30 Increased reactor temperature to 484°F.
06:40 Increasing recycle how to reach 96 MSCFH reactor flow.
07:00 Increased reactor setpoint to 485°F, Moved fin fan to 66%.
07:15 Increased reactor setpoint to 486°F.
07:35 Increasing CO + 0.2 to 13.6 and HP H2 + 0.5 to 16.9.
07:45 Moved fin fan to 65%.
07:55 Increasing CO +0.2 to 13.8 and HPH2 to 0.5 to 17.4.
Completed 22.16 transfer to trailer 1516 72" down to 19.5, hydrocarbon reached at 34"
1163 gal - 238 gal = 925 gal. Trailer 1516 at 1066 + 925 (1.08) = 2065 gal.
08:13 Increased CO + 0.2 to 14.0 and LP H2 + 0.5 to 7.1, Moved fin fan to 64%
08:30 Increased reactor setpoint to 487°F.
08:45 Increased CO +0.2 to 14.2 and LP H2 + 0.5 to 7.6.
08:50 Increased reactor setpoint to 488°F.
09:00 Increased CO + 0.3 to 14.5 and LP H2 +0.6 to 8.2.
09:15 Increased CO + 0.2 to 14.7 and LP H2 + 0.6 to 8.8.
09:10 Increased reactor setpoint to 489°F.
09:30 Increased reactor setpoint to 490°F.
09:40 Increased reactor setpoint to 491°F, Call this startup condition #10
Run #1 condition before trip was 15.6 CO, 10.4 LP H2 and 17.1 HP H2 @ reactor temperature of 494°F. Currently at 14.7 CO, 8.8 LP H2 and 17.4 HP H2 @ 491°F.
09:55 Reactor feed at 1.13 H2/CO, outlet 0.69 H2/CO.
10:00 Increased reactor setpoint to 492°F

Increased CO +0.3 to 15.0 and LP H2 +0.6 to 9.4.
10:10 Increased reactor temperature to 493°F.
10:20 Changed CO +0.3 to 15.3; and LP H2 +0.6 to 10.0 and HP H2 -0.3 to 17.1.
10:25 Increased reactor setpoint to 494°F.
10:30 Increased CO +0.3 to 15.6 and LP H2 +0.4 to 10.4.
10:55 Increased LP H2 +0.3 to 10.7.
*12:00 Start of Mass Balance period - Condition #1, GC's switched to mass-balance sequence.
12:45 Nuke scan → FT4NK20.xls
15:15 Heavy wax sample taken
15:45 22.14 drained to 27.13 to wax bin
28.30 being drained to wax bin.
16:45 Day tank transfer
67" 1075 gal x 1.08 = 1161
20" 247 gal x 1.08 = 267
894 gal into 1516
+ 2065
2959 gallon total
17:00 Nuke scan.
17:45 Cut back on filter flow 25 → 20

4 April 1998
02:05 AJ caught heavy wax and hydrocarbon/water samples.
03:10 AJ caught a slurry sample.
03:50 Day tank transfer to trailer #1515. 89" to 20 ¾" (1299 gallons)
04:05 Heater firing is getting pretty high during the coldest part of the night. Increased fin fan bypass to 51.5%.
04:15 Moved fin fan bypass to 51%.
08:30 22-16 transferred from 44.75" to 18" in the trailer. The rest went to 6 drums (18" to empty), (~200 gallons)
11:00 28.30 wax transferred to drums. Filled 3 ¼ drums. Stopped when gas started coming out. ~3/4 drum of wax left in tank, 4 drums → ~200 gallons
17:00 22.16 transferred 57" to 20" in trailer 1515.
Previous amount in trailer = 1808 gal
+704 gal
2512 gal → present total in trailer
20:00 Dumped 22.14 to 27.13
23:15 Heavy wax and hydrocarbon/water samples.

