

CCR 000034308

$29.57 \text{ cc/. fl. oz.} \times 16 = 473 \text{ c.c.}$
 $16 \text{ oz. bottle good for } 26" \text{ of cat.}$
 $32 \text{ oz. bottle good for } 52" \text{ of cat. or } 78' \text{ of cat.}$
 $6 \text{ oz. bottle good for } 7" \text{ of cat.} = 91.8 \text{ c.c. (bottle is } 177.5)$
 $4 \text{ oz. bottle} = \text{(bottle is } 118.2)$

(72)	6 oz need -	48 units	.20	$\frac{48}{20} = 2.4$
(48)	16 oz need -	48 units	32	$\frac{48}{32} = 1.5$
(24)	32 oz need -	48 units	58	$\frac{48}{58} = .83$
			464	
			232	
			27.84	
			15.36	
			2.80	

Support screen has $\frac{1}{2}"$ holes on $\frac{3}{4}"$ centers \$2.80
 about 64% free volume for $\frac{1}{2}"$ R.R. (stone wall)

$$\frac{G}{\sqrt{P \cdot 0.075}} = P = 0.500 \text{ lb/ft}^2$$

$$G = \frac{109,200 \text{ lb/hr}}{\left(\frac{5280 (0.8012 \text{ in}^2)}{144 \text{ in}^2/\text{ft}^2} \right) \cdot 2.80 \text{ ft}} = 3,720 \text{ lb/hr} \cdot \text{ft}^2$$

$$\frac{G}{\sqrt{\frac{P}{0.075}}} = \frac{3,720}{2.582} = 1,440 = \frac{G}{\phi}$$

$$\frac{0.500}{0.075} = 6.67$$

$$\Delta P \approx 3.0 \text{ "H}_2\text{O/ft depth}$$

with 7" = 58.49% of 1 ft. = $\frac{1.75"}{1.75"} \text{ on bottom}$
 $\frac{1.75"}{1.75"} \text{ on top}$
 3.50" total drop on $\frac{1}{2}$ ring
 top & bottom

Norton Manual

1/2 RR - U.S. Stoneware

at 500 $\frac{G}{\Phi} = .9$ "H₂O/ft.

1/2" Spheres at 500 = 0.59 "H₂O/ft.

1/2" Rings at 500 = 0.59 "H₂O/ft.

1/2"

1/2" Spheres

1/2" Intalox Saddles = 1.3 "H₂O at 1400 $\frac{G}{\Phi}$

78% free space -

Rich and Dick:

Oct. 28, 1968
10:30 P.M.

Have had 11 or 12 men most of shift and work 4 or 6 on R-303 plus 4 to 6 on R-301. Have kept 2 vacuum teams on 301 all shift and am slightly better than $\frac{1}{2}$ done. R-301 has been marked into quarters and one quarter is completely sucked out and is about $\frac{2}{3}$'s loaded with rings. Caps (green only) are being put in the tubes loaded with rings and each tube is checked for depth after loading. R-303 is almost $\frac{2}{3}$'s done with rings. All tubes are being checked while loading. (Dick - you will have to suck out your high tubes tomorrow) We have found several (about 20) tubes which rings won't go all the way down. There appears to be a ring of scale (fused catalyst) about 3 or 4 ft down the tube which is holding up the rings. We found one tube before loading it, and can see the ring. It is marked with a cap with a red tape under it and is near the center on the NE side.

5 Caps for 6.6" have been made up and will be in hands of chief operator. He will be told to check their accuracy ~~before~~^{when} using them. I have found about 20 lengths of $\frac{1}{4} + \frac{3}{8}$ " O.D. steel tubing in the warehouse. If you need more rodclay sticks, they work out quite well. We are to rod R-303 after each layer is added (as per Don C. and Rich's instructions tonight).

I took a check of catalyst tons as per Rich's request and can't find R-302's 65% catalyst. We also will have to make up about 13 or 14 drums of 45% catalyst for R-303. The loading procedure for R-303 is now 6.6" of 100%, 26" of 65% and 26" of 45%. This

is a compromise system to allow us to run either 2 or 3 reactors when we start up.

On R-301 if you are ready to load catalyst to the tubes which have been cleaned out and orange added, alternate from orange to green plugs to know where you are.

I would suggest that you vacuum out all bad tubes on R-303 before proceeding with next layer, if you can.

