APPENDIX D

Fischer-Tropsch II Run Chronology

Fischer-Tropsch II Run - May, 1994

5/7/94 10:00 Loaded 28.30 Prep Tank:

Wt. of full ethylflo-164 drum = 486 lbs
Wt. of ethylflo-164 drum after loading = 459 lbs
Amount of ethylflo-164 loaded = 27 lbs

Wt. of drum holder = 179 lbs
Wt. of 4 drums of Shell Start-Up Wax & Holder = 537 lbs
Wt. of Holder after Load #1 was loaded = 181 lbs
Wt. of Load #1 of Wax = 356 lbs

Wt. of 6 Drums of Wax & Holder = 731 lbs
Wt. of Holder after Load #2 was loaded = 191 lbs
Wt. of Load #2 of Wax = 540 lbs

Wt. of 2 1/4 Drums of Wax & Holder = 401 lbs
Wt. of Holder after Load #3 was loaded = 187 lbs
Wt. of Load #3 of Wax = 214 lbs

Total Loading of Wax in 28.30: 1110 lbs wax
27 lbs Ethylflo-164

Total Amount of Weight in 28:30 = 1137 lbs

5/10/94 9:00 FT-II Catalyst Loading / Activation

Samples of Catalyst Drums 1-4 UCSR23474 Customer PO OT-62181
L-3950 Catalyst Powder (1185-149)

Drum #	Tare	Empty	Net	Subtotal
1	373 lbs	130 lbs	243 lbs	243 lbs
2	373 lbs	126 lbs	247 lbs	490 lbs
4	372 lbs	125 lbs	247 lbs	737 lbs
3	382 lbs	134 lbs	248 lbs	985 lbs

10:30 Loaded Ethylflo-164 rinse

Wt of Full Ethylflo-164 Drum = 181 lbs
Wt. of empty Ethylflo-164 Drum = 45 lbs
Wt. of Ethylflo-164 rinse added = 136 lbs

After charging the prep tank, Matt noticed a clump of catalyst hanging out. The clump was removed with a pale - looks pretty well mixed.

13:00 Transferring slurry to 27.10 Reactor from 28.30 slurry prep tank.
Wt. of empty drum (ethylflo) = 46 lbs
Therefore, wt. of ethylflo added = 181 lbs - 46 lbs = 135 lbs

14:00	This is the start of the activation period (TOS = 0 for activation)! Transferred ethylflo chaser to reactor. Reactor level @ 112 - 117" level.
14:15	Started N2 Flow @ 5200 SCFH; Reactor pressure = 150 psig
14:30	Starting to bring CO in. Reactor temperature = 296 F. Reactor level = 141 inches. Saw a temperature rise, stopped at total flow of approximately 10,000 SCFH. Let the temperature peak go and flatten.
15:00	Increasing CO flow.
17:30	Reactor level at 157 inches.
17:50	Reactor at 3664 volts and counts = 199.
18:25	Reactor at 3582 volts and counts = 265.
19:00	Reactor at 3500 volts and counts = 179.
19:45	Made transfer from 22.14 to 22.12 (up to 9 bolts) to reactor (down to 2 bolts). Reactor cooled, OK.
19:55	Reactor at 3623 volts and counts = 130.
20:55	Reactor at 3646 volts and counts = 160.
21:30	Reactor at 3050 volts and counts = 104. (129 inches).
21:40	We're going to add ethylflo to 22.14. We've opened V-2139 to begin cooling 22.14 temperature (= 305 F). We're getting liquid in 22.18 and losing level in reactor.
5/11/94 01:00	Just completed adding about 10 nuts (34.3 gallons) of ethylflo into 22.14. We're bringing level up in reactor and shooting for 156 inches.
03:00	Resting comfortably: Reactor at 450 F and beginning to see increase in CO2 production. Holding level at 154 inches. The slurry is thicker than at start. Going to increase level to 157 inches.
05:00	Added 3 bolts of ethylflo (9.6 gallons). 22.14 cooled to 250 F (running set point of 280 F).
05:30	Talked with BLB and decided to raise level in reactor to 166 inches on the tape.
08:30	Reactor at approximately 518 F.
14:00	Filled 22.14 from 0 nuts to 4 nuts with ethylflo-164 (9.6 gallons).
17:40	Filled 22.16 level gauge with water.
20:00	Done with activation. Lowering temperature to 464 F.
21:00	H2 flow started (TOS = 0).
21:20	Main N2 off. H2 = 5700 SCFH, CO = 15000 SCFH.
21:30	H2 = 7800 SCFH, CO = 15000 SCFH. Temperature is rising.
21:42	Reactor temperature = 482 F, turning on fin fan, TI-190-4.
22:00	H2 = 10,200 SCFH.
23:00	Temp of reactor = 490 F, P = 200 psig, F = 28,700 SCFH.
5/12/94 00:00	Losing level in reactor too fast. Lowering setpoint to 290 F from 340 F. We are at rates and at temperature, 508 F, 200 psig. Added 8 1/2 bolts of ethylflo into the 22.14 and charged 27.12 to 1.75 bolts from "empty" (meaning some unknown level). Reactor at 135 inches. Will increase to 156 inches.
01:00	We are at 156 inches - on level control.

01:15 Lined up 22.18, 22.11, 22.15 (22.15 blocked in. 22.18 on LIC control).
Restarted the trend collector.

Digression: The DEC was up and down with modifications being made to files to get SPXMW up. Between 20:00 and, say, 22:00, the DEC was bad.