5 April 1998

02:00 ***Daylight savings time begins - This hour "lost"***.
03:00 We will not adjust the DEC clocks or GC.
03:00 CDT - Trends on control room screen have been lost. Time moved from 01:59:59 CST to 03:00:00 CDT and trend lines stopped being updated. Triangle at top of plot still moves forward as time passes. This would be a very bad time for an upset.
03:45 Beginning transfer from 22.16 to trailer.
04:00 Trends resumed on screens. One hour gap between 03:00 CDT and 04:00 CDT.
04:10 Transfer from 22.16 to trailer complete.
77" - 20.25" = 1251 = 1000 gal uncorrected
trailer 1515 level: 2512 gal + 1000 (1.08) = 3592 gal in trailer.
05:05 Decreased HP H2 -0.6 to 16.5 MSCFH, Increased CO +0.1 to 15.7 MSCFH
Run condition #1 complete, Moving to condition #3
06:00 Increasing recycle to go to transient 1
(Rx feed = 140,000 SCFM), Recycle on 01.20 58 to 57%
07:00 Drained additional 3 ¼ drum of wax from 28.30, ∴ totally 6 ½ drums filled.
Recycle in 01.20 57 to 56%
14:00 Increasing recycle @ 1%/15 minutes, 40% at 13:30
16:00 Day tank transfer 84" → 21", 1200 gallons (converted #)
Total in trailer 1515 = 4592 gallons - FULL to 90% capacity
Started increasing temperature since PIC 190 was 97% open (could not add more recycle), Reactor feed @ 147.9 kscfh, TIC 190-2 @495F
18:00 Resuming 1% moves on recycle (PIC - 247-2)
H2/CO reactor feed 1.11 - 1.13, Reactor outlet 0.83
19:00 Trying to empty 27.12 to 27.10 (looked like reactor level was low).
19:15 PIC 190 oscillating - increased TIC-190-2 to 489F, Recycle at 159 kscfh
20:50 Increased reactor setpoint to 499°F.
22:00 Reactor level has been low. Cutting back on wax to raise level.
22:40 Increased reactor setpoint to 500°F.

6 April 1998

00:45 Heavy wax and hydrocarbon/water samples taken.
01:00 Increased reactor setpoint to 501°F, Wax filtration loop at 3%.
02:00 Increased reactor setpoint to 502°F.
02:05 01.20 discharge temperature at 140°F. Compressor trips at 150°F. Backing off latest recycle increase to bring temperature down.
02:50 Increased reactor setpoint to 503°F.
03:50 Transferred from 22.16 to trailer 1514, 89" to 20.25" = 14.63 -251 gal = 1212 gal
trailer 1514: 0 + 1212 (1.08) = 1309 gal in trailer
04:20 Increased reactor setpoint to 504°F.
05:40 22.14 temp 320 → 315°F
07:05 22.14 temp 315→ 310°F
07:20 Transferred 28.30 wax: 1 ¾ drums, Totally 8 ¼ drums.
08:00 to 10:00 Increased Rxt temperature setpoint 504.5 → 508°F.
11:00 Disregard - Start data collection for 16.3 (10:00 hrs DEC time).
GC's switched to data sequence.
For 22.16 transfer: Use tank 1515 char, Max Vol. = 90% 5330, = 4797 gallon
13:00 Have reduced reactor temp setpoint → making too little wax/too much methane.
Reactor level is low, Reactor setpoint @ 505.5F.

15:30 Resuming reduction in reactor T setpoint, Want to return to 499 (avg reactor T) to prevent killing the catalyst. Reducing recycles to keep PIC-201 in control.
16:00 Day tank transfer 90.5" → 20"
1342 gallons (corrected valve) transferred 2651 gal in trailer 1514
17:30 Shooting for 499F average reactor T
Maximum recycle allowable in automatic 201 control
19:00 22.16 transfer 37.5" → 20.5"
319 gallons (corrected) - trailer 1514 full
20:30 Reactor setpoint at 500°F
22:30 Bypass on purge closed. Reactor flow FI-187 at ~148 mscfh.