J. Menotti

Rich and Dick;

Oct 27, 1968
10:30 P.M.

Very little accomplished this shift. Working on sucking out tubes. Electric suiter is no good. Air jet suiter is possible and can clean out a tube in 3 to 4 minutes if it doesn't plug up. Hired a crew of 5 men all shift on the 2 vacuums and have gotten about 200 tubes in the ^{SE} quadrant. 2 larger vacuums borrowed from DuPont arrived at 10:00 PM and we are setting up to run them plus the one good pneumatic unit we own.

R-303 had steam test completed at 9 PM and was depressurized about 10 PM but is still draining. It should be ready for loading by 4 to 5 P.M. We will use $\frac{1}{2}$ " Raschig rings in the bottom 4" layer. Bottles are not cut as yet, but are on my desk. As soon as reactor cools, we will test for proper cup size with rings. Cups for 66" of catalyst will have to be made tomorrow (in laboratory) (add volume of 52" cup plus 14" cup) from 32 oz. bottles. Maintenance is making up 12' long measuring rods to check ring depth in R-303 when rings are in.

Check of R-301 showed about 1100 tubes were bad or 1.8% of total. With luck, if the 2 new vacuums work, we should complete the reactor about 12 hrs. after they get the new vacuums ready (about noon Monday).

CCR 000034313

J. Minott

Spot checks of 115 tubes showed 52 were outside limits (10 were completely plugged)

Rich and Dick:

Oct. 26, 1968
11:00 P.M.

We have made up 8 steel rods for checking all tubes in R-301. ^{Rich and} Don C. have said that we can tolerate +3" to -5" without any correction and these limits have been put on all rods. All tubes outside these limits will have to be adjusted by sucking down to proper height or adding more catalyst. The tubes that are completely pulled to the top must be completely sucked out. Two vacuum cleaners are set up on the upper level of platform. At 11:00 P.M. about 2/3's of reactor is loaded with 32%. 4 more drums are being brought up (we have used 12 so far). Maint. has brought out 20 bags of silica from warehouse for use tomorrow (we may need 10 more bags). Thermowell tubes must also be sucked out and capped. 7000 more caps are due in tomorrow but haven't arrived as yet. Maint. is taking 3 men off the loading crew (as of 10:30 P.M.) to water blast R-303 but will give the men back to us later with interest. R-303 will probably be pressure tested Sunday A.M. and hopefully ready for loading by Sunday nite. Check with Rich or Don C. before starting on R-303 as catalyst loading levels may be changed. All 45% catalyst was removed from platform (is in front of process air compressor); we had 4 drums left over. One part drum of 100% is still on platform. [John Mumf

Oct. 25, 1968
11:30 P.M.

Rich + Dick:

all tubes loaded with 100% at 10:45 P.M.
Starting on 26" on 65% (with silica) after supper break
for maint. Vacuum cleaner works O.K. but sucker
pipe is too short (as roof is too low). Maint. trying to get a
longer pipe setup so we can suck out bad tubes.

Chief Opr - Larry? was briefed, and seems to know
what to do.

I have spot checked about 400 tubes during shift
and found many bad saddles - mainly too high, but
some tubes with no saddles. I would strongly
suggest that we depth check next reactor for all
tubes after saddles addition. They seem to bridge much
worse than catalyst. We ought to check all tubes
on 301 after this 65% charge is all in.

Had to bring up 1 more drum of 100% to complete
301 and have brought up 4 drums of 65%.

Doge stuka was made for chief opr. with new 65%
catalyst depth and he also has the 26" scoops at the
reactor.

John Minott

Loading of R-301 on Feb. 5, 1969

Started: 9:00 A.M. Putting steam on heads to dry out - tube check and look good. Bringing up 10 boxes of $\frac{1}{2}$ " Raschig rings plus plastic plugs and funnels. Made up 4 tubing measuring rods plus one wooden "rodde". Bottom Screens being bolted on.

10:30 A.M. Started loading with 8 men plus maint. leader. Found one non-drilled tube. all tubes filling easily.

11:30 AM Lunch Break - about 300 tubes done

12:00 PM Restarted loading - Steam shut off reactor - getting too hot on South End.

1:00 PM. - about 700 tubes done. Cranes getting set up to pull R-302 and ship it out. Weather about 60°F.

1:30 PM - shut down operations while cranes removed R-302.

