CL-683

4054

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ISSUED TO: C.D. Coryell

ISSUED BY: Mary Shelton

DATE: 9-11-44

9/11/44
TO ~ 5/27/45

"This document consists of 201 pages.
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p5 scrubber flow rate (706-C)

RUNS IN 706-C

RUN 1 - see pages 3 through 14
RUN 2 - see pages 17 through 29 and 198-199
RUN 3 - see pages 39 through 53
RUN 4 - See pages 85 thru 89
RUN 5 - See pages 89 through 90
RUN 6 - See pages 99 through 100
RUN 7 - See pages 100 through 101
RUN 8 - See pages 110

[redacted]

C2-683

[redacted]

TRANSMITTAL DATE 11-2-48

Box T-261

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By H W Hubbell Date SEP 22 1971

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This document has been approved for release to the public by:

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Technical Information Officer Date
ORNL Site

[redacted]

9/11/44 Batch HL-1

Coating removal solution in at 5:15 P.M. Soln heated to 90°–102°. Reaction slow in starting.

6:25PM The 15 gal. of sol. ~~have~~ has about 40 gms of $Hg(NO_3)_2$ in it now. The temp. of the dissolver was raised during this period until 114°C was reached. No sign of pressure development has been noted. The temp. of gases out of the condenser reached 60°C; ~~and~~ that out of the scrubber was ~~th~~ also 60°C.

Temp. setting on potentiometer was off, so these values are high.

Sample was taken from dissolver. Showed presence of Al(?) also was slightly yellow.

(A) Yellowish ppt did not dissolve in NaOH. Is it Hg II?

8:15PM 70% $HNO_3$ started pumping. There was a sudden burst of gas evolved in the tank so that it was necessary to turn the air jet pressure up to ~50 lb to control the pressure in the dissolver.

8:46PM T = 33° in dissolver
T = 26° Condenser off gases
T = 26° scrubber off gases – steam on.

8:50PM Slight pressure increase noted — T = only ~35° in dissolver. ~4# air in air jet necessary to maintain vacuum in dissolver

8:53PM Steam pressure ~10 psi

8:55PM 4# still on air jet to dissolver T = 52°

8:57PM When air jet was cut off, $NO_2$ fumes were seen coming out of dissolver

8:58PM Air jet up to 6 lbs T = ~62°
9:00PM Condenser gases T = 23°
Scrubber gases T = 28°
9:10PM Steam on vacuum jacket
9:13PM Water on dissolver jacket
9:15PM Air jet to dissolver down to ~2 lbs.
9:22PM Air jet to dissolver off.
9:26PM Jetting soln in dissolver to neutralizer from which it goes to new waste tank
9:30PM Jet off. $NO_2$ found in steam which was evolved by jet
9:31PM Jet on again to neutralizer

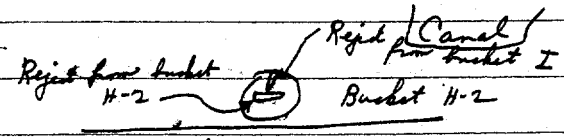
It was decided at this point to throw out the 70% $HNO_3$ that had started reacting because of the possible presence of Al in it. The Al might cause trouble later. Was supposed to have come in at 8:15 (see note) as evidenced by the "burst of pressure".

When this partially reacted solution was jetted to the neutralizer, a thick brown mist of $NO_2$ and steam filled the cell and was carried out doors by the cell ventilation system. Air samples were taken. The duct from the cell showed 24 mr at its surface, tripping ocotpus alarm.

at 22:13, reaction evidently started even though temperature in dissolver was only around 23°. This is very similar to reaction noted at 8:50 PM.

(1A)

22:20. H.A.L. Just finished getting 12 slugs from canal from bucket I. One slug was oversize & was rejected. It was placed in bucket H-2 which already contained one reject from earlier today.




22:55 Reaction has been going nicely, with appreciable gas evolution, but no $NO_2$ coming out in scrubber water (0.25 gpm). The onset of reaction at such a low temp. was suggested to be due to Uranium oxides formed while slugs were in the pile, but the operators claim to have seen a similar low-temp. reactions with "dead" slugs

23:10 Traces of $NO_2$ fumes were noticed again outdoors, and since the only probable source seemed to be the water from the dissolver scrubber ($NO_2$ disengages as the water runs down the ditch), the scrubbing rate was stepped up to 0.5 gpm. The $NO_2$ odor is gone.

9/12 ~1:00 0145 Took about 5 ml sample of fluke 70% $HNO_3$ solution which is fairly yellow scrubber water to 0.1 gpm
depth = 19.6 cm dia: 9.9 cm

0230 depth = ~~2~~ 19.8 den = 9.9
0240 steam off, scrubber off (see data sheet)
0300 10 liters water in
air agit on.
0543 jet on D top
sample line from D ~~[illegible]~~ is clogged ~~[illegible]~~
~~[illegible]~~
0605 Jetting of U.N.H. from dissolver to ppts finished. [When trying to apply a vacuum to ppts. be certain that tank vacuum, and not scrubber press. drop, is being read; Make certain that the rubber stopper is put in the funnel to the ppts., for it has quite an effect on ppts. vacuum; it is only necessary to barely open the valve to the steam jet (½ turn) or so) to get efficient transfer to the ppts. Any additional steam simply increases the job that the ppts. vacuum system has to do. When all the solution has been removed from the dissolver, steam will come from the ppts. tank and ~~the~~ tank will show a slight positive press. This will occur even when the dissolver depth reading is 0.8 cm.]
0635 Mixed sol. in ppts. for several min., took required readings.
0640 Added 6.5 liters $H_2O$ to ppts. to make vol. up to 50 liters.
7:00 Added 12 more slugs to dissolver.
TB Pumped in 88 lbs of coating removal

solution [5 gms $Hg(NO_3)_2$].

7:15 Dissolver showed appreciable pressure increase, so water was run into jacket temporarily, then heating was resumed

7:20 Sample of pptr. contents (49 liters in pptr) taken. It was not possible, previously, to pull a sample out of the dissolver because of a plugged sample line. UNH. apparently frozen in it.

8:00 First 70% $HNO_3$ soln. that was discarded D→N was jetted N→W into storage tank.

8:05 Pb all in - digesting

8:55 agitation off in pptator (see data sheet)

10:15 Jetting of supernate HL-1A to neutralizer took 10 min very good rate. 35 cm Hg on filter vacuum took 5 min to filter this through to neutralizer

10:40 All under control. Dissolving 105°C progress satisfactorily. HL-1a - waste cooling in neut. before jetting to waste to avoid steaming up cell #3. Cell #1 has 40 mr/hr.

11:40 HL-1a ← ? All under control Dis T = 106°C, Cond 26°, + Scrub 29° St. pres. 20 psi. HL-1a Waste still in N.

1200 Dis. 23.5 liters 1.6 = ρ.

1300 Dis. 22.5 liters 1.74 = ρ St pres. 34 psi 104°C, Cond 28°C, Scrub 32°C

1340 Diss. vol = 22.5 liters dens = 1.74

BIG ΔT — RUN IC STARTS?

1800 Valve on line to 105 opened. ~15-20 ml soln came out.

1800 Sample line from dissolver now clear.

1815 Pressure across condenser and scrubber higher than 7 cm. Water put in dissolver jacket until pressure reading became 4 cm.

(10)

2000 Dissolver depth: 18.8 cm ; density: 9.7 cm. ρ = 1.65
Vol = 22.5 l. Temp = 105°C

Ppt. : Ppt is settling Temp = 33°C

2030 Ppt. Supernate jetted to Neut.
Ppt. R - 15.5
Density R. - 7.1
Density - - 1.6
Volume - - 74 liters

2015 0.3 ml sample removed from precipitator (supernate) labeled "HL-1B-PS". 0.1 ml of this was diluted to 50 ml for analysis.

2200 Dissolver: finishing dissolving HL-1C
Neutralizer: Supernate and filtrate from HL-1B cooling for subsequent sample removal.
Precipitator: PbSO4 ppt containing Ba* from

runs HL-1A and HL-1B sitting on bottom of tank
Make up tank: coating removal soln. waiting to dissolve HL-2A slugs which are on top of cell 3.

2225 12 liters $H_2O$ into batch 1C in dissolver.
2315 Sample taken from dissolver, batch 1C. Labeled HL-1C-DU. Data in sample notebook. cubicle #9
2330 Sample taken from waste, batch 1B. Labeled HL-1B-Waste. Data in sample notebook. cubicle #9.
2340 Waste from batch 1B jetted to tank outside Bldg.
2345 Dissolved batch 1C all transferred to ppts.

9/13

0035 Reaction is slow in starting [Coating removal]
0040 Reaction started
0053 started addition 8 l $H_2SO_4$ to prec. t=85°C

0120 Dis. - depth = 22.0 den = 16.3 t=100°C
Prec - dep = 16.4 den = 11.3 t=82°C
(0015) Carbonate for coat removal soln in N.
0155 jet D→N on
0210 coat soln all over + washed.
0215 70% $HNO_3$ to D [= batch HL-2A

0235 prec = den = 18.6 dep = 13.2 t = 75°C
Dis = den = 22.1 dep = 13.6 t = 105°C

7:00 AM When the dissolving was complete, and the depth and density of the dissolver solution (HL-2A) taken, it was noticed that the

volume was unusually large (33 liters). A check-back showed that the vol. at the beginning of the dissolving was high by about 12 liters (see item 5 on sheet HL-2A). So, if it is assumed that 12 liters of $H_2O$ were present in the dissolver when the 70 # $HNO_3$ were jetted over, the vol. of 35.5 l. and the density of 1.27 can be explained. This more dilute acid would react more slowly, but still would do fairly well; Actually, it was noticed that the behavior was quite smooth. At the end of the reaction there would be a vol. and a density corresponding to that obtained on regular runs after diluting with 12 liters. This run (2A) showed vol = 33 l; $\rho$ = 1.56. Run 1B showed 33 liters and $\rho$ = 1.58 after the 12 l. addition.

If the dissolver manometer stop cock were on density instead of depth when the coating sol. was jetted to the Neut. tank, it would read zero when there were actually ~12 liters of soln. still present in the dissolver (6 cm depth still in tank). These 12 liters would then mix with the incoming 70 # $HNO_3$ and cause all the foregoing miscarriage

9/13

1000

1315

1320

1430

9/13/44 at 9 AM the alarm bell on the octopus rang. The selector switch indicated that #2 detector was high. This is the one by the ~~ouste~~ outside filter disk. Lauritsen readings showed 45 mr/hr by the right side of the detector, 30 mr/hr about a foot and a half from the face of the cell and 250 mr/hr as close to the drain line under the filter shield as the electroscope could be placed. The shield was washed with water and at 9:13 A.M. the scope read 8 mr/hr where it had read 250.