7 April 1998
00:00 *Start data collection for 16.3 @ 00:00 (real time), 4/6/98 23:00 DEC time
01:00 Heavy wax and hydrocarbon/water samples taken.
Wax looked brownish, like caramelized sugar.
03:30 Heavy wax sample taken.
07:30 Nuke scan done.
08:00 22.16 transfer 90.5" → 20.5", 1333 gallons (corrected valve) in trailer 1516.
09:00 Tracerco setting up for Gamma Scan.
~10:45 Tracer scans begin, 2710 feed flow (FI-187A) 144.3 mscfh, T average = 502.1
12:00 Tracer scans completed.
14:50 Noticed that last GC update was 0744 (DEC time, i.e. 08:44 real time)
Dean is rebooting the GC's and restarting the sequence.
Message file shows a bod file received from HP at 0746 (bad message files started on April 3 09:14 and occurred ~hourly) until April 7th 07:46.
15:30 Scott caught a slurry sample
16:00 Bharat not in the office and Rodger out until 4/20. Trying NG_Stop and NG_Start.
Some sort of problem on the restart and the DEC seemed to go thru a warm boot on its own.
16:15 NG_Start
16:50 System didn't come up quite right - signal overview doesn't have tag list and reactor picture won't load up. Tried a cold boot (pulled the plug).
17:00 DEC + HP on CDT. Reset clock to CDT and Dean reset clock on HP. NG_Start. Once again, the system didn't come up quite right, but signal overview looked OK after closing and restarting. No such luck with picture and HP still isn't sending data across.
18:00 Got in touch with Rodger Kradel in San Francisco (925) 676-2324. We tried a few things over the phone without success. He's going to try to dial in, but not right away.
18:15 Dean is starting and re-sequencing all analyzers so we will at least have hard copy output.
19:50 Day tank transfer to #1516. 88 ½" to 20 ¾".
1454 gal -260 gal = 1194 *1.08 = 1289 gal into trailer
Trailer 1516: 1333 gal + 1289 gal = 2622 gal in trailer 1516
23:05 Day tank transfer into 1516 trailer
36.75" to 20.75" = 542 gal -260 gal = 282 gal
Trailer 1516: 2622 gal + 282 * 1.08 = 2926 gal in trailer
23:30 Heavy wax and hydrocarbon/water samples taken.

8 April 1998
00:15 Dean tried to reboot HP again. No luck. Trying NG_Stop.

00:20 NG_Start.
02:00 DEC is fixed. The file FROMHP.TXT from the HP system were not being processed because the files FROMHP.OLD had reached the limit on version number of 32767. When the FROMHP.OLD files were renames to HP.LAST to clear the version number, the backlog of FROMHP.TXT files was processed. The GC data was processed in a 10 minute period from approximately 01:15 to 01:25 CDT. Therefore, data from GC's for 07:44 CST (08:44 CDT) to 01:25 CDT is compressed into that 10 minute period.
08:30 Downloaded average and instantaneous data from 01:22 - 07:20 to verify continuous data collection from 1 a.m. on. Will switch to condition 4 @ 1 p.m. (12 hours of data) after communication restored).
11:20 Day tank transfer. 86" → 20.5" 1247 gallons (corrected valve) transferred. Additional wax and slurry and liquid samples taken - per DOE request. From now on, 3 sample bottles should be taken at each sample time (one for Shell, one for APCI, one for DOE).
13:00 GC's to be rebooted at end of condition AF-R16.3 due to GC problem. GC's will be re-sequenced for transition between conditions 3 and 4.
13:05 Beginning transition to condition AF-R16.4 by cutting back recycle and decreasing temperature.
13:25 GC's back on line (after 15 minute reboot and re-sequencing).
13:45 Closed off wax take-off to 28.30 to minimize reactor level loss as feed flow is decreased.
15:10 Making first move on fresh feed flows. CO -0.2 to 15.5, HPH_2 - 0.1 to 16.4
15:40 CO -0.3 to 15.2, HPH_2 -0.3 to 16.1
16:10 CO - 0.5 to 14.7, HPH_2 -0.2 to 15.9
16:40 CO - 0.6 to 14.1, HPH_2 -0.3 to 15.6
17:10 CO - 0.6 to 13.5, HPH_2 -0.3 to 15.3
17:40 CO - 0.5 to 13.0, HPH_2 -0.3 to 15.0
18:00 Reactor level has come back up some since we stopped decreasing recycle flow. Opening back up on the wax take-off. 5%
18:10 CO -0.5 to 12.5, HPH_2 -0.3. This concludes first-pass moves on flow.
21:10 HPH_2 +0.3 to 15.0
21:15 Decreased wax take-off to 3%.
21:40 HP H_2 + 0.3 to 15.3
22:07 HP H_2 + 0.3 to 15.6
22:30 Decreased reactor setpoint to 480°F.
22:20 HP H_2 +0.3 to 15.9
23:50 Decreased reactor setpoint to 479°F. Wax takeoff at 0%.