2:00 P.M. - Restarted loading - about 800 tubes done.

3:30 P.M. - Coffee Break

3:50 P.M. - Back on Shift

Sick Churni. 4:00 PM

5:00 - Rain Shut down Opns.

7:00 PM shift Break - some drizzle - Restarted Work.

8:00 PM - Hot over reactor being completed

Graveyard shift - P.m. Weyan 2/5 - 2/6

8 people on

Could use a iron rod made on day shift to
push rags down.

6 drums of 100% catalyst put on deck at 4³⁰ AM

Fork lift is out - new (rental) fork lift coming
in ~~tomorrow~~ ^{today} (9³⁰ - 10⁰⁰ AM). However, this should
be checked on. - Transporting with crane/truck/crane in ^{at best} actual
Crew is working excellently - best I've seen.

Would like to see layers called out i.e. 100% 1st
etc. as I do not know what final decision was.

P.S. Leave a hot jug of "Northern Coffee" ~~left~~
in office if you think about it - Thanks.

Crew working to 6³⁰ - Covered 6 drums up
approximately 826 tubes to be filled + 20 tubes
to be smashed. - Would recommend smashing them
before proceeding to catalyst layers

5820 tubes - Have 5000 done in

18 hrs.
18 hrs.

$$\frac{5000}{18} = 278$$

Need 2 1/2 hrs. to complete rings - 9:30 → 10:00 AM Break.

9:00

2 1/2 hrs. - last 1 hr.
1 1/2 hrs.
1 hr.
2 hrs.
1 1/2 hrs.

Need 1 1/2 hrs x 8 men

1 1/2 hrs.
1 1/2 hrs.
14 1/2 M.H. for rings

or some 130 M.H. for rings
125 M.H. for rings

Thursday - Feb. 5

Started

7:45 AM - 8 men on rings - Have 6 new funnels; plaster.

9:00 AM - Got 6 14" cups ready. 6 drums 100% on reactor platform

9:30 - 10:00 AM Break

10:00 AM - 4 tubes not drilled right. rodding from bottom.

about 100 tubes to fill.

11:15 AM - Rings all in - all bad tubes cleaned out & recharged.
Starting Lunch break

12:00 AM - Restarting on 100% Cat. 14" cups - Pulling out all
tube plugs

1:00 PM - Starting with 100% Catalyst

2:00 P.M. Turned over to Dick Chuen. Operators started break

PMW 10:5 - Pulling Plug - 2/6 - 2/7
used 5 drums of 100%

10:55 - 11:10 Coffee Break

11:10^{AM} Began loading 65% Catalyst layer

8 men -

~~10~~ 8 drums on top deck -

Respirator (vacuum system not set up) No one
on mt shift to do this - 36 drums of 100%
6²⁰ about 1400 tubes left, Used 7 drums
of Catalyst

Brought 1 additional Drum up, Other 3 at
base with Payloader in position. Recommend
that at least 2 more drums be brought up
to finish 65% layer. No problems

In addition to the scheduled break about
2⁰⁰, I gave another at 4⁰⁰ (15 minutes) which
was held to 15 minutes, and also a 5 minute
in place break at 5¹⁰. Frankly, the fastest
and most accurate loading occurred from 5¹⁵ to
6³⁰ with no bathroom trips, etc. I would recommend
that this ~~period~~ ^{period}, particularly toward the end of a
shift.

Lu.

2/7/69 7:45 AM - Started loading 65% into remaining 1400 tubes with
JDM. 8 men. Cleaning up MT fiberpacks. Bringing up more 65%.
Have used 7 drums 65% so far. Getting 40 % Cat. brought
out.

9:30 AM - Break - 40% Catalyst is brought out (12 drums)

10:00 AM Back on

10:45 AM - Completed all 65% cat. 25 bad tubes - Used 9
drums of Cat - Left 1 full ^{one} on platform. Pulling Plugs

11:45 AM - All plugs pulled.

12:15 PM - Starting on 40%. 2 men checking the 25 bad tubes
and correcting up to 4" with 40%.

1:00 P.M. - about 500 tubes done - Mistakes much more than
last 26" layer.

2:00 P.M. all but 1 bad tube corrected.

Jix - Note

P. W. 2:30^{AM} - Completed 40% - Used 9 1/4 drums cat. Removed all
but 1 partial.
2:30 - Finished pulling plugs - Made new rods. ~~Adding~~ adding
28% - Sucking out mistakes.
6:30 - Men off shift.

