START-UP MANUAL FOR THE PYDRAUL REFORMULATION PROGRAM

DISTRIBUTION:

B2SF

- D. H. BOLLIGER - G.O.
- J. H. DAVIDSON - G.O.
- R. A. DYKSTRA - J.F.Q
- P. D. FOWLKES - G.O.
- J. D. GARRISON - J.F.Q
- P. GATENS - J.F.Q
- R. A. GEISMAN - J.F.Q
- J. S. GILLIES - J.F.Q
- J. F. HERBER - G.O.
- S. KRESKO - J.F.Q
- D. HOVIS - J.F.Q
- R.M. KOUNTZ - G.O.
- J. LEVERLE - J.F.Q.
- D. LOCKWOOD - J.F.Q.
- E.D. MALONE - J.F.Q.
- A. OEHLER - J.F.Q.
- E.M. POTTER - G.O.
- D.B. REDINGTON - J.F.Q.
- W.R. RICHARD - G.O.
- J.R. SAVAGE - G.O.
- J. SEGRAVE - J.F.Q.
- M.J. SMID - J.F.Q.
- L.R. STARK - G.O.
- J. D. SULLIVAN - G.O.
- D.O. SUTTER - J.F.Q
- G. TAYLOR - G.O.
- A. ULNER - J.F.Q
- R.L. WAGNER - J.F.Q
- W. WEBB - J.F.Q

0065731

Prepared by:
J. L. SOLARI
May 17, 1972

TOWOLDMON0056144

TABLE OF CONTENTS

	PAGE
I INTRODUCTION	1
II OVERALL SCHEDULE - EE BLDG	2
III OVERALL SCHEDULE - C.D.	3
IV ORGANIZATION	4-5
V TRAINING PLAN & SCHEDULE - EE BLDG	
A. SALARIED	6
B. HOURLY	7
VI WATER BATCHING - EE BLDG	8-9
VII INITIAL START-UP - EE BLDG	10-11
VIII DEMONSTRATION - EE BLDG.	12
APPENDIX A - RAW MATL. REQ. - EE BLDG	13
APPENDIX B - RAW MATL. REQ - C.D.	14

0065732

TOWOLDMON0056145

(I) INTRODUCTION

The purpose of this start-up manual is:

① To outline the sequence of events that have occured in the Pydraul Reformulation Program.

② To outline the sequence of events that are planned in the Pydraul Reformulation Program.

As most of you know, we are currently phasing out the old Pydraul line (based on chlorinated hydrocarbons), and phasing in a new Pydraul line which is based on N_2CP and NCP.

This entire program is based on the premise that Monsanto will not sell any (PCB-PCT based) Pydrauls after June 30, 1972. Our objective is to retain at least 90% of our present Pydraul business thru the introduction of our new (N_2CP/NCP based) Pydraul line

From the viewpoint of N_2CP/NCP production - We are currently producing N_2CP/NCP in Department 50 (EE Building) at a reduced rate. Our experience to-date indicates that there are some potential problems which must be carefully considered. These are: (1) Critical supply of nonyl phenol (2) Critical supply of Silicic Acid (3) Major filtration problems with Silicic acid (4) Capacity problems with the phenol extraction system and (5) Low raw material yields.

From the viewpoint of Pydraul production at Central Drumming - We have produced approximately 1,100,000 lbs of the various Pydrauls. Our experience to-date indicates that the supply of raw materials is the most pressing problem. Critical raw material supplies are (1) Santicizer 141, (2) Santicizer 148 (3) Lubersol 7401 and (4) TPP.

Despite the numerous problems mentioned above, we are on target as far as producing the required amounts of N_2CP, NCP and the various Pydrauls.

This start-up manual proposes to outline the future steps which are planned.