1000 Sample taken from dissolver by Zeiland Knight. Labeled $\boxed{\text{HL-2A-DU}}$

1315 Reaction in Dis. started at 1315 87°C $Pb(NO_3)_2$ being added to Pptr. all's well

1320 Steam off 105° Dis, Cond. = 25° Scrub 29° Pptr. = 63°C 15 psi off gas jet.

1430 Dis. Dissolving 10 psi St. pres., 103°C 4 psi air jet. Cond 33°, Scrub, 35°. Pptr settling 61°C

1530 Pptr being sampled for supernate.
Dis. still Dis. Steam increased to 20 psi.
2030 PPTr - supernate has been transferred to N. and from N to waste. A sample was taken of the waste. The UNH in the dissolver was sampled and jetted to PPTr. Volume 54 liters in PPTr. [redacted] slugs were added to Dissolver and the coats are ~~[illegible]~~ removed.
2200 In the last hour a sample was taken from ppt. labled $\boxed{HL\ 2B\ PU}$ coats were removed from 2-C washing of dissolver was complete.
2500 eight liters of $H_2SO_4$ added to pptr
2300 4 liters of $H_2SO_4$ and 5 grms of Pb added to pptr
(2C) dissolving reaction on [redacted] started jetted from neutralizer to waste
2400 new batch of slugs brought down

agitation in pptr turned off settling period started

9/15
08
11
12

[WHAT HAPPENED TO 9/14/96 AND BATCHES 3A, B, C?]



# SAMPLES

Take samples of dissolver UNH and waste only.

9/15/97
4:15 Coating removal on HL-4A starting, $H_2SO_4$ being added to ppts.

(4A)

0800 4-A dissolving (started at 0600)
3-abc ready for dissolving up ppt.

1130 sample of dissolver UNH was not taken yetting to pptor and taking sample from pptor (reason Dissolver sample lines clogged)

1240 ~~B~~ ~~Di~~ Started to dump slugs for 4B. The first slug dropped out of carrier and became lodged in the iron funnel in top of cell 3. Present were Brady, Jenni, Zeil, Govin, McAddams, Dan Richardson made a hook on end of steel rod. Zeil & Govin lifted slug carrier off the hole Brady pulled slug loose with hook from overhead; rest of slugs were

(4B)

then dropped phew ! ! ! ! ! !

[No record of batch 4C]

Outside storage tank 9/20/44

Density – 9.8" $CCl_4$ $\rho = 1.3$
Depth – 21.5" $H_2O$ 400 gal.

If we consider 17.5 batches of regular waste (0.5 for the fluke on 1A), it is seen that there are about 22.8 gal/batch, or 86 liters per batch, which is in good agreement with the volumes as given by our equipment.

We have capacity for about 4 more 150 curie shipments

Data on Runs

Avg. time for 11 "normal" runs (1B thru 4C) was 10 hours each. Pretty good time.

[RUN 1 SHIPPED 9/18]

1B, 1C, 2A, 2B, 2C, 3A, 3B, 3C, 4A, 4B, 4C

## Test on Heat Transfer in Dissolver Jacket and Condenser

9/21/44

2:20 PM Filled the dissolver with 138 lbs. of water, which is sufficient to make the depth 1 ft. The calibrated value and a calculated value agreed very closely.

2:46 Steam on at 30 P.S.I. $H_2O$ in Dissolver at 20°C

2:47 (1.8 KW) 45°C

2:48 (2.5 KW.) 62°C

2:48 gas exit from condenser is 25°C ; dissolver is at 82°C

2:50 2420 ml condensate in 2.5 min.
liters with

Dissolver at 93°C

2:55 " " 94°C

2:57 Temp. out of condenser (gas) still at 25°C

2:58 Get sudden ~~from~~ press. increase in dissolver. Turned on condenser water. Dissolver at 96°C

3:02 Dissolver Temp at 98°C. Big pressure in dissolver. Cut back on steam

3:10 Cond gas out 28°C. Dissolver 98°C

3:31 Started to collect condensate. Steam has been at 15 P.S.I. for 15 Min.

3:34 Started collecting water out of condenser jacket. Temp $H_2O$ out is 35°C, temp $H_2O$ in is 18°C.

3:36 Finished collecting condensate. 2150cc/5 Min

3:36.5 " " condenser water. 5 gal.

Gas out of cond. is 28°C

4:00 Turned air jet on to 10 PSI, and has been running for 20 min that way, to reach equilibrium. Press. across two columns is ~8 cm, press. in dissolver about 2 cm. 10/1

4:04 Started collecting condensate

4:09 finished " " 2100 cc/5 min 10/

4:13 Started collecting the cooling $H_2O$. Temp is 35.5 out

4:15.5 Finished " " " " 5 gr/2.5 min

4:32 Turned on cooling $H_2O$ in dissolver. Temp = 98°C

4:[illegible] Air agit. in dissolver is on. " 3.7

4:34 Temp is 81°c

4:37 " " (2.6 mv) 64°c

4:40 (2.1 MV) 52°c

4:45 (1.6 mv) 40°c

4:50 Started jetting diss. to Neut. diss. 29.5 (60.5 l) Neut 1.2 (~7 l)

5:01 Finished " " " diss 1.2 (1 l) Neut 10.6 (72 l)

14

# HL – 21A

10/10/44 Coating removal reaction started about 11 AM. 36 slugs were put in yesterday.

10/12/44 Starting time of each batch from time reaction started.

| | | | | |
|---|---|---|---|---|
| 21 A | 1230 | 10/10 | 645 | 6.25 |
| 21 B | 1915 | 10/10 | 535 | |
| 21 C | 0050 | 10/11 | 655 | |
| 22 A | 0745 | 10/11 | 830 | |
| 22 B | 1615 | 10/11 | 445 | |
| 22 C | 2100 | 10/11 | 615 | |
| 23 A | 0315 | 10/12 | 630 | |
| 23 B | 0945 | 10/12 | 400 | |
| 23 C | 1345 | 10/12 | | |

TIME PER BATCH?

averaging about 6 hrs. & 10 min. per batch – not too bad.

1400 Last dissolving 23-B took 1½ hr to reach dens. 1.80. The present batch is also progressing rapidly.

10/11/44 The first ammonium acetate solution was ready to transfer at about 10 AM. There was a new fine filter disk in the outside filter position. The ~~ammonium~~ ammonium acetate was put into bottle 3 requiring about an hour and a half for the transfer. The fuming nitric was put into bottle 2. Transfer was quite slow. After the fuming nitric and one 6N $HNO_3$ wash were in the bottle the level indicator registered 470 ml. The transfer of the nitric acid was going so slowly that the second two washes were combined in the reservoir. After about an hour and a half more filtering time no more solution was coming over. The bubbler on the ~~side~~ side of bottle 4 to indicate rate of filtering was not bubbling. The shield around the outside filter disk was raised and the disk inspected by means of a mirror on a 3' rod.

This Space Reserved for Ed Brady
(to write down all notes for last two days)

10/11/44 Dissolving should be continued until the density of the solution remains constant for at least ½ hour. With the bubbler set at ~ 4 bubbles / second the density should be ~ 1.80 - 1.82. If the bubbling rate is too high a high value will be obtained from manometer reading. The bubbler should be adjusted to as slow a rate as possible without causing the manometer to fluctuate.

10/11/44 2200 When transferring the 1st $NH_4Ac$ sol from ppt. to reservoir the manometer reading did not fall for ten minutes. Normal time is ~ 5 minutes. Transfer was interrupted to permit Darwin Harris to filter any solution in the reservoir and measure the volume. An accurate value was not obtained because the initial depth reading in the stopper bottle was uncertain. Transfering was resumed for another 5 minute period (manometer reading went up to 60 cm) A second portion of 240 ml of $NH_4Ac$ solution was obtained. Transfering from ppt to reservoir again resumed. After 5 minutes at 60 cm Hg the manometer reading fell indicating that ppt was empty. The color of the 1st $NH_4Ac$ solution was yellow

2240 The 2nd $NH_4Ac$ sol was transfered from ppt. to reservoir in 2 minutes. The color of the

solution was very pale yellow

It now seems apparent that the difficulty experienced in the first transfer was due to the line being clogged with uranyl sulfate.

2300 Fuming $HNO_3$ filtered slowly with considerable loss in volume (500 ml added and 267 ml recovered) pptator and product line had been cooled with water

0030 Only 11 slugs were counted by Ross and Money when loading dissolver for HL 24 B The bucket was monitored and no activity detected. The sliding section was pushed back into position and the bucket raised ~1 inch No radiation was detectable. This eliminated the possibility of there being a slug stuck in the funnel. The slug bucket was then taken down to the canal and the lid removed — no slug was found in the bucket.

2-4B

1610 Thought for the day — Consider the fact that although all thermal shock is being done away with on glass apparatus side there is still some on our storage bottles due to warm $NH_4Ac$ and $HNO_3$ solutions.

someone will have to sign for two cases of $H_2SO_4$ at store room tomorrow 10/13/44

10/13/44

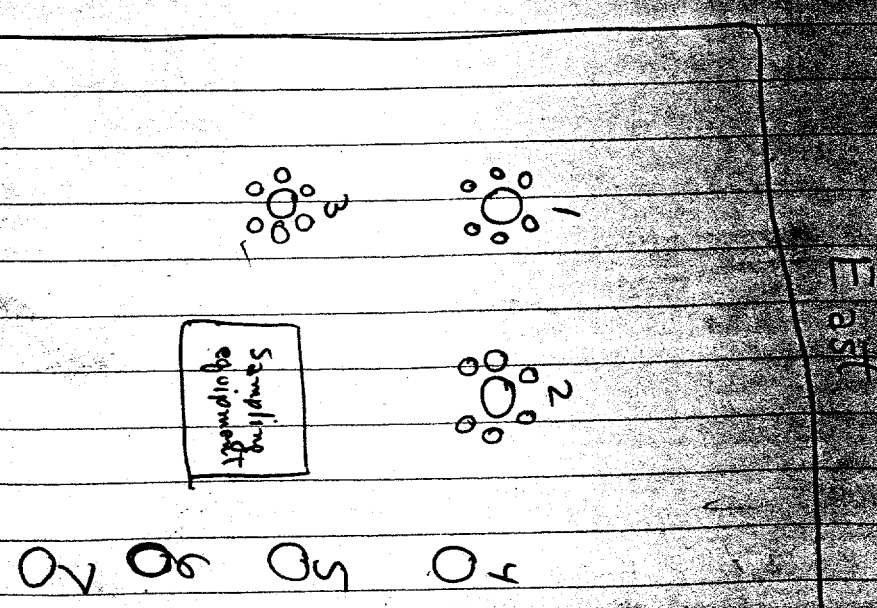
1830 1st $NH_4Ac$ for HL 24C came over almost colorless

1840 Dissolver density for HL 25A remained almost constant over a period of 1 hours

| time | | dens |
|---|---|---|
| 1745 | — | 1.84 |
| 1810 | — | 1.85 |
| 1840 | — | 1.86 Reaction stopped |

2-5A

1800 Some measurements were made in cell 4 with the ionization chamber and Beckmann amplifier. For purposes of identification a sketch of the holes in the cell top is shown.