01:30 Ed has noticed reactor performance improved with level increase.
02:30 Added 7.5 bolts (from 3.5 to 11.0 bolts) to 22.14. Will be adding to bring reactor up to 172 inches on the tape.
02:00 Made set point changes to feed flow.
CO = 13.5 (7 % high)
H2 = 8.5 (20% high) These numbers are what it reads!
N2 = 0.5 (50% high)
Should give right flow and composition.
03:00 Lined out on level. Overshot composition correction (39 % N2) bumping up a bit.
03:08 GC "Bharat" gives 670 % C7 in effluent.
04:00 Lined out at approximately 40% N2 in feed.
07:00 Blocked in 22.18.

Digression: Summary of chat with Mike Herron
1) TREND_COLLECTOR was not on prior to 01:15 AM this morning. Therefore, cannot start data period prior to this time.
2) Overshot composition on D05001 (H2) at 03:00 AM this morning. Therefore, wait until at least 04:00 AM to start data period.
3) Bharat was showing 670% Heptane in effluent during night. This problem was not fixed until 10:00 AM on May 12th. Therefore, must exclude all Bharat information when do download on this information.

09:00 Brought 02.61 on line to increase reactor inlet.
11:00 Increased reaction temperature from 509 F to 518 F.
13:00 Did a nuke scan. Nuke readings not steady in liquid. (+/- 1).
Increasing linear velocity by reducing pressure to 150 psig.
Initial Nuke reading at 1096 volts equal too 13-14 counts.
Jumping to 16-17 counts after every move on pressure.
13:45 Putting N2 in the feed gas to 5000 SCFH. Initial Nuke reading at 1093 volts equal to 16 counts, and jumping around.
14:45 Diluting slurry from 157 inches to 190 inches.
16:00 Slurry sample taken from 22.18.
17:20 Reactor at 190 inches on level control.
18:20 Backing out N2: Reactor level dropped from 190 inches to 184 inches.
19:20 Added 12 nuts ethylflo to 22.14.
20:00 Completed Nuke scan at 190 inches. Begin Pressure ramp to 400 psig.
22:00 Around 300 psi on reactor, will hold. Temperature profile is hot in bottom and at top of reactor.
23:20 Begin to increase reactor levels to 211 inches on tape.

5/13/94 01:00	Going to control at 525 F. Reactor level at set point = 211 inches on the tape.
02:00	Samples from 22.15 sight glasses left and right, 22:15 sight glasses now contain aqueous. Sample from 22.18 and 22.14.
04:00	Put sample (22.14) in hot box to settle.
05:20	Reactor temperatures stabilized but falling for the last hour. Increased heater set point by 0.5 F.
05:45	Increased set point 1F.
05:55	Increased set point 1F.
08:25	Matt grabbed sample from 22.14 off 10.52.01 discharge.
08:50	Moved to H2 rich syngas (2:1 ratio H2/CO) to hopefully get rid of possible carbon that may have settled on catalyst.
09:00	H2 to 12.2 SCFH, CO to 10 SCFH.
09:20	H2 to 14.0 SCFH, CO to 7.7 SCFH.
09:40	27.11 in service.
09:45	Transferred 22.18 (11.5 nuts to 1 nut) level to 22.15.
10:00	Added 10 nuts of ethylflo to 22.14.
11:30	Installed jumper between 10.52.01 to 27.11 Hi-Point vent and 27.10 outlet Hi-Point vent to flush reactor outlet line.
13:30	Lined-up steam to 02.61.
13:50	Decided we will proceed with slump test.
14:01	Gas shut off. Started performing slump test. No liquid flow to reactor. Took nuke profile. Looks very uniform.
14:15	Starting gas again. Reactor slump test complete.
14:30	Reactor in level control at 211 inches. Reset TAH-625-2/3/4/5/6 to 590 F.
14:45	Increased 27.10 temp to 550 F.
15:00	Increased 27.10 temp to 572 F.
15:30	High Temperature Shut Down (SD-2). Some reactor temperatures were approximately equal to 626 F.
16:26	SD-2 on TI-723. Product side inlet to 21.38.
16:30	Shutting down the plant. Left syngas out, put N2 in. Cooling the reactor down.
5/14/94 01:00	27.13 heat-up proceeds slowly because of limited flow & temperature to 21.85.
04:45	Tried a slump test. Closed HIC-150 but flow kept coming to reactor. Had to close the other HIC-150 to isolate the reactor.
07:30	Completed 22.60 ethylflo test. 27.13 PIC-202 = 30.15 psig. Filter outside PI-739 = 33.13 psig. Filter inside pressure PI-732 = 37 psig (35.45 psig). Pump speed (10.60) = 200 RPM, Filtrate flow = 250 cc/53 sec.
07:32	Reactor at 142 inches on tape, beginning transfer, N2 flow on. Target reactor end level = 51 inches on tape.
07:35	Attempted wax transfer from 27.10 to 27.13.
08:00	Stopped wax transfer - samples too thick.
15:00	Drained slurry from 27.10 reactor directly to tote bin. Empty tote bin weight = 955 lbs Full tote bin weight = 3242 lbs Total slurry weight = 2287 lbs.

15:30 Drained 22.14: Drum #1 = 361 lbs
Drum #2 = 17 lbs

21:00 Drained 22.16

Drum #	Tare	Gross	Net	" from Top	Vol.	Density
1	45	455	410	1.75	55.6	55.2
2	45	443	398	1.75	55.6	53.5
3	45	339	294	8.0	45.1	48.7
Total	x	x	1102		156.3	52.7

Drum Vol = 58 gallons (from calculation)
22.15 Sight Glass - mostly HC
Estimate 768 lbs of hydrocarbons, 334 lbs of water using density of hydrocarbon = 48.7 lbs/ft3 and density of water = 62.4 lbs/ft3

5/15/94 Dave says that they drained 20 gallons of 22.18 and 20 gallons of 22.14 into drums (prior to 5/14 22.16 drain).