TOWOLDMON0056146

(II) OVERALL SCHEDULE - EE BUILDING

Inorder to effectively phase in the new Pydraul line the following schedule on N_2CP/NCP production in the EE Building has been and will be used:

Dates	Actions	Pounds Produced
2/15 - 2/22	Silicic acid treatment of N_2CP made in Nov.	30,000
2/22 - 4/2	N_2CP production with one reactor	833,000
4/3 - 4/10	NCP production with one reactor	105,000
4/10 - 4/13	N_2CP production - Start-up second reactor	66,000
4/13 - 4/16	N_2CP production - Using once-dist para-CP	100,000
4/17 - 4/30	N_2CP production - two reactors	580,000
5/1 - 5/10	N_2CP production - two reactors	375,000
5/11 - 5/14	NCP production - two reactors	100,000
5/15 - 5/22	Silicic acid treat - NCP made in November Silicic acid treat - N_2CP made in November	66,000 124,000
5/15 - 6/12	Department Down for construction	0
6/5 - 6/9	Shift Supervisory Training Review	0
6/12	Mechanical completion date (CEA 2451)	0
6/12	Hourly training and review - All operators	0
6/13 - 6/18	Water batching, equipment checkout and hourly (on-the-job) training.	0
6/19 - 6/25	Initial start-up on NCP	260,000
6/25 - 6/30	Initial start-up on N_2CP	340,000
7/1 - 7/26	Demanstration on N_2CP	1660,000
7/27 - 8/1	Shutdown and empty system.	0

0065734

TOWOLDMON0056147

(III) OVERALL SCHEDULE - CENTRAL DRUMMING

The logistics between EE Building production, C.D. Inventory and Pydraul production and sales is a very important consideration. To date the Pydraul production at C.D has been approximately as follows (3/1 - 4/16)

Pydraul	29ELT	(Drums)	= 91,600
Pydraul	30E	(Drums)	= 50,000
Pydraul	50E	(Drums)	= 175,000
Pydraul	50E	(Bulk-CD Stg)	= 480,000
Pydraul	65E	(Drums)	= 54,900
Pydraul	230C	(Bulk Sales & Drums)	= 117,000
Pydraul	312C	(Drums)	= 169,000

Inorder to handle the logistics problem mentioned above, Pydraul production at C.D. should be scheduled as follows:

Dates	Pydraul		Pounds	Comments
4/17 - 4/30	Pydraul	50E	125,000	This Pydraul production will satisfy all the Warehouse inventory stock as per G. Taylor's memo of 3/13/72. - This Pydraul production is also required to allow inventory room for N₂CP production @ EE. The molten TPP storage at W&K will also be empty by 4/30/72.
		65E	25,000	
		90E	75,000	
		115E	50,000	
		29ELT	50,000	
		230C	150,000	
		312C	500,000	
		540C	25,000	
5/1 - 6/19	Pydraul	29ELT	50,000	This Pydraul production will allow us to meet all sales thru June, as per the 2-1-72 sales forecast. This Pydraul production is also required to deplete the NCP/N₂CP at C.D inorder to allow room for the EE Production run in June/July.
		50E	500,000 ①	
		65E	300,000	
		90E	75,000	
		115E	50,000	
		230C	100,000	
		312C	1200,000	
6/19 - 8/1	Pydraul	50E	1,000,000①	This Pydraul Production is required to keep from filling up the system during the EE Building production run in July. - This is considered the minimum Pydraul production required during this period. Other Pydrauls will of course be produced during this period.
		312C	480,000	
		90E	75,000②	

① Inorder to have an adequate supply of molten TPP, a TPP run will have to be schedule in late May or early June. We will have to take 160,000 lbs of TPP during that production run at W.G.K.

② This amount of 90E will have to be produced before 7-1-72.

0065735

TOWOLDMON0056148

(IV) ORGANIZATION

(A) Personnel

The following page shows the organizational chart of salaried personnel involved in the Pydraul Reformulation Program.

(B) EE Building Start-up

The EE Building start-up will be handled as follows:

1. Manufacturing - D. Sutter and J. Solari will handle the start-up activities for the June start-up. Shift supervision will cover this start-up from June 5, 1972 thru 7/31/72.