Results of measurements.

A. In hole #2, 2" hole

(1) Chamber stuck in top to measure radiation coming out of hole

10" ohm scale 4.85 volts

(2) In standard position (which Henri knows), chamber between bottles 1 and 2 outside of lead shield.

$10^8$ ohm 1.27 volts

(3) About 1½' higher than (2). Chamber above lead.

$10^8$ ohm 0.652 volts

B. Chamber in hole #4

(1) Chamber stuck in top

10" ohm 3.38 v

(2) against lead next to bottle 2. Chamber had to be swung past a couple of obstacles. Two inches of lead between bottle and chamber.

$10^8$ ohm 1.92 v

(3) About 1½' higher to clear Pf shield.

$10^8$ ohm 2.10 v.

C. In hole #5

(1) Resting on board, near Bottle 3

$10^8$ ohm 3.04 v

(2) About 6" higher to clear shield

$10^8$ ohm 4.33 v

1900 After 2nd NHyAc was filtered 100 ml water (~65°) added to reservoir and transfered to NHyAc storage via outside filter 17

2150 70% $HNO_3$ for HL-25-B ~~dark yellow~~ 2-5B

10/14/44

1635 Checking with Earl Purchase it was discovered that the 1st 6N $HNO_3$ for HL-25C was transfered to the reservoir before the fuming nitric was filtered 2-5C 10/15/ 01

1645 Beckman readings in Cell three

I Ionization chamber just touching floor 2-6A

A) HL-26A in dissolver

$10^8$ scale 5.56 volts

II Top of ~~ionization~~ ionization chamber level with top of neutralizer

A) $10^8$ scale 3.00 volts

~~1700 It was~~

1700 It was called to my attention by Dick Money that only ~~11~~ 11 slugs were dropped

for HL-25-B. This was detected when the bucket was being loaded for HL-25-C. It appeared that the bottom had not been screwed out far enough for the last slug was the one remaining. Bersohn and Bellner swear up and down that they heard 12 slugs drop.

1740 Beckman readings in cell 3

I

B) HL-26A trans to ppf
$10^8$ scale 3.38 volts

II B) ~~[illegible]~~ $10^8$ scale 1.88 volts

25-C

10/15/44 J-6B

0845 HL-26B (last tube remaining) — dissolving time was 5 3/4 hours

| | Time | Density 1.4 | Volume 24 l | |
|---|---|---|---|---|
| Start | 1815 | | | |
| | 2200 | 1.82 | 21.5 l | |
| | 2225 | 1.90 | 21.5 l | |
| | 2240 | 1.91 | 21.5 l | |
| | 2305 | 1.92 | 22 l | |
| | 2320 | 1.92 | 22 l | |
| | 2335 | 1.94 | 21 l | (bubbler rate increased) |
| | 2350 | 1.92 | 21 l | |
| | 2355 | Reaction stopped | | |

No sample taken

0200 The valve on the water line to the weigh tank leaks: The liquid in the weigh tank is just water. Both valves on the water line are turned off

10/15/44 Locating Lost Curies

It was considered possible that fission barium has exceeded saturation value for $BaSO_4$ in the pptator and accumulated during the runs. Since no $H_2SO_4$ was added to HL-26A, the UNH solution would act as a good solvent. The pptator UNH was sampled 1915 (25¼ hours after getting from dissolver) and an increase of 57.9 curies ~~of~~ over the dissolver UNH. HL-26A-DU 26.8 curies HL-26A-PU 84.7 increase 57.9 curies

~~At 2200 the precipitator was he~~

At 2200 steam to ppt jacket turned on and left on overnight

| | Time | Temp. | Density | Volume |
|---|---|---|---|---|
| | 2200 | 38° | 1.38 | 49 l |
| | 2230 | 104° | | |
| | 2320 | 104° | 1.42 | 41 l |
| Steam by-pass | 2348 | 104° | 1.43 | 40 l |
| 10/16/44 | 00.05 | 101° | 1.45 | 38.5 l |
| | 0:55 | 105° | 1.46 | 38.5 l CDC |
| | same | | 1.48 | 38 JMS |

Turn off at 1:00, to control agitate.
Want to check measurements at various temps

| Time | Temp. | Den's. | Vol. |
|---|---|---|---|
| 0112 | 69-70 | 1.485 | 36.5 l |
| 0120 | 50 | 1.51 | 36 l |
| 0132 | 30 | 1.52 | 36 l |
| Steam on again at 0137 | | | |
| 0153 | 96 | 1.47 | 36.5 l |
| Agitation left on by accident | | | |
| 0315 | 98° | 1.71 | 25.5 l |
| Add 34 l $H_2O$ with agitation on | | | |
| 0350 | 99° | 1.33 | 52 l |
| 8 liters $H_2O$ added | | | |
| 0400 | 99° | 1.32 | 59 l |
| 0930 | 85° | 1.34 | 52 l. |

10/16/44 Sample taken from precipitater by Foltz at 9:15.

900 32 lb NaOH put in soln in 250 lb of water, pumped to neutralizer and then jetted to waste in order to neutralize 20 liters of fuming nitric waste from glass sled. Make up tank and neutralizer washed with 75 lb of water.

1000 Outside filter disk gave 10 r at about 6' with lead shield up.

DC
JMS

10/16 Precipitator Notes.

At 9:30 the ppt had 52 liters
$\rho = 1.35$. This was heated.

10/16
2250 Outside filter disk after all of run 6A solutions have ~~gone~~ gone through gave 2x where it gave 10x this morning. Gave 10x at ~2½'.

10/17 ~~0415~~ 0510 5 l. of 1N $HNO_3$ was added to the empty precipitator.
2 Liters were added through pptr filter.
3 Liters were added through funnel.
A temp. of 80°C was maintained in the pptr. for a period of one hour.
The pptr. is cooled and sampled.
0530 No sample could be obtained so 5 additional liters of water were added and mixed thoroughly. Solution was finally diluted to 50 l. No sample could be obtained. It was then jetted to neutralizer.
0645 ~~A san~~ Neut. was sampled

[RUN 2 SHIPPED 10/17 1330]

10/19 Sample is in room 9 where the level is too high to look for it so another sample was taken. This sample was labeled HL2-PD1N. About 10 ml were taken. Gave 150 mr/hr. Put in bottle 64.

# Thicknesses

| No. of Plate | 1 | 2 | 3 | Average | Weight - mg/cm² |
|---|---|---|---|---|---|
| 1 | .134" | .136 | .134 | .135 | 3880 |
| 2 | .134 | .135 | .135 | .135 | 3880 |
| 3 | .133 | .133 | .133 | .133 | 3850 |
| 4 | .135 | .136 | .136 | .136 | 3910 |
| 5 | .133 | .134 | .135 | .134 | 3850 |
| 6 | .271 | .271 | .271 | .271 | 7790 |
| 7 | .270 | .271 | .269 | .270 | 7750 |

2.54 X 11.3 X 1000 = 28,800 mg/cm²

| | | | | | |
|---|---|---|---|---|---|
| 8 | .271 | .271 | .271 | .271 | 7790 |
| 9 | .527 | .527 | .527 | .527 | 15,000 |
| 10 | .527 | .527 | .521 | .527 | 15,000 |
| 11 | .521 | .521 | .521 | .521 | 15,000 |
| 12 | .271 | .271 | .271 | .271 | 7790 |
| 13 | .521 | .527 | .527 | .527 | 15,000 |
| 14 | 1.001 | 1.005 | 1.004 | 1.003 | 28,900 |
| 15 | 1.006 | 1.005 | 1.001 | 1.004 | 28,900 |

PLATE
H.P
2
No PLA
6
2 top
6+7
6+7+
14
14+6
14+6+
14+1
14+15
14+15
14+15+
+11
14+15+9
+11+13
6
6+7
6+10
14
14+1
14+15
14+15+
14+15+9
14+15+9
+13
14+15+
+13+6
A+8+

# Absorption Curve Data

Taken on roof of 706 C 10/17/44 Collimator not in

50 = 10 to 60 on scale

| PLATE # | TIME | READING | | W.C. | I B / Hr | wt of absorber |
|---|---|---|---|---|---|---|
| H.P. | Electroscope | | | | | |
| 2 | 1:39 | 1.8/50 | | | 3880 | |
| 2 Cm. | | 2.1/50 | | | | |
| No PLATES | | 1.6/50 | 1.5 | 1870 | 0 | |
| 6 | 1:40 | 2.5/50 | 2.6 | 1180 | 7790 | |
| 2 top of 6 | | 2.1/50 | 2.9 | 1000 | 3880 + 7790 = 11,670 | |
| 6+7 | 1:41 | 3.5/50 | 2.5 | 856 | 7790+7750 = 15540 | |
| 6+7+8 (3/4") | 1:42 | 4.6/50 | 4.4 | 666 | 7790+7750+7790 = 23,280 | |
| 14 (1") | 1:43 | 5.0/50 | 4.9 | 606 | | |
| 14+6 (1 1/4") | 1:44 | 5.6/50 | 5.9 | 522 | 28,900+7790 = 36,690 | |
| 14+6+7 | 1:45 | 6.6/50 | 6.5 | 458 | 28,900+7790+7750 = 44,440 | |
| 14+15 | 1:46 | 7.3/50 | 7.3 | 411 | 28,900+28,900 = 57,800 | |
| 14+15+9 (2 1/2") | 1:47 | 8.6/50 | 8.5 | 351 | 28,900+28,900+15,000 = 72,800 | |
| 14+15+9+10 | 1:49 | 10.0/50 | 10.0 | 300 | 28,900+28,900+15,000+15,000 = 87,800 | |
| 14+15+9+10 +11 | 1:50 | 11.0/50 | 11.0 | 273 | 28,900+28,900+15,000+30,000 +15,000 = 102,800 | |
| 14+15+9+10 +11+13 | 1.52 | 12.8/50 | | 234 | 28,900+28,900+60,000 = 117,800 | |
| 6 | 1.54 | 2.5/50 | 2.6 | 1180 | 7790 | |
| 6+7 | 1.55 | 3.4/50 | | 852 | 7790+7750 = 15540 | |
| 6+10 (3/4") | | 4.0/50 | 4.4 | 714 | 7790+15,000 = 22,790 | |
| 14 | 1.56 | 5.2/50 | 4.9 | 594 | 28,900 | |
| 14+15 | 1.57 | 7.9/50 | 7.6 | 387 | 2[28,900] = 57,800 | |
| 14+15+9 | 1.59 | 9.1/50 | 9.1 | 330 | 57,800+15,000 = 72,800 | |
| 14+15+9+10 | 2:00 | 10.9/50 | 10.8 | 276 | 57,800+30,000 = 87,800 | |
| 14+15+9+10+11 | | 13.0/50 | 12.8 | 232 | 57,800+45,000 = 102,800 | |
| 14+15+9+10+11 +13 | 2:02 | 15.8/50 | | 190 | 57,800+60,000 = 117,800 | |
| 14+15+9+10+11 +13+6+7 | A 2:03 | 21.0/50 | 21.5 | 141 | 57,800+60,000+15,540 = 133 3/4 | |
| A+8+12 | 2:05 | 31.3/50 | | 96 | 57,800+60,000+15,540 +15,580 = 148,920 | |