Fischer-Tropsch IIA Run - May, 1994

5/25/94 Loaded oil to 28.30

Drum # 1 466-114 = 352 lbs
Drum # 2 460-114 = 346 lbs
Drum # 3 363-116 = 249 lbs
Total = 947 lbs

5/26/94 00:00 Process back on site. Reactor has oil only and is under syngas at 480F. Nextgen is running . . .

07:25 Begin cooldown to 250F. Ed tells me he added 947 lbs of oil to prep tank yesterday.

10:30 Began catalyst loading to 28.30.

Drum #5 & Catalyst = 444 lbs
Empty Drum #5 = 125 lbs
Total Catalyst = 319 lbs

Drum #6 & Catalyst = 288 lbs
Empty Drum #6 = 125 lbs
Total Catalyst = 163 lbs

Final Catalyst Loaded = 482 lbs

13:30 Transferred catalyst/oil slurry from 28.30 to 27.10.

13:45 Added 342-114 = 228 lbs of Drakeol-10 to 28.30 for flushing transfer lines.

14:05 Transferred flush oil from 28.30 to 27.10.

14:10 Added oil to vessels: 13 nuts to 27.12, 16.5 nuts to 22.14.

14:20 27.10 at 75 psig, beginning heat up.

15:00 Reactor average temperature = 277 F, Reactor pressure=75 psig.

15:05 Slurry height = 136 inches on the tape.

15:10 10,000 SCFH N2 flow.
15:20 17.5 nuts on 27.12. Vessel readings from Matt.
15.0 nuts on 22.14.
Began raising reactor level. Target level = 166 inches.
15:45 Reactor at 166 inches on tape and in level control. 27.12 at 13.5 nuts, 22.14 at 2.5 nuts.
19:30 Reactor at 142 inches, 75 psig, 412 F on N2.
20:20 Reactor at 433 F, bringing in CO. Will ramp to 518 at 2F/4 min.

Digression #1: Ed reports approximately 5 lbs of catalyst left in prep tank. We will use 477 lbs of catalyst loaded for nuke spreadsheet calculations.
Digression #2: As it turns out, there was substantially more than 5 lbs of catalyst left in the prep tank. By DMH calculations then, the correct number of lbs of catalyst loaded = 445 lbs.

20:35 CO at 6800 SCFH (probably 7400 actual). Making fine adjustments to N2 flow, will wait for GC, Reactor at 442F.

Note: For activation, TIME ON STREAM = 0 at 20:30.

21:10 T= 460F.
23:25 Lined out at 518 F.

5/27/94 00:40 Completed nuke scan at 190 inches and will move to next level of 197 inches (01:00).
03:10 Nuke at 197 inches on tape.
03:50-04:00 Opened V-2120 and bypassed reactor.
10:15 Did nuke scan. P = 75.2 psig, T = 518 F. Level = approximately 191 inches (actually in interference range).
10:30 Gasoline fire on pressure washer near 27.10 unloading area.
11:15 Took levels before bringing in H2.
11:30 Started introducing H2 into plant. Target CO = 6250 SCFH.
H2 = 3800 SCFH.
Note: Flow factor corrections to use for feed flows:
CO = 0.93
H2 = 0.83
N2 = 0.67

TIME ON STREAM = 0 at 11:30 5/27/94.

11:45 SD-1 Shutdown - 01.20 high discharge temp. (01.20 recycle throttled).
11:50 Plant restarted and back at run conditions.
13:25 Increase H2 flow: 900 SCFH
H2 flow goes from 3800 to 4700 SCFH.
Reactor level still at 180 inches (4515 volts).
Note: Flow correction factor for H2 probably off - more like 1.00 than 0.83.

14:35		Added Drakeol-10 to 22.14 up to 16.5 nuts. (was at 3.5 nuts so added 13 nuts of oil).
15:00		Reduced FIC-111 to 225 SCFH.
16:30		22.18 at 1.5 nuts, starting to come up.
18:10		H2 in feed has gone up. Reduced H2 from 4.7 to 4.5 MSCFH (FI-101).
19:20		Reduced H2 from 4.5 to 4.3 MSCFH.
21:30		Took 22.14 sample.

Digression: NUKE SCANS

		Point 9 (3599 volts)	Point 5 (2494 volts)
	23:35	16.6	17.4
5/28/94	01:25	15.3	15.9

Nuke scan at 23:55 on 5/27/94 showed significantly lower holdup than previous one.
Nuke scan at 01:25 confirms reduction in holdup.
Call BLB while discussing the concentration of CO2 in effluent begins to fall off rapidly, H2 increasing as well.

02:00 During discussion, the compositions change +/- 4 points in an hour or so.

Flow Ramp:	H2	CO	
02:30	4.1	6.25	Begin
02:35	4.5	6.9	
	5.0	7.6	Hold to get temp.
02:55	6.0	9.1	Going to let temperature come up, putting utility oil on manual.
03:00	7.2	10.9	
03:10	8.6	13.1	Pressure in reactor = 179 psig, Temp in reactor = 529 F
03:15	10.3	15.7	
03:45	12.4	18.8	37.4 MSCFH on FI-187A, Pressure in reactor = 225 psig, Temperature in reactor = 522 F.

04:00 Bringing in HP H2. Increased HP H2 (holding CO constant) until total flow returned to previous level. New reference H2 flow (on FI-1200) is 17.9 SCFH.

	H2	CO	P	T	Flow (FI-187A)
4:20	21.5	22.6	275	553	44.3
4:25			300		
4:35	25.8	27.1	380	554	51.8
4:40	31.5	33.0			

4:50 Temperature of reactor = 553F. P = 450 psig, F = 62,500 SCFH
07:05 27.10 pressure at 750 psig.