9 April 1998
00:45 Transferred 22.16 to trailer 1514
Hydrocarbon at 35" → 87" to 21.25" = 1428 gal - 259 gal = 1159.
Trailer 1514: 1247 gal + 1159 gal (1.08) = 2499 gal
01:05 Decreased reactor setpoint to 478.5°F. Wax takeoff at 2%
01:40 HP H_2 +0.1 to 16.0
02:30 Decreased reactor setpoint to 478°F, Wax takeoff at 3%
Transferred 22.16 to trailer 1514
30" to 0" = 423 gal, trailer 1514: 2499 gal + 423 gal (1.08) = 2956 gal.
02:35 Wax samples taken
03:30 Decreased reactor setpoint to 477°F

05:55 Wax takeoff at 5%.
07:55 Increased wax take-off to 7%.
08:00 PIC-201 bypass is completely closed. GC sequence started
08:30 Increased wax take-off to 8%.
10:40 Decreased wax take-off to 6%.
13:30 Temperature excursion, apparently related to a big swing in HP H2 line pressure caused by Shell Deer Park. Wax take-off closed during the recovery.
Maximum reactor temperature (TIC-190-2) was 518°F at 13.43.
16:30 Transferred 22.14 to trailer
72.5" to 28.75" density = ~ 1.1, 28.75" to 20.375" density = ~ 0.95
18:00 Conditions back to R16.4, Begin data period #2
H_2/CO in Rxt feed = ~2.0, Rxt out = ~ 1.7
20:30 Slurry, heavy wax, and 22.10 samples taken.

10 April 1998
06:50 Day tank transfer to *1516. 89" to 20". Hydrocarbon/water interface at about 36".
06:55 Changing conditions to return to baseline.
13:00 Flows and temperature are back at baseline condition. Starting regular GC sequence.
14:00 Begin data period for run 16.5 (baseline repeat).
19:30 Day tank transfer to #1516. 88.25" to 20.5", density change @ 47.5"

11 April 1998
03:30 Catalyst, heavy wax, and 22.10 samples taken.
06:00 Transferred 22.16 to trailer 1516 - hydrocarbon at 36"
76" to 20" = 1234 gal -247 gal = 987 gal
trailer 1516: 3618 gal + 987 gal (1.1) = 4704 gal in trailer
15:00 Wax samples taken.
17:00 Day tank transfer to #1513
77.5" + 21" ⇒ 966 gallons (1096 gallons corrected), hydrocarbon @ 38"
19:30 AJ noticed that 27.15 temperatures have dropped sharply since 9 a.m.

TI 1763	9 am = 445.66	7:30 a.m. 295.75
TI 1762	= 387.07	341.11

middle T1 is lower than upper TI
Reducing filter flow to raise level in 27.15 to test TI's in 27.15, Reactor level = 215"
20:45 T1 1763 & 1762 are increasing. T1 - 1763 = 311.51 (middle T still lower than upper T)
T1 - 1762 = 344.32
23:30 Lost the plant because of pump problems in the filtration loop. Around 19:00, AJ noticed that the degasser showed a low level by TI indication even though reactor level was fine. AJ tried to drop pressure on the degasser with HV-1753 closed to clear any plugs, but in the process of re-pressuring, the 10.62 pump lost prime. Henry and AJ found wax in the 10.63 pump reservoir and associated piping, so the pump is down for maintenance. While trying to troubleshoot the pumps during the night, we slowly backed outflows and dropped temperature to maintain reactor level. Eventually, we backed out all of the CO and HP H_2 and set up 5K each on LP H_2 and N_2.

12 April 1998

08:30 Plant de-pressurized <100# to blank off 10.62 suction for maintenance.
14:20 10.62 pump back in. Filled up the filer loop with Durasyn - 164.
14:30 Started 10.62
15:00 Increasing 27.10 pressure.
15:45 10.62 pump back in 27.10 loop.
16:05 CO brought in @ 5 mscfh, N_2 backed out (on "big Joe"), LP H2 ~9 mscfh
Target HP H2 = 17.2, LP H2 = 10.7, CO = 15.6
Temp = 494 setpoint, Rx feed = 103
16:35 Swapped 10 LP H2 for 5 HP/5 LP H2
17:00 LPH2 @7.7 mscfh, CO @7.5, HP H2 @6.8
17:30 LPH2 @ 10.7 @ target, CO @ 9.5, HP H2 @6.8, T setpoint on reactor 455F
18:20 HPH2 @ 9.9, LPH2 @ 10.7, CO @ 11.2
19:15 HP H2 @ 12.3, CO @12.7
19:30 Latest moves made system swing, Backed at HPH2, letting system equilibrate
Next move will be increasing recycle so 27.10 feed ~91000 (start up condition #3)
21:00 Tank transfer. 87.25" → 20.5" in 22.16
Transferred 1294 gallons (corrected) into trailer #1513.