Calculation of Thickness of Absorber

| PLATE # | TIME | READING | |
|---|---|---|---|
| A+8+12 1+2+3 | 2:08 | 52.0/50 5716 | 57,800+60,000+31,120 +11,580 = 160,500 |

Collimator put in shield

| | | | |
|---|---|---|---|
| A+8+12+ 1+2+3 | 1431 | 167/50 | ~~160,500~~ 168,290 |
| A+8 | 1432½ | 70/50 | ~~141,130~~ 148,920 |
| A | 1434½ | 49.6/50 | ~~133,340~~ 141,130 |
| #6 off | 1436 | 42.6/50 | ~~125,500~~ 133,340 |
| 1,2,1,2,3 vs background | 1441 | 173/50 | ~~160,470~~ 168,260 |
| #1 off | 1444 | 138.5/50 (?) | ~~156,590~~ 164,380 |
| #2 off | 1447 | 178/50 | ~~152,710~~ 160,500 |
| #3 off | 1449½ | 102/50, 91/50 | ~~145,890~~ 156,680 |
| ~~1 min~~ #4 off | 1454 | 78.5/50 | ~~144,980~~ 152,770 |
| #5 off | 1455½ | 65/50 | ~~141,130~~ 148,920 |
| #6 off | 1456¾ | 51/50 | ~~133,340~~ 141,130 |
| #12 off | 1458 | 41.5/50 | ~~125,550~~ 133,340 |
| #7 off | 1459 | 35.5/50 | 117,800 ~~125,590~~ 117,800 ~~118,340~~ |
| ~~#8 off~~ Repeat | 1504 | 37/50 | 117,800 ~~110,000~~ ~~110,590~~ |
| #13 off | 1504½ | 29/50 | 102,800 ~~95,010~~ 102,800 |
| #11 off | 1505½ | 24/50 | 87,800 ~~80,010~~ 87,800 |
| #10 off | 1507 | 19/50 | 72,800 ~~65,010~~ 72,800 |
| #9 off | 1507½ | 15.4/50 | 57,800 ~~50,010~~ 57,800 |
| #15 off | 1508 | 8.8/50, 8.9/50 | 28,900 ~~57,600~~ 28,900 |
| #14 off (Oabs) | 1509 | 2.8/50, 2.3/50, 2.5/50 | 0 ~~25,900~~ 0 |

In the following data each successive absorber was added to the ones already there.

| | | |
|---|---|---|
| 1 | 1508 | 3.6/50 |
| 2 | | 4.4/50 |
| 3 | | 5.2 |
| 4 | | 6.0 |
| 5 | | 6.6 |
| 7 | | 8.6 |
| 12 | | 10.0 |
| 6 | | 11.8 |
| 8 | | 13.4 |
| 9 | | 17.2 |
| 10 | 1520 | 21.4 |
| 11 | 1544 | 26.8 |
| 13 | 1544 | 34.0 |
| 14 | 1546 1/2 | 65.8 |

Calibration of electroscope
(Data furnished by John Deal 11/23/44

| | | | |
|---|---|---|---|
| 1000 mr/hr | 2.1 sec/50d | (10-60) | |
| 750 | 2.7/50 | — | |
| 500 | 3.7/50 | — | |
| 250 | 6.3/50 and | 1.3/10 | (10-20) |
| 100 | 13.3/50 | 2.8/10 | |
| 10 | 107.7/50 | 23.5/10 | data by Mrs. Johnson |
| 1 | — | 218.8/10 | |

mr/hr calculated from geometry with respect to 25 mg cal. Ra source (assuming negligible scattering)

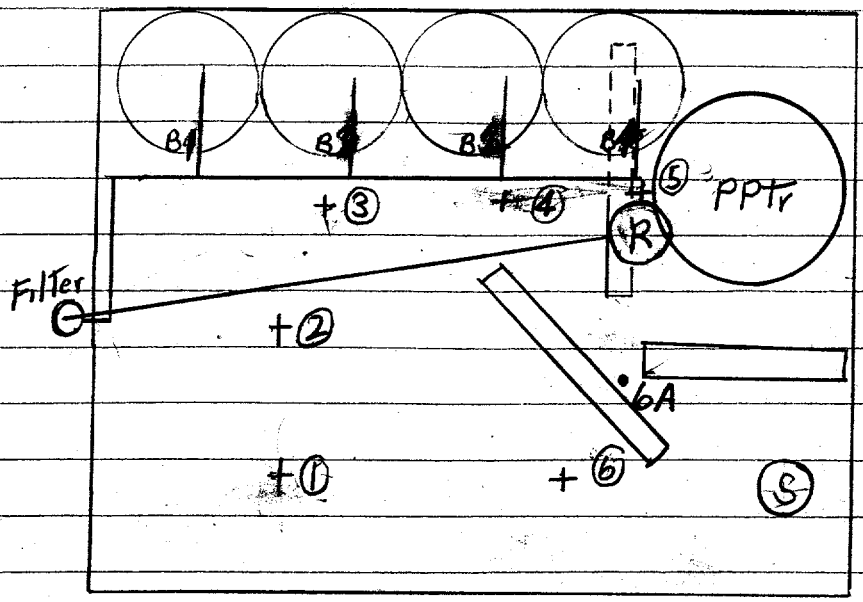
10/23/44 Calibration of Ammonium Acetate Underground Tank #1.

Distance from inside bottom of tank to upper edge of pipe = 135.2 cm (53¼")

| Vol. | | Depth | |
|---|---|---|---|
| 2 | liters | 2.9 | cm |
| 4 | " | 6.0 | " |
| 6 | " | 8.8 | " |
| 8 | " | 11.7 | " |
| 10 | " | 14.4 | " |
| 12 | " | 17.3 | " |
| 14 | " | 20.1 | " |
| 16 | " | 22.9 | " |
| 18 | " | 25.6 | " |
| 20 | " | 35.5 | " |

# Bank 2 - Cell 4 — 10-20-44

## Beckman Readings




| | | | | | |
|---|---|---|---|---|---|
| ① Floor | 1.55 V | $10^8$ scale | ⑥ Floor | 0.87 V | $10^8$ Scale |
| 1m From Floor | 3.00 V | " | 1m | [illegible] | " |
| 2m " | 0.485 | " | 2m | 0.45 | " |
| 3m | 0.290 | " | 3m | 0.35 | " |
| ② Floor | 1.70 | " | Top of Pb Shield | 1.5 | " |
| 1m | 5.75 | " | | | |
| 2m | 0.675 | " | Level with R | 0.55 | " |
| 3m | 1.05 | " | | | |
| ③ Floor | 1.70 | " | (6A) Beckman on End-on Floor | | |
| 1m | 6.6 | " | | 0.84 | " |
| 2m | 1.00 | " | Lay on Floor | | |
| 3m | 1.35 | " | | 0.96 | " |
| ④ 3m | 0.485 | " | | | |
| ⑤ 3m | 0.19 | " | | | |

-over-

Bank 2 - Cell 4 10-23-44

① 96.5 cm From Floor 112 R

② 130 cm From Floor 266 R

③ 142 cm From Floor 627 R

Holes ④ and ⑤ were not Tried.

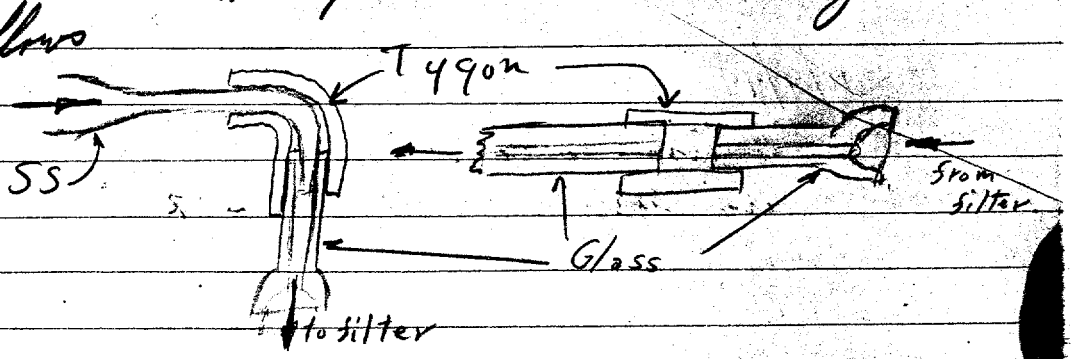
⑥ On top of Pb Shield
near PPTr 102R

Outside Pb shield
on Floor 38R

6A Inside Pb shield
near PPTr 33R

10/30/44 To date the treatment of Cell 4 Bank II after the operations discribed on p 29 were as follows.

1 liter cold 6 $HNO_3$ was added to the Reservoir, taken thru the filter disk & put into bottle #2. At the same time 2 liters of 6 $HNO_3$ were added to the ppt. 300 ml. thru filter disk & 1700 thru splash plate. This was left in the ppts. for 3 days. In the mean time the connections to the filter over door of cell #4 leaked so the disk was removed, and in doing so the glass capillary leading back into the cell to the storage bottle was broken. also the silicate that was used for cementing the stainless draw off line to the filter had crumbled. Tygon was used to replace this & clear the glass. as follows




The lead shield was generally decontaminated & the old filter disk replaced. The 6 $HNO_3$ in the ppts. was then transfered to bottle 3. 1 l 6 N $HNO_3$ was added to the ppts., boiled & drawn up to bottle 3. Samples on these have been taken.