07:45	Started transfer of 22.18 to 22.15. Then LIC-693 into Auto control (09:00).
10:00	27.10 level into auto at 182 inches.
13:00	Did nuke scan. Numbers are stable and uniform along length of reactor.
13:30	Rained like cats and dogs!
14:50	Filled 22.16 sightglass with water.
15:15	Starting pump back to 22.14.
15:45	Added oil to 22.14 (6.5 nuts).
15:58	FIC-1200 tripped on pressure differential. Attempted to reset HS-1200 (repeatedly) - would not hold.
16:20	Ed Heydorn called and authorized PIC-129-2 to be blocked-in to prevent FIC-1200 from tripping.
16:45	PIC-201 back at 750 psig.
17:00	27.10 back at T, P, and feed composition.
22:20	Took 22.11 and 22.14 samples.

5/29/84 00:30 Moving to new condition. Reactor at 182 inches., Temp = 574F, P = 750 psig, % bypass = 73.5, TIC 511. So . . . .

	Temp	Bypass	TIC	
00:30	574	73.5	511F	Note: TI-190-3B (Nozzle 5)
01:00	578	74.0	512F	is lagging
	581	74.5	513F	considerably behind
01:20	584	75.0	514F	by 4 - 8 F and
01:45	587	75.5	515F	dragging down the
02:05	589	76.0	516F	average temp.
02:35	595	76.5	517F	
		77.0		

03:10	Pretty much lined out - will hold for a while. Thermocouple at bottom and top of slurry a bit hotter (+ 2 F) than internals.
03:20	We are moving fin-fan. Bypass = 77%, TIC = 517F.
03:40	Lined-out. Drop 22.14 to 330 F.
04:30	Fill 22.14 from 3.5 nuts to 10 nuts.
05:47	GC Dennis gets hung up on a port - now out of sequence.
06:30	Changed TAH 626-2/3/4/5/6 from 590 to 605 F.
07:50	CO line pressure dropping. Someone jumped on CO line without calling the HYCO plant. FIC-104 in manual at 100%.
08:25	Reducing reactor temperature to 575-580 F in preparation for adding extra H2 to the feed.
08:40	GC Dennis back on-line.
09:45	Just noticed GC's haven't updated since 09:00. Dean is restarting his computer in the lab.
10:15	Beginning to increase H2 flow from 23.0 MSCFH. Starting increasing H2. Change in temperature in oil (out - in) increased from 32 to 34 F.
10:30	H2 at 31 MSCFH.
10:45	H2 at 1:1 ration with CO. Increasing H2 again. Also, just received good GC file. GC's appear to be sending to DEC again.

11:00	H2 at 41 MSCFH.
11:07	HS-1200 tripped - - - PI-1200/PIC-247-1 differential. Throttled V-1631 to drop 01.20 suction pressure.
11:20	Plant back at run conditions.
12:45	Reducing H2 back to 23.0 MSCFH.
13:05	Adding oil slowly to 22.14. Start at 15.85% on LIC-688, 3 nuts in 22.14 sight glass, 46.15% on LIC-639 (45% set point). Ended at top of second glass on 22.14.
15:20	Preparing for shutdown test. 22.14 = 15.5 nuts, 22.18 = 7.5 nuts, 27.12 = 8.5 nuts.
15:30	Slump test.
17:25	27.10 at 211 inches.
21:00	Block-in 22.15.
23:00	Loading approximately 2 x 350 lbs of Drakeol plus ethylflo into prep tank (2 x 55 gallons).
23:30	Samples taken on 22.14 and 22.11.
5/30/94 00:55	Starting to reduce rates. Dropping flow and pressure by 25 %.
01:25	Reducing rates to 50% of original values. Swapping out HP H2 for LP.
02:10	Adding oil to 22.14 from 0 nuts to 16.5 nuts.
04:30	Lined out (pumped back too much oil during flow drop, had to thicken). 29,000 SCFH, 375 psig, 518 F, DIC-636 at 211 inches. At these conditions, the weird thermocouple (190-3B) is right in line with the others.
07:20	End of period, begin cooldown.
07:35	PIC-201 at 250 psig.
09:00	V-2590 closed - - 10.52 to 27.10.
09:30	Drained reactor slurry from 205 inches on tape to 126 inches. % removed = 79/(205+32) X 100 = 33.33%.
10:00	HP H2 in service to 01.20. Bringing pressure, temperature, and flow up.
10:30	LP H2 blocked in. PIC-129-2 valved out and depressured to prevent HS-1200 from tripping. PIC-201 at 750 psig, CO at 31 MSCFH, H2 at 23 MSCFH.
11:15	Filled 22.14 from 2 nuts to 24 nuts.
15:30	We have been at condition with full reactor since noon. Reactor temperature is however drifting.
16:00	Filled 15.90 flare K.O. pot.
16:45	Grabbed 2 samples off of 22.11.
17:15	Had Matt take samples off of 22.11. Density analysis follows: Density (H2O phase) = 34.3507 g / 50.00 ml = 0.687g / ml Density (HC phase) = 55.2530 g / 50.00 ml = 1.1051 g / ml
19:00	HYCO 1 tripped, steam generator below out. Maintaining rates with HP H2 and CO pressure falling.
20:18	1200 trip. Low pressure on H2 pipeline. Swapped over to LP H2.
21:50	Back at conditions. T = 570F.
23:50	Samples taken from 22.11 and 22.14.

5/31/94 04:30 Have been cruising along but H2 flow drops out at 04:30.

08:30 Data period ends for AF-R12.3. T=578F, P = 750 psig, and Flow = 58000 SCFH.

09:25 PIC-201 at 500 psig.