JDM
Sat. AM 7:45 - Started with 9 men + leader - about 500 holes done.
9:00 Repairing mistakes - Made new rods ^{taking} off ~~off~~ and are adding
before + after filling. Very few mistakes now.
11:30 about 1500 tubes done. Bottom head lifted up
into position and being bolted down. Lunch Break

(35% to 40%)
1:00 PM. 7 Drums cat. Used - going for 12 more drums. Almost
all bad tubes corrected now. Working 9 men

RWC on 2:30 PM - 8 drums cat. Used - 13 drums brought out. 50 bags
Tuc-O-Sil ^{bags} brought out.

P. W. on
Saturday
note

11:00 PM
~~12:00 AM~~
~~1:00 AM~~

28% Cat. done - used 19? drums. ^{Doublechecking overshots} Pulling Plugs.

1:00 AM - Pulled Plugs - loaded Tuc-O-Sil in. Put on steel ring.

3:00 AM - 4 T.C. wells installed + pipe shields installed

6:00 AM - all rings in head. Nickel Screen installed.

Oct 1968 job

R-301 -

38
5/10
25

$$1/2" \text{ rings} - 7" \text{ top} + 7" \text{ bottom} = 39 \text{ ft}^3 = 20 \text{ boxes}$$

$$32\% - 52" = 140 \frac{1}{2} \text{ ft}^3 =$$

$$45\% - 26" = 70 \frac{1}{4} \text{ ft}^3 =$$

$$65\% - 26" = 70 \frac{1}{4} \text{ ft}^3 =$$

$$100\% - 26" = 70 \frac{1}{4} \text{ ft}^3$$

$$R-302 - 1/2" \text{ rings} - 14" (7" \text{ top} + 7" \text{ bottom}) = 39 \text{ ft}^3 = 20 \text{ boxes}$$

$$45\% - 52" = 140 \frac{1}{2} \text{ ft}^3 =$$

$$65\% - 26" = 70 \frac{1}{4} \text{ ft}^3 =$$

$$80\% - 52" = 140 \frac{1}{2} \text{ ft}^3 =$$

$$R-303 - 1/2" \text{ rings} - 14" (7" \text{ top} + 7" \text{ bottom}) = 39 \text{ ft}^3 = 20 \text{ boxes}$$

$$65\% = 52" = 140 \frac{1}{2} \text{ ft}^3$$

$$100\% = 78" = 210 \frac{3}{4} \text{ ft}^3$$

$$\text{Volume of } 7" = 7 \times 0.8012 = 5.605 \text{ in}^3 \times 16.39 = 91.8 \text{ cc.}$$

$$26" = 26 \times 0.8012 = 20.810 \text{ in}^3 = 34 \text{ c.c.}$$

$$52" = 41.620 \text{ in}^3 = 68.2 \text{ c.c.}$$

$$78" = 72.430 \text{ in}^3 = 102.3 \text{ c.c.}$$

Need beakers of		100 c.c.	(.44)	need 24	125 ml. - 19 ⁴
		350 or 400 c.c.	(.90)	need 24	500 ml. - 38 ⁴
		750 c.c.	(1.80)	need 48	
		1200 c.c.	(2.00 each)		

Need Parts - 24

Need Funnels - 24

200 lb. 7" and 12" long

CCR 000034322

5/19/69
JDM

Catalyst Blending

Catalyst - 6.47 ft³/drum
Silica - 1.1450 ft³/drum bag.

26" of 100% Cat. = 12 drums (5/27/68 calc)
14" of 100% Cat = 5 drums (actual count on 5/8/69)
~~32" of 100% Cat~~ = 5(6.47) = 32.35 ft³ req'd for 14"
 $\frac{32.35}{14} = 2.31$ ft³/inch depth.

52" x 2.31 = 120.00 ft³ " " " 52" "
26" x 2.31 = 60.00 ft³ total volume for 26" layer.
40" x 2.31 = 92.30 ft³ " " " 40" "

R-302 - 40" 80% Volume 96
26" 65% "
52" 45% "

80% x 92.30 = 73.90 ft³ 100% = 11.42 drums ~~11.42~~
 $\frac{73.90}{6.47} = 11.42$ ~~11.42~~
 $\frac{18.40}{1.1450} = 16.05$ bags.