2. Research and CED - No special shift coverage is planned. Both Research and CED will be on call as needed.

3. Maintenance - Maintenance will provide mechanical shift coverage (hourly) as required during the weeks of 6/12/72 and 6/19/72. Instrumentation check out will be handled by the plant, except in those cases requiring CED assistance.

(C) Central Drumming

No special start-up plans are scheduled for Central Drumming. R. Wagner and J. Solari will coordinate Pydraul Production at C.D. with the EE Bldg start-up.

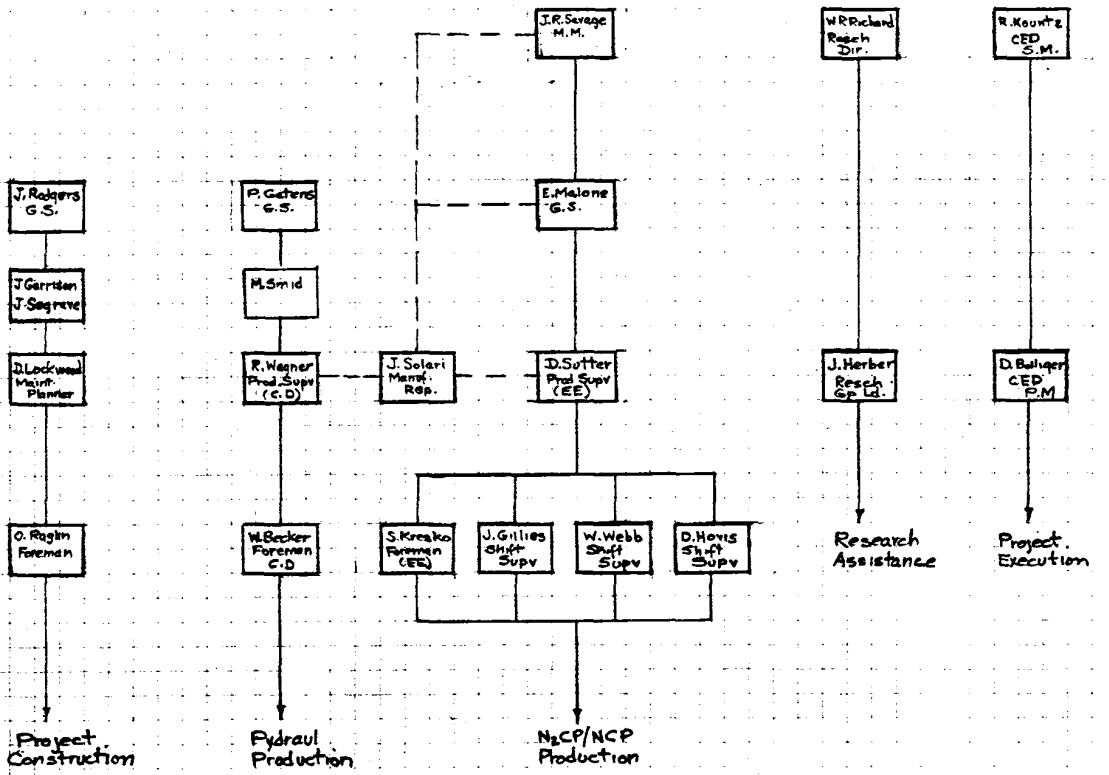
(D) Communications

Starting on 6/21/72, J. Solari will send out a teletype every-other day to the following people: H.S Bergen; R.M. Kountz; E.D. Malone; D.E. Munie; W.R. Richard and J.R. Savage.

Starting on 6/21/72, the following people will meet (every-other-day) to discuss status and plans for the EE Bldg start-up: D. Bolliger J. Herber; D. Lockwood; J. Solari and D. Sutter. These meetings will be at 8:30 AM at the J.F.Q. Plant.