10:45 Drained slurry/catalyst out of prep tank into 5 drums.
Results of the draining of the 28.30.
Weight of 4 drums (empty), Matt and hose = 666 lbs.
Weight after 1st drum was filled = 1009 lbs.
However, approximately 3 lbs of slurry spilled as Drum #1 was overflowed (rather, bubbled up and spilled out).
Therefore, net weight of drum #1 = 1009 - 666 + 3 = 346 lbs.

Weight of drum #2 = 1352 lbs
Net weight of drum #2 = 1352 - 1012 = 340 lbs.

Weight of drum #3 = 1698 lbs.
Net weight of drum #3 = 1698 - 1352 = 346 lbs.

Weight of drum #4 = 2054 lbs.
Net weight of drum #4 = 2054 - 1698 = 356 lbs.

New weight of 4 drums (empty), Matt and hose = 656 lbs.
Weight drum #1 = 819 lbs.
Net weight of Drum #1 = 819 - 656 = 163 lbs.

Total weight of drained slurry = 346 + 340 + 346 + 356 + 163 = 1551 lbs.

15:00 Results of 22.11 Two-Phase Liquid Samples follow:
(Note: This analysis is probably more accurate than previous one due to more accurate volume measurements.)

Top Layer: empty 25 ml flask = 19.7915 g
full 25 ml flask = 39.8015g
Density of top layer = (39.8015 - 19.7915) / 25 ml = 0.8004 g/ml

Bottom Layer: empty 5 ml flask = 41. 4154 g
full 5 ml flask = 46. 2686 g
Density of top layer = (46.2686 - 41.4154) / 5.0 ml = 0.9706 g/ml

17:00 Did nuke scan.

20:20 Begin pumping to 22.14. It is probably near empty, certainly below the glass - filled to 11 nuts by 21:00.

21:30 Took samples from 22.11 and 22.14.

23:00 End of data period AFR12.4.

23:45 Move to new condition. HP H2 blocked in. LP H2 open. Reducing gas rates. Lowering pressure and lowering temperature.

6/1/94 00:00 When changing conditions, level in reactor dropped from 211 inches to 191 inches. Now at pressure and temperature, level in reactor = 188 inches.

00:40 Shut down the fin fan.

01:15 At 211 inches in reactor, P = 176 psig, T = 518F.

01:40 Filled 22.14 from 4.5 nuts to 8.5 nuts.

02:30 We noticed that Dennis GC is not totalizing - we strongly suspect CO because H2 and N2 of GC Dennis and GC Gary match. Just made final composition move (on N2). We are on-line and ready.

09:00 Lowered TIC-725 set point to 300 F per Mike.

10:00 Results of density analysis of 22.11 gotten at 21:30.
Top layer: empty 50 ml = 37.3028 g
full 50 ml = 78.5273g
density of top phase = (78.5273 - 37.3028) / 50 ml = 0.8245 g/ml
Bottom layer: empty 50 ml = 37.6799 g
full 50 ml = 86.3820 g
density of bottom phase=(86.3820-37.6799)g/50 ml =0.9740 G/ml

10:30 Results of density analysis of 22.11 gotten at 21:30 last night.
Top layer: empty 25 ml = 20.4728 g
full 25 ml = 40.9028g
Density of top layer = (40.9028 - 20.4728)/25 ml = 0.8172 g/ml

13:30 Grabbed samples off of 22.11 and 22.14.

14:10 Starting to heat up reactor to 578 F.

14:10	534F	14:35	559F
14:15	539F	14:40	564F
14:20	544F	14:45	569F
14:25	549F	14:50	574F
14:30	554F	14:55	579F
		15:00	584F

15:15 Did yet another density calculation on 13:30 sample.
Top layer: empty 25 ml flask = 25.6161 g
full 25 ml flask = 45.9730 g
density of top layer = (45.973 - 25.6161)g/25 ml = 0.8143g/ml
Bottom layer: not enough phase present to give accurate density!

17:00 Ramp from 582 F to 590 F (steady at new temperature by 17:20).

20:45 Noticed things were screwy with DEC. For instance, showing 2710_AVG_TEMP = 520 F when we know it is 580 F. Checked historian - when prompted for data from 4pm to 9pm, didn't accept 4 pm data and time. Did "sho sys" - proof that Trend collector was not running. We estimate it went out between 4 - 6 pm today, 6/1/94. Restarted the trend collector.

21:00 After further analysis of DEC, we believe we lost data at 4 AM on June 1, 1994, not 4 pm! So, DEC was down from 4 AM to 21:20 on June.1, 1994. Had to do a nextgen restart. Main terminal in control room is now locked. Had to switch to Trexlertown for remote monitoring in the back process room.

23:45 22.11 & 22.14 samples taken.

6/2/94	01:05	Slump test performed. Base line: Level = 212" (counts = 46) T = 590 F, P = 175 psig.
	01:10	H2 gas ran out. FID's not working.
	01:25	Done with slump test. T = 586. Begin cooldown.
	04:45	Bringing in N2.
	05:20	Added oil to 22.14 (below sight glass to 4.5 nuts) and stopped pumping back to reactor.
	08:30	Drained 27.10 into drums. Slurry seems typical - not lumpy or especially viscous.
		Drum # 1 - 741 to 981 lbs = 240 lbs.
		There was approximately 70 lbs of steam condensate in drum to start with. As this boiled, drum was overfilled.
		Drum # 2 - 981 to 1361 lbs = 380 lbs & 6 sample bottles.
		Drum # 3 - 1361 to 1737 lbs = 376 lbs.
		Drum # 4 - 1737 to 2122 lbs = 385 lbs.
		Drum # 5 - 660 to 1038 lbs = 378 lbs
		Drum # 6 - 1038 to 1420 lbs = 382 lbs
		Drum # 7 - 1420 to 1611 lbs = 191 lbs
		Drained drakeol - 1611 to 1795 lbs = 184 lbs from 22.14
	08:45	22.14 unloaded.
	10:00	01.10 restarted.
	10:05	10.52 restarted.
	10:15	PIC-201 at 200 psig.
	10:30	N2 at 3-4 MSCFH.
	10:40	TIC-293 at 275 F.
	10:45	N2 at 9 MSCFH.