Plans have been submitted, approved + are being filled for the construction of 6 10 l. st.st. storage tanks to be placed atop of Cell 4 in the N.E. corner. They will be placed as a hexagon + shielded with special cast lead bricks with 9 8/15" protection. Tanks promised for Nov. 1 + lead for Nov 6.

11/1/44 AM 4 of the SS storage tanks arrived, the distributor, + reservoir #2. The storge tanks have a 9 liter capacity, the distributor 1240 ml., + reservoir #2 about 1790 ml. The reservoir has been installed, + general installation is progressing. Work is being done on developing a S.S. diaphram type remote control valve.

11/9/44 The S.S. storage system is near completion. All tanks were pickled overnight with f $HNO_3$. Test on the system to date have been made. The following transfers of 1 l $H_2O$ was made within 1/2 hr. #1 → R → 2 → R → 3 → R → 4 → R → 5 → R → 6 → R → 1. Operations will be outlined later. Connections to Cell I + II have to be made also panel board + accessories installed. A S.S. diaphram valve with black Korosed as a diaphram has been subjected to 24+ hrs $HNO_3$.

11/14/44 3 new men came Sat 11/11, Dissolver, Elbert, + Orlep. Another new man came in today. Storage tanks are in the last stages of installation; testing for final leaks + calibration has yet to be done also. Slugs were dumped for us Sun. 11/12/44. Shift work is started on the engineering side.

[RUN 3]

11/15/44 The first batch of slugs were dissolved on the swing shift last night. This was held in the dissolver pending completion of S.S. storage system. The graveyard shift completed the shielding, depth + dens. lines were connected + Bubbler + Manometer installed. The system holds air pressure (~6") reasonably well. The second batch started to dissolve at ~1400.

11/16/44

HL-31C was finished ~~except~~ precipitating ~~by 8 AM~~. By 900 it looked as though the steel storage system would require a couple of days testing before it would be ready for use so it was decided to go ahead using glass bottles 3 and 4. The nitric acid in Bottle 3 was dumped to the drain and operations proceeded. ~~During~~ The filtration of the 500 ml of 6N $HNO_3$ seemed to be taking a long time so some volume measurements were made. It was found that the volume in Bottle 4 into which

11/16/44 the ammonium acetate had been put had increased by only about 500 ml and the volume in Bottle 3 had increased by about 1400 ml. Apparently the filtration of the ammonium acetate was not finished when it was stopped. Evident that the filtration ~~—~~ of the acetate was complete were the facts that the filter disk was free of solution and air was racing through the line leading to Bottle 4. The shield around the outside filter disk was raised and it was observed that the solution on the upper part of the disk was cloudy and the solution below was clear. The cloudiness was undoubtedly due to $PbSO_4$ or $Pb(NO_3)_2$ which precipitated out of the ammonium acetate-fuming nitric mixture. When filtration was finally finished ~~it was observed~~ there was about a 1/8" thick layer of ppt on the top side of the disk.

Storage bottles 3 and 4 were sampled immediately and analyed by Money.

Results: Bottle 3 110 millicuries Ba
Bottle 4 30 millicuries Ba

11/16/44 At Charles suggestion nothing further was done in the precipitator and the UNH from 32 A was brought over and $PbSO_4$ pptd in the usual way for the first batch of a triple

11/17 When the pptor was turned off to allow settling the sol. Sol was found to be ~~low~~ 47 liters (32B)

11/17 245 The filter disk was washed with
(1) 200 ml $H_2O$. Sent to bottle 3. Weakly active (~ 1/2 C). 20 mg Pb in soln.
(2) 300 ml hot $NH_4Ac$. Ppt dissolved. Moderate activity (est 8 C) Bottle 4 1.95 g Pb.
(3) 100 ml $H_2O$ Bottle 4.

The $NH_4Ac$(?) from Bottle 4 and the mixture from Bottle 3 were dumped previously. Both were very low in Pb.

1000 Water wash in Bottle 3 dumped.

Apparently the solution which was supposed to be $NH_4Ac$ in bottle 4 had had all the Pb pptd from it,

probably in the pptr. (It was quite acid ~2.5 M$_{OC}$) This indicates that the washing procedure may not be adequate so some ~~tp~~ expts will be made to determine how effective our washing actually is.

~~1130~~

1110 Sample taken from 32C waste.

1135 Waste all jetted to storage tank.

1137 60# dil $HNO_3$ (10# $HNO_3$, 50# $H_2O$) pumped to neutralizer as wash — air agitation on.

1150 wash jetted to waste

1154 2nd dil $HNO_3$ wash in N (60#)

1215 app 5 ml sample of wash taken from N — sample clear with very slight activity

bottle #87

1220 2nd wash jetted waste

1235 It was determined that at least two liters of solution were necessary to take a sample from the neutralizer.

1245 Washing started. 1 liter water added. Jetted to ntlzr. 2nd liter added. Jetted to ntlzr. Jet on about five minutes. Sample taken; labeled [HL-32C-Water wash-1] Ntlzr washed with 2 liters water.

1315 Above procedure repeated. Sample labeled [HL-32C-Water wash-2]

1330 Above procedure repeated. Sample labeled [HL-32C-Water wash-3]

11-18-44 When this shift came on (midnite)
~~48~~ it was noticed that Bank II fan
was off. recommend keep on all
during dissolving & jetting to avoid contamination
Manometer measuring pressure in
dissolver was jumping around drained
line to "hill" didn't help

11-18-44
0200 A sample was drawn from the
dissolver of 33B and put into
bottle #95 however this sample
crystalized within 5 min the temp
of dissolver was 48°. Steam and
agitation were turned on to the
dissolver and temp brought
to 70° and another sample was
withdrawn bottle #96

11/18/44
1500 The ~~pptr was~~ soln in the pptr was jetted to the
nttzr (33C) and sampled. The soln was
jetted to waste and the nttzr washed
out with two 60 lb portions of 10%
nitric acid. These were also jetted
to waste (without neutralization).
Washing of pptr was started.
1 liter water added. jetted to nttzs.
2nd liter added and jetted

11/18/44 a sample was taken from the nitzr.
Labeled [HL 33C Water wash 1] Nitzr washed
~~1515~~ ~~with 2 liters water Procedure repeated with two more~~
1515 3rd liter water added. Jetted to nitzr.
4th liter water added. Jetted to nitzr.
Sampled. Labeled [HL 33C water wash 2] Nitzr washed with 2 liters water.
1535 5th liter water added. Jetted to nitzr.
6th liter water added. Jetted to nitzr.
Sampled. Labeled [HL 33C water wash 3]
1545 Nitzr washed with two liters water.
1548 7th liter water added to ppte. Jetted to nitzr.
8th " " " "
Sampled. Labeled [HL 33C Water wash 4]
N15 ppte washed with 2 liters of $N_2O_4$ and
11- Jetted to N - a sample of the 5th wash was taken

11-18-44

2100 ~13% $NH_4OAC$ wash has stopped filtering. About 150 ml of solution has been drawn into bottle #4. - The present filter is being changed.
2230 The new filter has been installed and the rest of the $NH_4OAC$ is to be filtered.
When Vac was applied to the filter NO $NH_4OAc$ was drown through the filter.
It seems ~~that~~ all of the $NH_4OAC$ in the first wash was filtered ~~through~~ the old filter.

The 2nd $NH_4OAC$ Wash (500 ml) has evaporated and it is necessary to add water (1000 ml) to the pptr to take up the residue. This solution is transfered to Reservoir and filter into the $NH_4OAC$ battle.

11-19-44

After the filter was change readings were taken as follows:

| | |
|---|---|
| AT start old filter | 1.9 R/hr |
| After $NH_4OAC + H_2O$ | 7.0 R/hr |
| " F. $HNO_3$ | 6.7 R/hr |
| " 1st 6N $HNO_3$ | 6.4 R/hr |
| beginning of 2nd 6N $HNO_3$ | 7.0 R/hr |
| After 2nd 6N $HNO_3$ | 1.0 R/hr |
| " 3rd 6N $HNO_3$ | 0.5 R/hr |
| " 4th 6N $HNO_3$ | ~0.3 R/hr |

11-19
1130 After jetting supernate of 34 A from P to N, we could get no appreciable vacuum on the filter disc when we filtered the remaining supernate. Assuming the disc was clogged, I sent Diebler upstairs to blow some air through the filter disc and he found that 15# of air was being blown through the filter disc already. Therefore the solution in the pptr was being agitated while it should have been settling quietly. Most of the supernate was already

in the neutralizer, and it probably contained a large portion of the activity along with the $PbSO_4$ ppt. A sample of the neutralize showed a slight turbidity. Charles & Henri were notified and both agreed that 3YB be jetted over to the ppt atm and the precipitation be carried out using 15g of Pb.

SLW

The new filter-disc has been replaced by the old one. The old filter disc was then washed several times until the reading was reduced from 9R/hr to 1R/hr at 1 meter.

11-20-44
1200 The acetate washes on batch 34 failed to increase the activity on the outside filter disc and it was then found that the windshield wiper agitator was broken so that the $PbSO_4$ ppt was not completely dissolved. The F.$HNO_3$ wash was already in the ppt atm so that it was necessary to wash out the ppt atm before reworking with NH4Ac. This was done by means of two water washes the first of 100 ml and second of 50 ml, agitating by means of the air blow back line and the air agitation line. These washes were combined with F.$HNO_3$ wash. The F.$HNO_3$ wash failed to show any increase of activity on the filter disc over that of the acetate washes. All agitation will have to be carried out now by means of the air lines.

11-10-44

1310 1 l. 6N $NH_4Ac$ added to ppt. using air line for agit.

1400 1st wash being removed from ppt

1406 500 ml $NH_4Ac$ into ppt. RH recorder ↓

1430 1 additional liter $NH_4Ac$ into ppt.
Ed Brady worrying (about windshield wiper).

1448 Hose blew off. Fixed promptly by Ed Brady & Scw.

1454 $NH_4Ac$ transferred to reservoir.

~1456 Began filtering $NH_4Ac$.

1510 500 ml fuming $HNO_3$ into the precipitator.
Filter disc moved up and down intermittently.