TOWOLDMON0056149

ORGANIZATION CHART



006737

TOWOLDMON0056150

(V) TRAINING PLAN AND SCHEDULE - EE BUILDING

(A) Shift Supervisors

Since all of the shift supervisors are familiar with the production of N-CP/NCP in the EE Building, the training required will be minimal.

The shift supervisors will be assigned to the start-up, starting the week of 6-5-72. During the week of 6-5-72, the shift supervisors will review the revised operating instructions, water batching plans, initial start-up plans and demonstration plans.

J. Gillies will prepare the revised operating instructions for both N-CP and NCP, and co-ordinate the training activities for the shift supervisors during the week of 6-5-72

The training and refamiliarization for the shift supervisors will include the following:

1. Handout and review of the revised operating instructions
2. Review of all new equipment
   a. New para-cumyl phenol storage
   b New pyrollidone storage and charging tank
   c. New instrumentation on the Step I Reactors
   d. Therminol system
   e. Cold TCE system
   f. Deionizers and water softner
   g. Silicic acid or Soft water system
   h. All new flows and instrumentation
3. Field review of all new equipment
4. Water batching plans
5. Initial start-up plans
6. Demonstration plans.

Shift supervisory personnel will be assigned to this project from 6-5-72 thru 8-1-72.

0065738

TOWOLDMON0056151

(V) TRAINING PLAN AND SCHEDULE - EE BUILDING

(B) Hourly Personnel

Since all of the hourly personnel are also familiar with the production of N_2CP/NCP, the training required will be considerably less than normal.

All hourly personnel in the EE Building will report for training on Monday, June 12, 1972. One full day will be spent with the operators, to define our objectives and make sure that everyone knows what we are trying to accomplish. J. Solari will publish an agenda for this training session.

Shift coverage will start on 6-13-72 for all hourly personnel and the shift supervisors. Hourly training on new equipment will be done on-the-job by the shift supervisors.

The period from 6-13-72 thru 6-18-72 will serve the dual purpose for on-the-job training of hourly personnel and water-batching and equipment checkout of new equipment.

The hourly personnel involved in this start-up are as follows:

1. Step I Operators (Chiefs) - (4 men) - Operate the 3 Step I reactors and the associated raw material charging systems; the existing HCl system; the new therminol system and the new cold TCE system.

2. Step II-III Operators - (4 men) - Operate the 2 existing Step II-III reactors.

3. Washer Operators - (4 men) - Operate the 3 existing washers, the centrifugal contactor, and the new deionizer system. These operators will also handle the new TCE cleaning tank and regenerate the deionizers and water softner.

4. Deadorizer Operators - (4-8 men) - Operate the deodorizer, the new silicic acid system, the product filtration system and the phenol extraction system. Eight men will be required for this job if a satisfactory solution is not found for the silicic acid filtration problem

TOWOLDMON0056152

(VI) WATER BATCHING AND EQUIPMENT CHECKOUT PLANS - EE BUILDING

The objective of this phase of the program is to checkout those new or modified pieces of equipment for mechanical soundness and general operability.

In order to accomplish these water batching objectives, the following items must be accomplished in the period from 6-13-72 thru 6-18-72:

① Fill the new pyrollidone storage tank with water. Pump water from the storage tank to the pyrollidone head tank. Checkout piping, electrical and instrumentation.

Drop water from the pyrollidone head tank to <u>each</u> of the Step I reactors. Check piping.

Drain all water from the pyrollidone storage tank. Blow and drain all lines to and from the pyrollidone storage tank. Dry out system. This must be completed by 6/14/72; the first truck of Pyrollidone will be scheduled to arrive on 6-15-72.

Drain all water from the pyrollidone head tank to one of the Step I reactors. Blow or drain all lines. Dry system.

② Fill the new para cumyl phenol storage tank with water. Pump water to <u>each</u> of the three Step I weigh tanks. Checkout piping, electrical and instrument systems.

Drop water from each Step I head tank, into the proper Step I reactor. Check piping and each Step I flow controller

Drain all water from the new para cumyl phenol storage tank. Blow and drain all lines to and from Storage. Dry out system. Complete by 6-16-72.