10:50	280 F	11:55	345 F
10:55	285 F	12:00	350 F
11:00	290 F	12:10	355 F
11:05	295 F	12:15	360 F
11:10	300 F	12:20	365 F
11:15	305 F	12:25	370 F
11:20	310 F	12:30	375 F
11:25	315 F	12:35	380 F
11:30	320 F	12:40	385 F
11:35	325 F	12:45	390 F
11:40	330 F	12:50	395 F
11:45	335 F	12:55	400 F
11:50	340 F		

12:00 Disconnected hoses to Arrow trailer. Purging N2 through 22.11 and 22.15 low point bleeds. Purging N2 through 22.16 low point bleeds and transfer line to trailer bleed.

NIGHT ORDERS: Maintain plant at following conditions:
PIC-201 at 200 psig.
TIC-293 at 400 F.
N2 at 9-10 MSCFH.
27.10 at 211 inches.

Sweep LP H2, HP H2, and CO feed lines with N2.
At 01:00, 1) Reduce N2 to 4-5 MSCFH.
2) Use 10.52's to transfer 22.14 and 22.12 levels to 27.10.
3) Begin to cool 27.10 to 250 F at 60 F /hr.
Once 27.10 is at 250 F, secure 01.10/01.20, depressure the plant to 80 psig, and transfer 27.10 level to 28.30. Shut off water hose to 10.53 pumps. Set-up plant N2 purge. Secure flare. Sweep the methane line with N2. After transfer, cool utility oil system with fin-fan and 21.20 to 100 deg F.

18:00 Dean performed density analysis for 22.11 sample taken at 23:45 June 1, 1994.
Top layer: empty 10 ml flask = 41.3861 g
full 10 ml flask = 49.5091 g
density of top layer = 0.8123 g/ml

Bottom layer: empty 25 ml flask = 45.0209 g
full 25 ml flask = 20.472 g
density of bottom layer = 0.9819 g/ml

6/6/94 09:00 Drums from 1/3 slurry drained during F-T IIA on 5/31/94

Drum #	Total Height	Oil Height
1	25"	17.75"
2	28"	27"
3	27"	23.5"
4	27"	25"
5	13"	11"

Drums from final slurry drained at the end of F-T IIA on 6/2/94

Drum #	Total Height	Oil Height
5A	28.625"	11"
6	22.25"	8.375"
7	28.75"	10"
8	28.5"	15.125"
9	28.375"	11.5"
10	28.5"	11"
11	14.5"	5.5"
Drum from 22.14 12	15"	15"

Drum Dimensions: 23" Diameter
34.5" Height

APPENDIX E

Liquid Compositions

LIQUID COMPOSITION FOR FT-IIA (1994) AT LAPORTE

DATE	TIME	CARBON NO. ----->								ALCOHOLS, WT%														TOTAL
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
22.11 HC PHASE (WT%)																								
5/28/94	11:50	NO HC PHASE IN THE SAMPLE																						
5/28/94	22:20	NO HC PHASE IN THE SAMPLE																						
5/29/94	23:30	0	0	0.2	0.2	0.6	0.3	0.3	0	0	0	0	0	0	0	0	0	0	0.2	0.3	0	0	0	2.1
5/30/94	12:00	NO HC PHASE IN THE SAMPLE																						
5/30/94	23:59	2	0	1.9	1.7	2.1	2.6	1.5	0.7	0.7	0	0	0	0	0	0	0	0	0.2	0.3	0.2	0	0	13.9
5/31/94	12:00	1.7	1.5	0	1.3	1.7	2.3	1.3	0.7	0.1	0	0.2	0	0	0	0.2	0	0	0.4	0.4	0	0.3	0	12.1
5/31/94	21:30	1.1	2.2	0	1.6	1.6	2.3	1.4	0.6	0.6	0.4	0.3	0	0	0	0	0	0	0.3	0.5	0	0	0	12.9
6/1/94	13:30	0	0	0	1.1	3.1	2.1	1.3	0.9	0.6	0.3	0.2	0	0	0	0.3	0.3	0	0.5	0.5	0	0.5	0.3	12.0
6/1/94	23:45	0	0	0	1.4	3	2.1	1.3	1	0.6	0.4	0.2	0	0.2	0	0.3	0.2	0	0.5	0.7	0	0.4	0.3	12.6
22.16 HC PHASE (WT%)																								
6/2/94	11:30	NO HC PHASE IN THE SAMPLE																						
6/2/94	11:35	NO HC PHASE IN THE SAMPLE																						
6/2/94	11:40	NO HC PHASE IN THE SAMPLE																						
6/2/94	11:45	3.9	1.1	0.7	0	0	0	0	0	0	0.1	0	0	0	0	0.1	0	0	0.3	0	0	0	0	6.2
6/2/94	11:50	5	1.1	1.7	0	0	0	0	0	0.3	0.1	0	0	0	0	0	0	0	0.2	0.2	0.2	0.1	0	8.9
6/2/94	11:52	3.4	1	0.3	0	0	0.1	0	0	0.3	0.1	0	0	0	0	0	0	0	0.3	0.2	0.1	0	0	5.8
6/2/94	11:55	2.4	1	1.6	0.9	2	0.4	0.3	0.5	0.2	0.1	0	0	0	0	0	0	0	0.2	0.2	0.1	0	0.1	10.0
6/2/94	12:00	3.6	1	1.6	0.8	1.8	0.3	0.3	0.5	0.2	0.1	0	0	0	0	0	0	0	0.3	0.3	0.3	0.2	0	11.3