1610 Filtering of $NH_4Ac$ finished. 100 ml water used to wash disk. Volume of $NH_4Ac$ only 1000 ml.

1620 500 ml fuming $HNO_3$ into the reservoir.

1623½ Filtration of fuming $HNO_3$ begun.

1647 " " " " completed.

1648 500 ml 6 N $HNO_3$ in precipitator.

1710 Monometer indicated that no liquid was being pulled up into the reservoir. Apparently all evaporated.

1712 500 ml more of 6N $HNO_3$ into the precipitator.

1728 The 6N $HNO_3$ is in the reservoir.

1730 500 ml 6N $HNO_3$ into ppt.

1737 Filtration of the 2nd 6N $HNO_3$ finished $\Delta v = 200$ m

1743 6N Nitric drawn to reservoir.

1755 Filtration of 6N $HNO_3$ finished. $\Delta v = 250$ ml

1757 500 ml 6N $HNO_3$ in ~~reservoir~~ ppt.

1820 Filtration of 6N $HNO_3$ finished

1710 When air was blown back through the filter disk in the str there was no pressure registered on the manometer. If this means what it seems like it means there is probably a broken connection in the filter system.

2100 The back wash to the filter (P to N) has come loose just below the lamp. Levy and Brady have fixed the back wash line by replacing it with another line. Operations were continued at 2220 / 11-20-44.

11-21-44

1730 Four 1 liter water washes (PPTr $PbSO_4$) were jetted (Filtered) to N and from N to ditch. The Neut. was washed with to 70# portions of dilute $HNO_3$ and then with 4 liters of $H_2O$. PPTr washes 5, 6, 7 and 8 were jetted to N → Ditch, Washes 9 and 10 were sampled for $UO_2^{++}$ and $H^+$ before jetting to waste. The Neut. was washed with 20# of $H_2O$ before washes 9 and 10 were transferred from the PPTr.

2145 1500 ml of $NH_4AC$ added to PPTr —
400 ml backwash through Filter and
1100 down reagent funnel.
2200 $NH_4AC$ transferred from PPTr to Reservoir
2207 1000 ml $NH_4AC$ added to PPTr
300 ml through Filter and
200 ml down reagent funnel.
2218 Apparently most of the $NH_4AC$ (2nd wash) evaporated — so 0 liter added again.
2209 The activity on the filter has increased from an original reading of 4.9 to 5.5 for the first wash.
2310 The 2nd wash increased the activity on the filter from 5.5 to 8.0 The 2nd and Portion of $NH_4AC$ is still filtering.
2340 Filter reads 8.2 R/hr.
11-22-41
0020 Filter goes 8.4 R/hr
0030 The third $NH_4AC$ wash is in the Reservoir and being filtered. The first part of the 3rd has increased the reading on the Filter to 8.18 R/hr
0030 $F-HNO_3$ in PPTr. 300 ml back through filter — 200 ml reagent funnel
0035 Filter 8.5 R/hr
0055 " 9.2 R/hr
0103 Filtering of $NH_4AC$ finished. 150 ml Hot $H_2O$ in Reservoir
Filter Reads 9.2 R

0104 $H_2O$ is boing filtered -
0110 Activity on Filter 9.5 R/hr.
0230 Fe $HNO_3$ in Reservoir - and started to filter.
Filter reading - 9.9 R/hr
0240 600ml 6N $HNO_3$ added to ppte -
150ml back through filter
350 down reagent filtrate,
0300 Filter - 10.2 R/hr.
0555 Filter - 11+ R/hr NEEDLE OFF SCALE!
With shield down, meter Reads 1/4 R

0618 6N $HNO_3$ in reservoir
0620 2nd 6N $HNO_3$ added to ppte (500 ml)
350 to splash plate
150 to filter disk
0638 2nd 6N $HNO_3$ in reservoir
0640 3rd 6N $HNO_3$ added to ppte (500 ml - [illegible])
0700 3rd 6N $HNO_3$ in reservoir

It was later discovered that the zero setting of the victoreen was off, so the reading with shield down probably doesn't mean anything. However, with shield up, the reading was still off scale.

0715 after last 6N $HNO_3$ went thru filter, the victoreen read about 0.3 R. with the shield up.

52

SCW
RB

# Calibration of ~~Large~~ $NH_4Ac$ Storage Tank

| Vol. added | Pressure Difference ($CCl_4$ manometer) |
|---|---|
| 2 l. | 3 mm. |
| 4 | 11 |
| 6 | 17 |
| 8 | 22 |
| 10 | 30 |
| 12 | 36 |
| 14 | 41 |
| 16 | 47 |
| 18 | 57 |
| 20 | 61 |
| 22 | 68 |
| 24 | 74 |
| 26 | 80 |
| 30 | 93 |
| 35 | 109 |
| 40 | |

11-22-44

2nd $K_2CO_3$ Metathesis.

2010 5 liters of 1M $K_2CO_3$ were added to PPT. Three 150 ml portions were backwashed through the filter; the rest added through reagent funnel. The solution heated to ~90°C for 10 min with agitation

2030 1 gm $Pb(NO_3)_2$ added to ppt in 1 lit of $H_2O$ over a period of 20 min; the solution was cooled and PbCO$_3$ allowed to settle.

2120 The ppt was washed with 2 500 ml portions of $H_2O$

2130 1 liter of 3N $HNO_3$ added to ppt. 300 ml backwash through Filter 700 ml down reagent Funnel

2150 3N $HNO_3$ transferred to Reservoir and Filtered into storage Bottle #3.

[RUN 3 SHIPPED 11/23]

12-1-44

Both supernates of the carbonate metathesis are in the neutralizer. The washing of the ppt was continued using the 2 portions of 3N $HNO_3$ which were put in bottle #3. The neutralizer has not been sampled as yet.

12-2-44

1130 Sample taken from neut

HL 36 B $CO_3$ W

vol = 37 l. Actually only 11 liters were gotten out from the ppt (10 l $K_2CO_3$ + 1 l backwash) However Bob Lesch claims there

is a sufficient steam leak on the jet P→N to account for this dilution. The solution has been sitting in the neutralizer for two days.

25.6
18.3
7.3
1.5
5.8

22.7
21.2
1.5

Start of decontamination of cells 3+4 Dec 1, 1944

Dec 1, 100# 6N Nitric Acid to be added to pptor and dissolver

Dec 4 100# 6N Nitric added to neutralizer after its contents ($K_2CO_3$ supernate from metathesis) was jetted to waste. The Beckman is to be used to measure the radiation level between the pptor and the shields before the 6N acid in pptor is jetted and then after. Also a sample of the sol after jetting to neutralizer is to be taken

Beckman reading
.15 volts

105 r/hr/volt $10^8$ scale
82 mr/hr/volt $10^{11}$ scale

~~[illegible]~~

Sample withdrawn from neutralizer
Labeled $\boxed{HNO_3 \text{ pptr wash } \#1}$
Depth = 7.3 Density = 1.5 $\rho$ = 1.1 Volume = 47 liters
Sample was cold — therefore discarded
Neutralizer jetted to waste.

Beckmann readings cell #3 1400 12-4-44

| | | |
|---|---|---|
| halfway down dissolver | 37 | on 10" scale |
| at bottom of dissolver | 62 | on 10" scale. |
| top of cyclone separator | 17 | on 10" |
| halfway down " | 35 | on 10" |
| at bottom below separator | off scale | on 10" |
| | 10⁸ scale | fails to read correctly |

An H.P. man entered cell #3 with a "Saint Pail" to check the Beckman it was thought the Beckman was unreliable

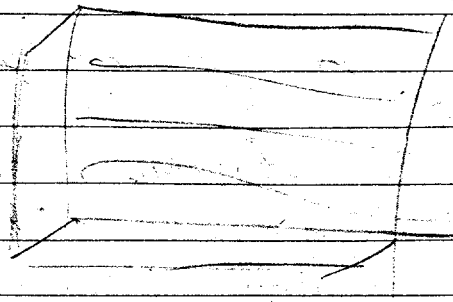
Got a reading of 550 mR/hr over the shield and 1 R/hr over the Neutralizer + Dissolver, Dissolver had 100# 6N $HNO_3$

This 100# was jetted to the tank outside likewise the 100# in the pptor

Dec 5 Cell #3 being washed down.

Beckman reading cell #3 0945

| | | |
|---|---|---|
| bottom (neutralizer + dissolver) | 57 | on 10" |
| half way down (betw N+D) | 48 | on 10" |
| side of cyclone separator | 24 | |
| base of " " | 94 | |



Dec. 6

| Beckman | Reading | Cell 4- |
|---|---|---|
| $10^8$ scale | .15 v. | Bottom of ppt. |
| $10^8$ scale | .10 v. | Middle of ppt. |
| $10^8$ scale | .30 v. | Top of ppt. |
| $10^8$ scale | .05 v. | near resivoir } same |
| $10^{11}$ scale | 70 v. | near resivoir } place |
| $10^8$ scale | .04 v. | storage bottle #2 |
| $10^8$ | .04 v. | above resivoir } same |
| $10^{11}$ | 60 v. | above resivoir } place |
| $10^8$ | 2.05 v. | storage bottle #2 |
| $10^8$ | .43 v. | 3" below line to filter disc from resivoir |

82
18
75-8
77.08

Dec 6 Beckman readings on cell #3

Between neutralizer & dissolver
81 on 10"
Probe at top of shield
20 on 10"
top of neutralizer
20 on 10"
top of dissolver
19 on 10"
Ditch cyclone separator
87 on 10"
0.07 on $10^5$
1.640 went to 94 on 10" when I pulled up the probe opposite; the cyclone separator the lower portion of it

A 100# water was pumped to the pptor and heated up.
1525 The water was jetted to the ntlzr and a 10 ml sample taken. This sample gave 50 mr/hr with the meter next to the bottle (~1 inch) Gave 15 mr [illegible] inches.
This sample was labeled
HL 30 Water wash of pptr

1605 2.5# oxalic acid neutralized with 1.2 liters conc $NH_3$ and diluted to 50#

1612 Solution pumped to pptor.

Dec 7
10:15

| | |
|---|---|
| Bottom of PPt | .09 on $10^8$ ~~(probably)~~ |
| Ditch behind PPt. | .26 on $10^8$ (probably) |
| Top of PPt | .21 on $10^8$ |
| near reservoir | 94 on 10" |

Previous to this the solution in the pptr was heated about to boiling for 15-20 minutes, allowed to cool and then jetted to the ntlzr. a sample was removed labeled HL 30 $NH_4O_x$ wash of Pptr. About 5 ml of this soln in a sample bottle gave 15 mr/hr at the surface.