Drain all water from each of the Step I head tanks. Blow or drain all lines. Dry system.

③ After ① and ② have been completed, drain <u>all</u> water from each of the Step I reactors. Start-up Step I vacuum system and put each reactor under vacuum and dry out. Check each reactor for overhead vacuum leaks in the piping during this time. Complete this by 6-15-72.

0065740

TOWOLDMON0056153

VI WATER BATCHING AND EQUIPMENT CHECKOUT PLANS - EE BUILDING

④ Pressure test the west Step I Reactor jacket. Complete this prior to starting Therminol system.

⑤ Fill the two cold Kerosene tanks with water. Circulate water thru each Step I cooler, each Step I condensor and thru the OPD head tank jacket. Check piping for leaks.

Drain all water from the cold Kerosene system. Blow out and drain all lines. Dry system.

Charge 10 drums of TCE to each of the two TCE (Kerosene) tanks. Circulate TCE thru the system.

⑥ Start-up Therminol system. Circulate therminol thru each of the Step I reactor jackets.

⑦ Charge OPD from the OPD head tank, to one of the Step I reactors. (Inorder to have OPD available, we will not process the last Step I batch produced in May)

Put the OPD batch in the Step I reactor thru a normal batch cycle. Check out the temperatur cam controller, and cold TCE system.

When the batch has been cooled to 75°C, transfer to another Step I reactor and repeat above batch cycle.

Run a batch cycle in each reactor and then pump the OPD to the OPD head tank. This must be completed by 6-18-72.

⑧ Run water thru all new process lines in the Step II-III and washer area.

⑨ Fill the new TCE cleaning tank with water and check out piping. Drain and dry system. Fill new tank with TCE.

⑩ Start water thru the deionizers and checkout piping. Start-up water softner and regenerate both deionizers with HCl and NaOH. Check out HCl and NaOH piping.

When the deionizers have been regenerated, prepare a brine (NaCl) solution and regenerate the water softner.

0065741

TOWOLDMON0056154

(VII) INITIAL START-UP - EE BUILDING

The objective of this phase of the program, is to start-up in an orderly fashion, fill the system and to iron out any mechanical or hardware problems not uncovered during water batching.

Initial start-up is scheduled to start on 6-19-72.

Prior to initial start-up, raw material receipts must be scheduled as follows:

1. Nonyl Phenol - Two 8000 gallon cars must be unloaded into storage by 6-16-72

2. Pyrollidone - The first truck of Pyrollidone should be scheduled to arrive on 6-15-72 (40,000 lbs)

3. Para cumyl phenol - Based on our past performance we will need 600,000 lbs of para cumyl for the June/July production run.

   At this point in time it appears we will order para cumyl from Dixie Chemical Order. This order must be placed with Dixie by 5-1-72.

   Based on the logistics problem we normally have with Dixie, we will plan on using both the existing para cumyl storage tank and the new para cumyl storage tank. This will require jumper piping from the existing to the new storage tank. Ultimately, we can resolve our logistics problems by receiving para cumyl by tank car. For the June/July run, however we are planning to receive para cumyl by tank truck.

   Based on our past experience with Dixie, we will require our first truck shipment to arrive at J.F.Q on 6-12-72. Four trucks will be required during the week of 6-12-72. Four additional trucks will be required during the week of 6-19-72.

   Inorder to meet this schedule Dixie must start-up their equipment no later than May 29, 1972

0065742

TOWOLDMON0056155

(VII) INITIAL START-UP - EE BUILDING

After the Step I Reactors have been checked out, we will be ready for initial start-up on 6-19-72. Our initial start-up will be on NCP.

On 6-19-72, the Step I Reactors will be started-up on a staggered schedule as follows

1. Start-up first reactor
2. Start-up second reactor, 3 hours after the first
3. Start-up third reactor, 3 hours after the second.