							LIQUID COMPOSITION FOR FT-IIA (1994) AT LAPORTE																	
DATE	TIME				CARBON NO. ----->						CIS-OLEFINS, WT%													TOTAL
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
										22.11 HC PHASE (WT%)													
5/28/94	11:50																						
5/28/94	22:20																						
5/29/94	23:30	0.6	0.8	0.7	0.5	0.3	0.2	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.2
5/30/94	12:00																						
5/30/94	23:59	0.5	0.8	1	1	0.7	0.5	0.4	0.2	0.1	0.1	0	0	0	0	0	0	0	0.2	0.2	0.1	0	5.8
5/31/94	12:00	0.4	0.6	0.8	0	0.6	0.4	0.3	0.2	0.1	0	0	0	0	0	0.1	0	0	0	0	0	0	3.5
5/31/94	21:30	0.2	0.4	0.5	0	0.5	0.5	0.3	0.2	0.2	0	0	0	0	0.1	0	0	0	0.4	0.3	0.2	0	3.8
6/1/94	13:30	0.2	0.3	0.5	0	0.5	0.4	0.3	0.2	0	0	0	0	0	0	0	0	0	0.4	0	0.3	0.3	3.4
6/1/94	23:45	0.1	0.3	0.5	0.6	0.5	0.4	0.3	0.2	0.1	0	0	0	0	0.2	0.2	0	0	0.5	0	0	0	3.9
										22.16 HC PHASE (WT%)													
6/2/94	11:30																						
6/2/94	11:35																						
6/2/94	11:40																						
6/2/94	11:45	0.7	0.9	0.8	0.6	0.5	0.3	0.2	0	0	0	0	0	0	0	0.1	0	0	0.3	0.2	0	0	4.6
6/2/94	11:50	0.7	0.8	0.8	0.6	0.5	0.3	0.2	0.1	0.1	0	0	0	0	0	0	0	0.3	0.2	0	0	0	4.6
6/2/94	11:52	0.7	0.9	0.9	0.7	0.5	0.3	0.2	0.1	0	0	0	0	0	0	0.1	0.1	0.3	0.2	0	0.1	0	5.1
6/2/94	11:55	0.6	0.8	0.8	0.6	0.5	0.3	0.2	0.1	0	0	0	0	0	0	0	0	0.3	0.2	0.2	0	0	4.6
6/2/94	12:00	0.6	0.8	0.7	0.6	0.4	0.3	0.2	0.1	0	0	0	0	0	0.1	0.1	0.2	0.4	0.2	0.2	0	0	4.9

LIQUID COMPOSITION FOR FT-IIA (1994) AT LAPORTE																							
DATE	TIME	CARBON NO. ----->					TRANS-OLEFINS, WT%																TOTAL
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
										22.11 HC PHASE (WT%)													
5/28/94	11:50																						
5/28/94	22:20																						
5/29/94	23:30	1.2	2	1.3	0.1	0.6	0.4	0.3	0.2	0	0	0	0	0	0	0.2	0.1	0.2	0.2	0	0	0	6.8
5/30/94	12:00																						
5/30/94	23:59	0.7	1.4	1.7	1.6	1.3	0.9	0.6	0.3	0.3	0.2	0.1	0	0.1	0.1	0	0.2	0.2	0.2	0.3	0	0	10.2
5/31/94	12:00	0.6	1.1	1.4	0.2	1	0.8	0.4	0.2	0.2	0.2	0	0	0	0.2	0	0.2	0.3	0.3	0.3	0.3	0.2	7.9
5/31/94	21:30	0.3	0.8	0.8	0.2	1	0.8	0.5	0.4	0.3	0.2	0.1	0.1	0.2	0.2	0	0.3	0.3	0.4	0.3	0.2	0.2	7.6
6/1/94	13:30	0.1	0.5	0.7	0.8	0.9	0.7	0.4	0.3	0.2	0.2	0	0	0.2	0.2	0	0.3	0.4	0.4	0.5	0.4	0.2	7.4
6/1/94	23:45	0	0.5	0.8	1	1	0.8	0.5	0.3	0.3	0.2	0.1	0.2	0.2	0.2	0	0.3	0.4	0.5	0.4	0.4	0.3	8.4
										22.16 HC PHASE (WT%)													
6/2/94	11:30																						
6/2/94	11:35																						
6/2/94	11:40																						
6/2/94	11:45	1.9	1.7	1.4	0.1	0.8	0.5	0.2	0.2	0.1	0	0	0	0.1	0	0	0.2	0.2	0.3	0.3	0.2	0	8.2
6/2/94	11:50	1.2	1.6	1.4	0.1	0.9	0.6	0.3	0.3	0.2	0	0	0	0	0	0.3	0.2	0.2	0.2	0.2	0	0	7.7
6/2/94	11:52	0.2	1.8	1.5	0.1	0.9	0.5	0.3	0.3	0.1	0.1	0	0	0	0	0.3	0.2	0.2	0.2	0.2	0.2	0	7.1
6/2/94	11:55	1.2	1.6	1.4	0.1	0.9	0.6	0.3	0.2	0.1	0	0	0	0.1	0	0.3	0.2	0.2	0.2	0.2	0.2	0	7.8
6/2/94	12:00	1.2	1.6	1.3	0.1	0.8	0.5	0.3	0.3	0.1	0	0	0	0.1	0	0	0.2	0.2	0.2	0.2	0	0	7.1