1045 100# HCl pumped to pptator - heated & agit.
1130 jetted to N. and sample taken
5 ml sample gave only 2-3 mr/hr at surface

The storage bottles have been dumped:

| | |
|---|---|
| 11:45 Below bottle #2 | .19 on $10^8$ |
| above bottle #2 | 43 on 10" |
| Below bottle #3 | 1.65 on $10^8$ |
| Below bottle #4 | 1.4 on $10^8$ |

1510 Water jetted to waste from neutralizer

Note: In the process of cleaning it is better if all solutions in the pptor are reasonably cool 35°-40° before jetting as this morning I noticed that we got a great of steam from jets and "dripping" went on in cell #3. The solution was about 80°

1500 130 lb of saturated (~5%) ammonium oxalate soln was made up. This is to be put in all the storage bottles as well as in the pptr.

1600 All storage bottles filled.

Dec 8 50# of saturated $NH_4Ox$ pumped

0845 to the pptor

0850 Started heating the pptor and turned on agitation

Beckman readings in cell 4

0935 Bottom of Chamber just above lead shield in front of bottle #2 - 62 on 10"

0940 In front of lead shield in front of bottle #2 23 on 10"-

0945 Just below lead shield in front of bottle #2 0.36 on $10^8$

0945 Near floor in same hole - 75 on 10"

0955 Bottom of bottle #3 - 1.2 on $10^8$

1000 Below bottle #3 - 1.5 on $10^8$

1000
10
100
10
10
10
.225
120
12
15
12-9
11
11

1000 In front of shield in front of bottle #3 - 59 on 10"
1005 at top of and between bottles #2 & #3
0.32 on $10^8$
1005 About 3" above lead shield between bottles
#2 & #3 - 0.41 on $10^8$
Bottom of bottle #4 — 0.7 on $10^8$
1015 Below bottle #4 & the reservoir - 0.75 on $10^8$
1020 Opposite bottle #4 on opposite side shield and
resting against reservoir shield - 0.08 on $10^8$
1020 On top of bottle #4 - 0.6 on $10^8$
Next to lines to valve over bottle #4 - 0.225 - $10^8$

.225

1200 jet sat'd $NH_4O_x$ to Nent and wash out pptate
with 50# $H_2O$ - jet to N.
1230 sample taken from nent. approx 5 ml gave
less than 1 mr/hr at surface (paintpail)

1515 Took samples from bottles
1, 3, 4, put 0.1 ml on a piece
of blotting paper and measured
the radiation with an
electroscope. Data is in
H.P. notebook #1 8.5 mr/hr #3 110 mr/hr.
#4 200 mr/hr. window open
sample "3.5" from scope.

12-9-44
1100 washed down cell #3
1130 water running thru ditch cell #4
reading in doorway cell #4
2 ft in (max) 6R

Dec 9

1200 I noticed a ball joint at the bottom of cow in cell #4 is disconnected HG2

1400 The sample of $NH_4O_x$ taken yesterday was measured by electroscope 0.1 ml was put on blotting paper and measured with Lauritzen scope window closed 1.2 mr/hr
" open 1.8 mr/hr.

1407 ~~[illegible]~~ cell doorway #4 about 1.5-2 ft in ~~[illegible]~~ reading 500 mR/hr

1424 Top of pptor and tops of lead shields around it were washed thoroughly with water

1430 Top of reservoir washer for 5 minutes with stream of water

1600 ~~[illegible]~~ All storage bottles empty

~~[illegible]~~

Beckman chamber just above lead shield close to bottle 4
Reading 45 on 10"

Chamber just under shield between ~~near~~ bottle 2 & 3
0.55 on $10^8$
Chamber just above shield above bottle 2
3.5 on 10"

12-11-44
0900 Beckman reading below & between bottles 2 & 3 gave 0.72 on $10^8$ (maximum reading in this axis) reading 2½ ft inside door 4.5-5R.
0930 cell #3 being washed down.— concentrating on the dissolver and neutralizer
1000 cell #4 being washed concentrating on the pptotor, reservoir and walls
1400 Wall of cell 4 to left of outside filter shield just above ledge = 200 mr/hr
Through lead in front of disk = 20 mr/
With shield raised 1.25 r/hr
1500 70 lbs of approx 5% sol of $NH_4Ox$ made up to be placed in storage bottles #1, 2, 3, & 4 and reservoir.
1525-1555 Storage bottles washed down by inserting line thru hole near top of pptotor. Each bottle given 5-10 minutes washing

12-12-44
0830-0930 $NH_4Ox$ (~5%) placed in storage bottles 1, 2, 4.

| | |
|---|---|
| 1000 | ~0.3 M $NH_4F$ pumped to pptn. Heat & agitation. (110#) |
| 1130 | 5% $NH_4OH$ into bottle #3 |
| 1135 | The $NH_4F \cdot HF$ solution was jetted from the PPTr to the Nutsche, and then to waste. |
| 1140 | 70# $N_2O$ Pumped to PPTr |
| 1200 | The Wash water in the PPTr is jetted to Nutsche, and to waste |
| 1220 | 70# $N_2O$ pumped to PPTr. |
| 1240 | The water wash in the PPTr is jetted to N and Waste |
| 1450 | 100# of Water added to PPTr. |
| 1530 | 3rd Water wash jetted to N and Waste, The final portion of $N_2O$ was filtered through the filter dryer. After removing the 3rd wash the filter is washed with the 2-liter portion of $N_2O$ to wash out the last traces of $NH_4F \cdot HF$. The bulk of the 3 washes was transferred to N through the decant line. |

12

12

10

At bot

At

Bt

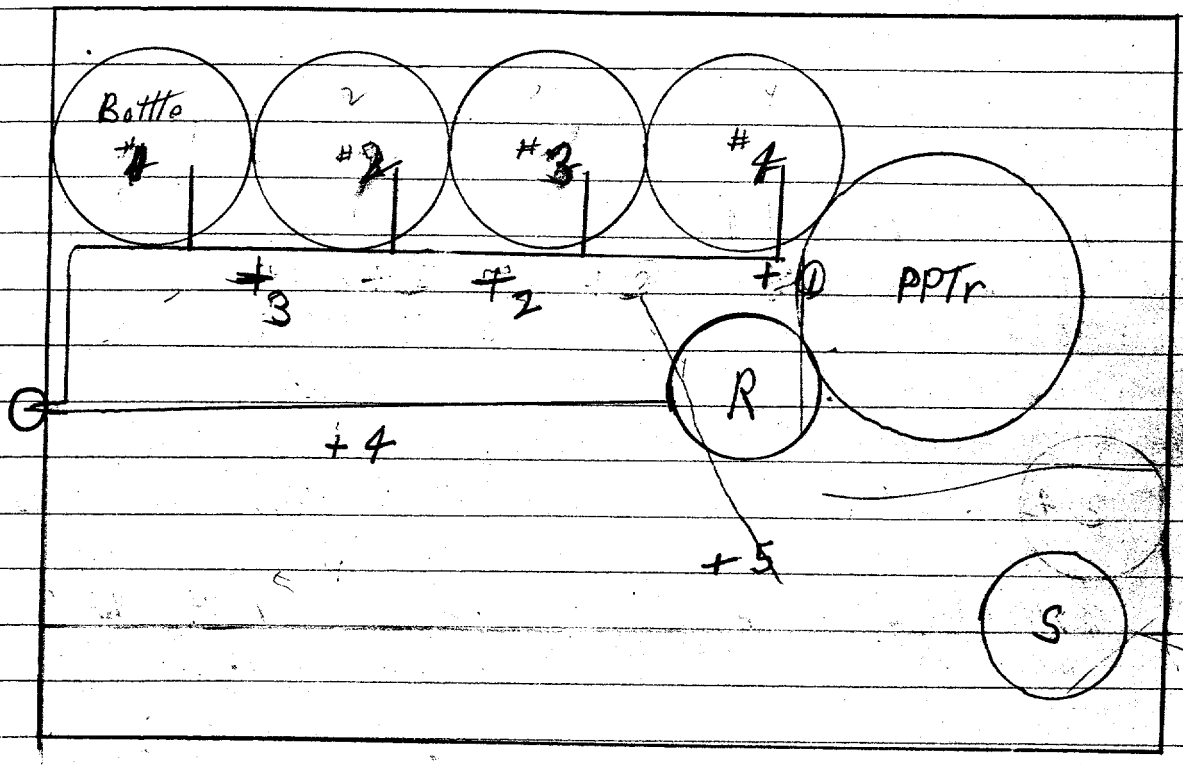
12-13-44

12-13-44

1150 Bottle #1 being washed down with water.

1250 Bottle #2 being washed with water by hose

1250 1500 ml $NH_4Cl$ added to Reservoir




| | | | |
|---|---|---|---|
| ① Floor | 3.6 | scale | $10^{11}$ |
| 3' from " | 0.105 | " | $10^8$ |
| 6' " " | 0.06 | " | $10^8$ |
| At bottom of Storage bottle shelf | 0.43 | " | $10^8$ |
| At top of bottle #4 | 21 | " | $10^{11}$ |
| Bottom of cement shelf | 35 | " | $10^{11}$ |

-over-

| | | | |
|---|---|---|---|
| (2) | Floor | 48 | scale 10" |
| | 3' from " | 0.2 | " $10^8$ |
| | opposite bottle #3 | | |
| | below shelf | 0.64 | " $10^8$ |
| | Top of bottle #3 | | |
| | about Pb shield | 47 | " 10" |
| (3) | Floor | 55 | scale 10" |
| | 3' from Floor | 0.11 | " $10^8$ |
| | at bottom of storage-bottle shelf | 0.61 | " $10^8$ |
| | at bottom of Cement | | |
| | shelf | 54 | " 10" |
| (4) | Floor | 50 | scale 10" |
| | 4' from Floor | 0.2 | " $10^8$ |
| | opposite drawoff line | 88 | " 10" |
| | 7' from floor | 10 | " 10" |
| | 8' " " | 8.8 | " 10" |
| (5) | Floor | 32 | scale 10" |
| | 3' from Floor | 0.1 | " $10^8$ |
| | 9' " " | 6.7 | " 10" |

5 30 bottle #4 being washed with water
16 20 Washing of bottle #4 Complete
10 15 bottle #3 being washed with water
11 40 Washing of bottle #3 complete

12-14-44 Reading
1400 see p65 for diagr.