0065743

TOWOLDMON0056156

VIII DEMONSTRATION - EE BUILDING

The objective of this phase of the program is simply to demonstrate all of the various facets of the project. These include:

1. Capacity - 2,000,000 lb/mo (66,000 lb/day)

Step I batch cycle	-	9hrs
Step II-III " "	-	6hrs
Washer " "	-	7½hrs
Centrifugal contactor	-	5.5 gpm rate (avg)
Deodorizer	-	5.5 gpm rate (avg)
Filtration	-	5.5 gpm rate (avg)
Phenol Extration	-	30.0 gpm rate (avg)

2. Yields -

$POCl_3$	- 80%	of theory
Para cumyl	- 80%	" "
Nonyl phenol	- 80%	" "
Phenol	- 75%	" "

3. Cost - Start-up costs not to exceed $42,000

After the initial start-up on NCP, we will switch to N_2CP. The demonstration phase of this start-up will start after the system is full of N_2CP on approximately 7-1-72.

Major problem areas not resolved to-date include:

1. Raw material yields
2. Silicic acid filtration

0065744

TOWOLDMON0056157

APPENDIX

0065745

APPENDIX A:

RAW MATERIAL REQUIREMENTS FOR EE BUILDING

DATES	F.G. Production	Raw Materials Required	
4/17 - 4/30	580,000 lb. N_2CP	Para cumyl	134,000 lbs.
		Nonyl Phenol	268,000
		Pyrollidone (Drums)	8,700
		Silicic Acid	8,700 *
5/1 - 5/10	375,000 lb N_2CP	Para cumyl	87,000
		Nonyl Phenol	174,000
		Pyrollidone (Drums)	5,600
		Silicic acid	5,600 *
5/11 - 5/14	100,000 lb NCP	Para cumyl	50,000
		Nonyl Phenol	25,000
		Pyrollidone (Drums)	1,500
		Silicic acid	1,500 *
5/15 - 5/22	66,000 lb NCP 124,000 lb N_2CP	Silicic acid	2,900
6/19 - 6/30	260,000 lb NCP 340,000 lb N_2CP	Paracumyl	210,000
		Nonyl Phenol	225,000
		Pyrollidone (Bulk)	9,000
		Silicic acid (?)	9,000
7/1 - 7/26	1660,000 lb N_2CP	Para cumyl	390,000
		Nonyl phenol	780,000
		Pyrollidone (Bulk)	25,000
		Silicic acid (?)	25,000

For other raw material usages use the following:

1. $POCl_3$ - 50.0 lb/100lb F.G.
2. Phenol - 60.0 "
3. NaOH (100%) - 50.0 "
4. TEA - 0.5 "
5. Versene - 0.8 "
6. Poppy red dye - .01 "

In addition the following special raw materials should be on hand at J.FQ by 6-12-72.

1. 10 Drums of Therminol 55
2. 40 Drums of TCE

0065746

* Supply of Silicic acid is very critical. Mallinkrodt may not be able to supply.

TOWOLDMON0056159

APPENDIX B

RAW MATERIAL REQUIREMENTS FOR CENTRAL DRUMMING

Major Raw Materials	4/17 - 4/30	5/1 - 6/19	6/19 - 8/1 * (Minimum)
Flaked TPP	17,000 lbs	12,500 lbs	7,500
Molten TPP	40,000	158,000	315,000
Lubersol 7401	5,100	10,000	3,000
Santicizer 711	45,900	90,000	27,000
Santicizer 140	15,000	15,000	
Santicizer 141	135,000	172,000	55,000
Santicizer 148	93,000	223,000	93,000
Humble Flexon 676	214,000	440,000	175,000
Jeffox 2700	27,000	52,000	
Admix 710	7,200	19,100	
Tolyl Triazole	400	650	
NaSUL BB	400	650	
DC 200	40	90	
Dupont Oil Blue	40	90	

* This is considered as a minimum requirement.

0065747

TOWOLDMON0056160