LIQUID COMPOSITION FOR FT-IIA (1994) AT LAPORTE																									
DATE	TIME	CARBON NO. ----->									N-PARAFFINS, WT%														TOTAL
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
22.11 HC PHASE (WT%)																									
5/28/94	11:50																								
5/28/94	22:20																								
5/29/94	23:30	2.7	4.2	6.4	5.7	3.6	2.8	1.9	1.5	1.3	1.1	1	0.9	0.9	0.8	0.7	0.1	0.4	0.2	0.4	0.2	0.1	0	0	36.9
5/30/94	12:00																								
5/30/94	23:59	0.6	1.7	3.1	3.7	2.4	2.1	1.6	1.3	1	0.9	0.8	0.8	0.7	0.5	0.5	0.2	0.2	0	0	0.2	0.1	0	0	22.4
5/31/94	12:00	0.5	0.8	1.6	0.6	1.4	1.3	1	0.9	0.7	0.7	0.8	0.8	0.8	0.7	1	0.4	0.5	0	0	0	0.1	0.1	0	14.7
5/31/94	21:30	0.3	0.6	1.5	0.6	1.7	1.6	1.2	1.1	1	1	1	1.1	1.1	0.9	1.1	0.4	0.4	0.1	0	0	0.1	0	0	16.8
6/1/94	13:30	0.3	0.3	0.8	0.4	1	0.9	0.7	0.6	0.5	0.6	0.8	0.9	0.9	0.9	1.3	0.6	0.7	0	0	0	0.1	0.2	0.1	12.6
6/1/94	23:45	0.3	0.3	0.9	1	1.1	1	0.8	0.7	0.6	0.6	0.7	0.8	0.9	0.9	1.4	0.8	0.7	0.3	0	0	0	0.2	0	14.0
22.16 HC PHASE (WT%)																									
6/2/94	11:30																								
6/2/94	11:35																								
6/2/94	11:40																								
6/2/94	11:45	2.5	3.5	5.5	4.9	3.1	2.3	1.7	1.2	1	0.9	0.7	0.7	0.6	0.6	0.7	0.3	0.3	0.1	0	0	0.1	0	0	30.7
6/2/94	11:50	2.4	3.6	5.7	5.1	3.2	2.5	1.9	1.4	1.1	1	0.8	0.8	0.8	0.7	0.2	0.2	0.2	0	0	0.1	0.1	0	0	31.8
6/2/94	11:52	2.2	3.4	5.4	4.9	3	2.3	1.7	1.2	1	0.8	0.8	0.7	0.7	0.6	0.4	0.4	0.3	0	0	0	0.1	0	0	29.9
6/2/94	11:55	2.1	3.5	5.8	5	3.4	2.7	1.9	1.4	1.1	1	0.8	0.8	0.6	0.7	0.4	0.4	0.3	0	0	0	0.1	0	0	32.0
6/2/94	12:00	2.5	3.4	5.4	4.9	2.6	2.3	1.7	1.2	1	0.9	0.8	0.7	0.7	0.7	0.9	0.3	0.3	0	0	0.1	0.3	0	0	30.7

LIQUID COMPOSITION FOR FT-IIA (1994) AT LAPORTE																							
DATE	TIME	CARBON NO. ----->									1-OLEFINS,WT%												TOTAL
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
											22.11 HC PHASE (WT%)												
5/28/94	11:50																						
5/28/94	22:20																						
5/29/94	23:30	0.3	0.6	0.4	0.4	0.6	0.4	0.2	0.2	0	0	0.1	0.1	0.2	0.3	0.2	0	0.3	0	0	0	0	4.3
5/30/94	12:00																						
5/30/94	23:59	0.7	1.2	1.2	1.2	0.8	0.5	0.7	0.4	0.3	0.1	0.1	0	0	0	0	0	0.1	0	0	0	0	7.3
5/31/94	12:00	0.6	0.8	0.8	0.8	0.6	0.3	0.4	0.3	0.3	0.2	0.1	0	0.2	0.3	0.2	0	0.3	0.3	0.5	0.3	0	7.3
5/31/94	21:30	0.7	0.8	0.9	1	0.8	0.5	0.5	0.5	0.4	0.2	0.2	0	0	0	0	0	0.2	0	0.3	0	0	7.0
6/1/94	13:30	0	0.4	0.5	0.6	0.5	0.3	0.3	0.3	0.2	0.1	0.2	0.2	0.2	0.3	0.3	0	0.5	1	0.6	0.5	0	7.0
6/1/94	23:45	0	0.4	0.5	0.6	0.5	0.4	0.4	0.3	0.3	0	0.2	0.2	0.2	0.2	0.3	0	0.4	0	0.3	0.5	0.2	5.9
											22.16 HC PHASE (WT%)												
6/2/94	11:30																						
6/2/94	11:35																						
6/2/94	11:40																						
6/2/94	11:45	0.5	0	0.7	0.4	0.5	0.4	0.1	0.3	0.1	0.1	0	0	0.1	0.1	0.1	0	0.2	0	0	0	0	3.6
6/2/94	11:50	0.6	0.8	0.7	0.5	0	0.4	0.4	0.3	0.3	0	0	0	0	0	0	0	0.1	0.4	0	0.2	0	4.7
6/2/94	11:52	0.5	0.8	0.6	0.3	0.5	0.4	0.4	0.3	0.1	0.1	0	0	0.1	0.1	0.1	0	0.2	0.4	0.3	0.2	0	5.4
6/2/94	11:55	0.5	0.8	0.7	0.3	0.5	0.4	0.3	0.3	0.1	0	0	0	0	0	0	0	0.2	0.2	0.2	0.2	0.2	4.9
6/2/94	12:00	0.6	0.8	0.7	0.1	0.4	0.4	0.3	0.3	0.1	0	0	0	0.1	0.1	0.1	0	0.2	0.5	0.3	0.2	0	5.2