13 April 1998

04:20 AJ caught heavy wax and water/hydrocarbon samples.
06:40 Have been slowly returning to baseline condition all night. Last flow move AJ 06:25, last temperature move at 06:40.
08:45 GC's switched data mode.
09:00 Data period R16.5C begins.
13:30 Transferred 22.16 to trailer #1513. 89.75" → 20.5". density change @ 44"
Tracerco set up for tracer studies.
22:40 Day tank transfer to trailer #1513. 73 ¾" to 20 ¼".
Density transition at 38".

14 April 1998

02:15 AJ caught heavy wax and water/hydrocarbon samples.
08:00 Tracerco here for first tracer study (AF-R16.5)
11:00 Day tank transfer 85" → 20.5" 1250 gallons (corrected)m in #1514
Collected 3 hydrocarbon samples from end of transfer
(previous 22.11 samples have been all water, collect samples at each future 22.16 transfer).
11:00 GC shutdown for tracer injection studies.
14:00 22.16 transfer prior to tracer study
35 ¼ → 20.5" 286 gallons (corrected), total in trailer #1514 = 1536 gal.
15:06 First Ar-41 Injection
15:40 Second Ar-41 Injection w/liquid out defector plugged
16:15 Third Ar-41 Injection w la out and liquid defector plugged
17:50 MnO_2 Injected thru top nozzle (wall). (all detectors unplugged)
Significant radioactive remaining in the slurry line between reactor and degasser.
DO NOT TAKE ANY ACTION
We will monitor the radioactivity and barricade the area if necessary.
18:56 Catalyst support injected thru top nozzle (wall)
22:25 MnO_2 injection thru bottom nozzle. (center)

23:30 Catalyst support injection thru bottom nozzle. (center)

15 April 1998

00:15 Tracerco off-site. GC's on-line. Moving to high flow condition.
00:40 Nuke shutter open.
03:50 Day tank transfer to trailer #1514. 94" to 20 ½", Density transition at 44".
06:40 Last recycle and temp. move to reach high flow condition (AF-R16.7)
08:50 Decreased reactor T setpoint to 499F. (reactor level was dropping w/ no wax take off)
09:00 Switched GC's to full cycle.
10:22 HPH2 decreased from 16.5 to 16 mscfh
10:40 HPH2 decreased from 16 to 15.5
10:54 CO increased from 15.7 to 16.0
11:00 Reactor T setpoint down to 489F.
11:45 Reactor T setpoint @ 485F
Level in reactor still low (can't see where it is since nuke is racked out).
Adding durasyn (10-15 gallons) because flow through 10.62 pump was "struggling"
Reactor T dropped down to 476F
12:15 Reactor level still low → added wax from prep tank.
14:00 Adjusted Rxt temp set print to 485°F.
15:00 22.16 transferred to trailer #1514. 71.5" to 20.5". GC's turned off
17:15 22.16 transferred to trailer #1514. 33" to 20.5"
19:00 Added some durasyn-164 from 28.30 to 27.15 to bring reactor level up.
19:20 First argon injection.
20:07 Second argon injection (liquid out and liquid in detectors plugged)
21:15 Mn_20_3 injected thru top nozzle (wall)
22:18 Catalyst support injected thru top nozzle (wall)
23:43 Mn_20_3, injected thru bottom nozzles (center)

16 April 1998

00:36 Catalyst support injected thru bottom nozzle (center)
01:16 Repeat Mn_20_3, injected thru bottom nozzle (center)
03:15 Tracerco off-site. Nuke is racked in with shutter open. Bharat is doing a nuke scan.
03:35 Isolating filtration for shutdown test.
03:38 Tripping HV-150. PIC-201 closed manually. Blocking in feeds.
Starting slurry level = 215" on tape. Slurry level after gas shut down = 104" on tape.
08:00 Day tank transfer. 73" → 0", 1181 gallons → 1299 corrected gallons.
08:50 Filling 27.10 w/ 10.54
09:00 Flare out of service.
10:05 Flushed filter loop connections to 27.10.
10:30 27.10 filled w/ durasyn to top thermocouple.
12:30 GC's turned off → reading all N2.