10 drums to 14.05 bags
5 drums to 7.025 bags
1 drum to 1.405 bags.

6.47 x 1.00 = 6.470
 $\frac{6.470}{1.1450} = 5.659$

= 79.0% Catalyst actually

need 12 drums 100% + 18 bags silica

$\frac{6.47}{1.1450} = 5.659$
 $\frac{1.1450}{1.1450} = 1.000$
5.659 + 1.000 = 6.659
6.659 x 20.60 = 137.17 ft³

$\frac{98.24 - 92.30}{92.30} \times 100 = 6.4\%$ Spare mat'l

5/19/69
JDM

$$65\% - 26" = 80.00 \text{ ft}^3 \text{ total} \times .65 = 39.00 \text{ ft}^3 100\%$$

$$\frac{39.00}{6.47} = 6.05 \text{ drums } 100\%$$

$$\frac{21.00 \text{ ft}^3 \text{ silica}}{1.1450} = 18.34 \text{ bags silica}$$

Make up 17 batches of drum cat to 3 bags silica

$$\begin{aligned} 6.47(7) &= 45.3 \\ 1.145(21) &= \frac{24.1}{69.4} \text{ ft}^3 \text{ total} \end{aligned}$$

$$\frac{9.4}{60.6} \times 100 = 15.7\% \text{ spare mat'l}$$

$$100 - \frac{45.3}{69.4} = \boxed{65.3\% \text{ Actual}}$$

$$45\% - 52" = 120 \text{ ft}^3$$

$$120 \times .45 / 6.47 = 8.36 \text{ drums Cat. } 100\%$$

Need ~~9~~ drums Catalyst

$$9 \times 6.47 = \frac{58.2 \text{ ft}^3}{.45} = 129.5 \text{ ft}^3 \text{ total}$$

$$\frac{71.3}{1.145} = 62.3 \text{ bags silica}$$

$$9 \times 7 = 63$$

$$\text{Use } 63.0 \times 1.145 = 72.1 \text{ ft}^3$$

$$100 \left(\frac{58.2}{130.3} \right) = 44.7\%$$

$$100 \left(\frac{10.3}{130} \right) = 7.9\% \text{ Excess}$$

$$\frac{58.2 \text{ ft}^3}{130.3} \text{ ft}^3 \text{ total}$$

$$32\% (\text{Need } 40") = 92.30 \text{ ft}^3 \text{ total} = \frac{92.30}{62.75 \text{ ft}^3 \text{ of Silica}} = 29.55 \text{ ft}^3 \text{ of Cat.}$$

$$\text{Need } \frac{62.75}{1.145} = 54.6 \text{ bags silica}$$

$$\text{Need } \frac{29.55}{6.47} = 4.57 \text{ drums catalyst}$$

ratio of 1/12

REQUISITION

OF
CONTINENTAL OIL COMPANY

№ 153451

ORDER NO. 401571

(IF SUBSIDIARY COMPANY WRITE NAME HERE)

ORDERED BY: B. Peloquin	CHARGE: 355-03-0013 08611-0801- 355-14-0000	DATE: 5-7-69
DATE REQUIRED: 5-8-69		

FROM: Alpha Chemical Company	SHIP TO: CONTINENTAL OIL COMPANY (SUBSIDIARY)
	ATT'N OF John Minott
	STREET
	CITY

<u>SHIP VIA:</u>			<u>CHEAPEST WAY</u>	<u>PREPAID</u>	<u>WILL CALL</u>	<u>F.O.B:</u>	<u>POINT OF ORIGIN</u>	<u>DESTINATION</u>
			☐	☐	☐		☐	☐
<u>ROUTE:</u>								

[illegible]

CCR 000034325

APPROVALS - OPERATING DEPARTMENT

APPROVALS - PURCHASING DEPARTMENT ONLY

Special Catalyst Loading

8/17/69

R. 301

40" of 32% -	$36.9 \text{ in}^3 \times 16.39 = 604 \text{ cc.}$	193.5
26" of 45% -	$24 \text{ in}^3 = 393 \text{ cc}$	117.0 cc cat.
26" of 65% -	$24 \text{ in}^3 = 393 \text{ cc}$	168.6 cc cat
26" of 100% =	$24 \text{ in}^3 = 393 \text{ cc}$	393.0
		<u>872.1 cc cat.</u>
		<u>1783</u>

.9229 in.³/in.

26" = 24"

Volume $\frac{604}{1179} = 1783 \text{ cc. total/tube}$

$\frac{169}{3} = 56.3$
 $\frac{117}{3} = 39$

Total Cat / tube $\approx 872.1 \text{ cc.}$ say 875 . have 3450 cc.
3.95 tubes

100% - layers - $400 \times 3 = 1200$ - each type

65% - 507 cc. cat. - 351 cc. silica

$\frac{717}{555} = 1.28$
159 ml. silica

$\times 1.10 = 558 \text{ cat}$
717 cc. cat

$\times 1.10 = 386 \text{ silica}$

$\frac{717}{1103} = 0.649$

45%

495 cat.
ml.

605 silica
ml.

total 1100 ml.
 $\frac{495}{605} = 0.818$

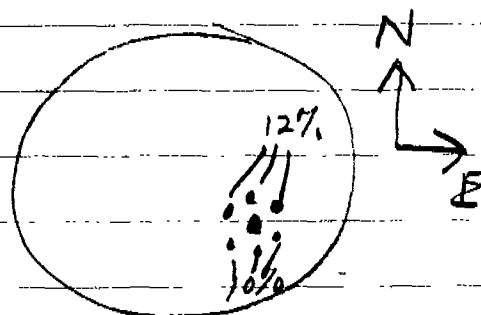
32%

350 cat.
ml.

740 silica

$\frac{1100}{350} = 3.14$
1740

CCR 000034326



Oct. 1968

JSM

CATALYST LOADING

OBJECTIVE: To load R-301, R-302 and R-303 with the proper grade of catalyst.

STATUS: The old catalyst has been dumped and the tubes have been thoroughly cleaned.

PROCEDURE:

- I. Seven (7) inches of Intalox Saddles are placed in the tubes in the following manner.
 - A. Place the funnel in contact with the tube to be filled.
 - B. Fill the seven-inch container evenly to the top with saddles.
 - C. Pour the saddles through the funnel into the tube. If bridging occurs, tap the funnel until the saddles fall into the tube.
 - D. Insert a pipe cap in the tube.
- II. When all of the saddles are in place, put a rubber stopper into the tubes that are to contain a thermocouple.
- III. Load each layer of catalyst in the following manner: (NOTE: each reactor has its own set of catalyst layers.)
 - A. Remove the pipe cap.
 - B. Fill the proper sized container with a level load of catalyst.
 - C. Pour the catalyst through the funnel into the tube.
 - D. After pouring the catalyst into the tube, place a pipe cap in the tube of items A-3, A-5, B-3 and C-3 on the next page.
- IV. Catalyst will be added in the following layers from bottom to top:
 - A. R-301
 1. 7 inches; Intalox saddles
 2. 14 inches; 100% catalyst
 3. 26 inches; 65% catalyst
 4. 26 inches; 45% catalyst
 5. 52 inches; 32% catalyst
 6. 19 inches; silica.

B. R-302

1. 7 inches; Intalox saddles
2. 40 inches; 80% catalyst
3. 26 inches; 65% catalyst
4. 52 inches; 45% catalyst
5. 19 inches; silica.

C. R-303

1. 7 inches, Intalox saddles
2. 66 inches; 100% catalyst
3. 52 inches; 65% catalyst
4. 19 inches; silica.

*Chg to 26" 65%
plus 26" 45%*

- V. Several of the tubes will be spot checked to determine if the proper depth of catalyst is used. If the depth is low by more than (1) one inch, add catalyst. If the depth is high by more than one inch, suck out catalyst.
- VI. At the completion of the top layer the catalyst depth will be measured in each tube.
- VII. The silica is added by tipping a bucket of silica on top of the reactor and spreading the silica by hand into the tubes.
- VIII. The following safety precautions will be followed:
- A. Dustfoe respirators will be worn during the loading of catalyst and silica.
 - B. Goggles will be worn during the loading of catalyst and silica.
 - C. Dustfoe respirators and goggles are not required during the loading of Intalox Saddles.
 - D. Hard hats are not mandatory when you are on the reactor but must be worn at all other times.
 - E. Copper catalyst is extremely toxic. Great care must be taken to remove all traces of catalyst from the skin before eating.
- IX. In the event of rain the reactors will be covered with a plastic cover.