① Floor 47 on 10"
3' from " 0.11 on $10^8$
bottom of shelf (b.b.) 0.27 on $10^8$
top bot #4 16 on 10"
at cement sh 60 on 10"

hole #2 - below + betw bot 3+4
0.80 on $10^8$
hole #3 - below + betw bot 1+2
0.36 on $10^8$

12-14 Ed took a couple of smears on the
1510 shield and one on bottom of shelf at battle #3
and they were cold. Smears were
made with a pole on which there was
some cheese cloth wrapped and which
was dipped in $NH_4O_x$
Radiation field inside doorway
was 6 R/hr. Ed went in twice
for a period of 10 sec each time
Ed wiped wall under battle #3
barely sped up the counter. Ed stayed in
cell 10 seconds.

12/15/44

(2) 6" below storage bottle shelf 1.00 scale $10^8$
(3) 6" below storage bottle shelf - 0.29 - scale $10^8$

12-15-44 Each storage bottle was washed with 55# of $NH_4Ox$, 5% sol
Some of the washing dripped from the trough to the floor of cell #4 and a sample of this was ice cold

12-15-44

(2) 2" below storage-bottle shelf 0.65 scale $10^8$
10" above storage bottles 0.14 scale $10^8$
(3) 2" below storage-bottle shelf 0.37 scale $10^8$
10" above storage bottles 0.12 " $10^8$
(1) 2" below storage-bottle shelf 0.41 " $10^8$
10" above storage-bottles 0.11 " $10^8$
Inside Pb shield - beside bottle #4 - 1.20 scale $10^8$

1515 1 liter conc HCl put in bottles 1 & 2.
Survey of draw-off line of reservoir -
1220 15 in from E Wall - 0.13 - $10^8$
Near (8") reservoir - 0.32 - $10^8$
Under bottle #1 - 0.4 - $10^8$
Under shelf to right of [illegible] line 1.0 - $10^8$
[illegible] Pb shield SE corner ppto - 3' from floor - 0.12 - $10^8$
Probing done by Strickland & Humphrey

12/18/44

| | | | | |
|---|---|---|---|---|
| 0845 | (3) | 6" below bottle #2 | 0.34 | $-10^8$ |
| 0945 | | 6" " " " | 0.35 | $-10^8$ |
| 1000 | (2) | 2" below bottle #4 | 0.28 | $-10^8$ |
| 1100 | | 2" " " " | 0.27 | $-10^8$ |

0950 (1) Beckman laying on Top of Reservoir 16 ± 10"

12/19/44

1040 Inside of Pb shield and to the west of bottle #4
Fe shield on beckman to cut out β activity

| | | |
|---|---|---|
| | 0.14 | scale $10^8$ |
| inside shield between #3 & 4 | 0.16 | " $10^8$ |
| " " east of #3 | 0.53 | " $10^8$ |
| " " between #1 & 2 | 0.17 | " $10^8$ |

1055 Reading without Fe shield:

| | |
|---|---|
| resting on shelf behind shield 8" west of bottle #4 | 0.23 on $10^8$ |
| same 2" west of bottle #4 | 0.58 on $10^8$ |
| inside shield between #2 & 3 | 0.85 on $10^8$ |
| " " " #1 & 2 | 0.27 on $10^8$ |
| " " east #1 | 57 on 10" |
| northwest corner of reservoir | 97 on 10" |
| 1' off floor behind shield west of Mtr | 51 on 10" |
| on the floor " " east of Mtr | 25 on 10" |
| top of Mtr | 0.12 on $10^8$ |

1130 cell #4 washed with 280# cat'd oxalic acid

1400 cell #4 washed in entirety with strong stream of water.

1525 2" west of Bottle #4 inside Pb shield 0.63 - $10^8$
1528 between Bottles #3 and #4 " " " 3.1 - $10^8$
1530 " Bottles #2 and #3 " " " 2.4 - $10^8$
1533 " " #1 and #2 " " " 0.29 - $10^8$
1535 4" east of Bottle #1 " " " 71 - $10^{11}$

1545 Smear taken of bottle 3 - Shows outside colder than a witches teat - Inside is theoretically hotter than an whore's dream -

Dec 20
1000 Washed cell #4 with water because a leak developed in the line from bottle #3 to the manifold and "sol" sprayed out on cell

12/20/44

1400 East of bottle #1 inside Pb shield 0.14 - $10^8$
between " #1 and #2 " " " 0.40 - $10^8$
" " #2 and #3 " " " 2.4 - $10^8$
" " #3 and #4 " " " 3.5 - $10^8$
1412 West of bottle #4 " " " 0.76 - $10^8$

12-21-44

0900 151# $Na_2CO_3$ had been put in waste tank. Sample was taken and another 100# $Na_2CO_3$ were put in tank. A pH reading was taken on the sample (N 0.00)
$\rho = 1.22$ $V = 580$ gal

1050 3rd 100# $Na_2CO_3$ has been put in waste tank.
4th 100# " " " " " " "

1200 5th 100# $Na_2CO_3$ " " " " " "
$\rho = 1.20$ $V = 640$

1250 6th 100# $Na_2CO_3$ " " " " " "
A sample was taken after 2 hrs of agitation -
pH N 0.0

12-22-44 7th and 8th 100# $Na_2CO_3$ has been added to waste.
1430 Tank reading $\rho = 1.2$ Vol = 700 gal
A sample was taken out of the waste tank.
pH paper was used to check acidity.
pH is less than one.
9th 100# $Na_2CO_3$ added
10th 100# $Na_2CO_3$ added to waste tank
agitation on over night.

12-23-44 sample taken of waste solution.
pH = 4.1
$\rho = 1.2$ $V = 900$ gal

12-26-44 pH = 4.2
a rough manometer was set up of the spill to attempt to estimate the volume left in waste tank. The manometer difference was 8 cm or approx 4 inches.

(4) The spill took place the first thing in the morning when the jet in the line to the hill was turned on. The valve in that line was shut off and pressure built up in the tank forcing solution out of every line that led to the bottom of the storage tank. Hot UNH came squirting out of the depth & density manometers and spilled over the hand counter and the floor. A couple of liters came out of the sample line and spilled into the tray underneath the sample head and overflowed onto the ground. A good part of the day was spent cleaning up the mess. The hot ground was shoveled into a red can. The UNH in the tray was pipetted up and poured into the hot drain. The hand counter was washed with water & ammonium citrate and the floor was washed with these reagents and with HCl. The activity was lowered considerably (down to ~150 mr/hr at the hottest point and ~20 mr/hr over most of the area that had been 7200 mr/hr) but further decontamination must be done.

Washed Well #4

12/28/44

0845 Reading with Lauritson scope, in cell #4

| | |
|---|---|
| 3.5/10 - 3/4 wong to top of shield | 130 mr/hr |
| 6/50 - at top of and to left of front shield | 400 |
| 11/50 - over ditch | 190 |
| 5/50 - 3/4 wong to top of back shield | 500 |
| 9/50 - at top of front shield (center | 240 |
| 3/50 - over the back shield | 1000 |

0905 Beckman readings in cell #4

| | |
|---|---|
| Site of bottle #2 | 27 on 10" |
| " " " #1 | 12 on 10" |
| " " " #3 | 39 on 10" |
| " " " #4 | 47 on 10" |
| opp trap by the reservoir | 48 on 10" |
| opp reservoir (southwest side) | .09 on $10^8$ |
| against the scrubber | 5.1 on 10" |
| north of pptation on floor | 17 on 10" |
| east of pptation on floor | 21 on 10" |
| south " " " (pat in ditch) | 0.12 on $10^8$ |
| west " " " | 26 on 10" |
| top of pptation | 81 on 10" |

The manometers to the waste tank were reinstalled. The depth and density readings were off by a large factor. A sample was taken of the waste. The pH was 4.2. On standing, the remainder of sample solidified. (The steam jet to the sample

head was turned on as well as the agitation to warm the solution in the waste tank. The steam was left on all night and the temperature checked in the morning.

1425 6# $HNO_3$ acid put in Reservoir –

12/29/44 The depth and density did not change after the solution in W tank had been heated

1130 Started to get to W-11 –
1150 No change of volume getting stopped.
1430 A high pressure steam line was connected to the air line to and to heat the solution in the waste tank.
455 Steam to waste tank off
456 Jet to W-11 on – Depth R – 4.6 inches Hg
503 Jet turned off. A sample was taken of the waste pH ~ 4 – The solution was cloudy – After the addition of two drops of 6N $H_2SO_4$ the solution became clear.
1615 35# $HNO_3$ was added to waste tank. Steam turned on to heat solution
1720 Steam off – temperature 82°C

12/3/[illegible]
0910 All #4 washed with water

1005 Jetting from waste tank to W-11
1130 Jetting to W-11 finish

1230 300# $Na_2CO_3$ pumped to waste tank and jetted to W-11

1120 solution was forced back through the catch funnel (condensate from $HNO_3$ dissolving) to the ground, a pump system is being set up and the solution pumped to a hot drain

70

Jan 1 1945 Happy New Year

Beckman readings of Cell 4

① Battle 3 position
35-10"

② Battle 4 position
62-10"

③ outside shield near res.
3.6-10"

④ against draw off line about 8 in. from res
15-10"

⑤ against res. behind lead shield
42-10"

⑥ south pptor near floor
.24-10"

⑦ top pptor
68-10"

⑧ ditch below pptor
.07-10"

⑨ seven drain of storage bottle
5.4-10"

⑩ 12-10" under battle #4

⑪ north pptor on floor
15-10"

10

121

1500

1/2

100

104

14

160

1/3/45

1000-1

1050
pumped 100#, 5% Oxalic acid to the pptor
~~#~~ Steam on to the pptor

1210 Oxalic acid jetted to N - PPTr washed with 40# $H_2O$ - (all thru filter disc)

1500 Oxalic acid jetted to Waste

1/2/45 $HNO_3$ removed from Reservoir
Reservoir washed with 2 liters of $H_2O$
$HNO_3$ soln gave ~600 mr/hr.

1000 Beckmann readings of cell #4
1) against reservoir behind shield 31 on 10"
2) top of pptator 78 on 10"
3) south side pptator opp filter disc .21 on $10^8$

1045 240# 5% $NH_4Ox$ to pptator

1430 $NH_4Ox$ to out to N
washed 12 liters $H_2O$

1600 125# citric acid pH 3 pumped to pptor

1/3/45
1000-1100 washed filter disc with about citric acid by successively jetting a small portion thru the filter and then blowing back thru the disc.

1125 Beckmann readings
1) south side ppt: max = 0.22 on $10^8$
2) Top ppt. 0.07 on $10^8$

100 100 liters of water was pumped into the pptr to see if the shielding effect would be appreciable. With the water in the tank the following readings were obtained.
Chamber on top of pptr 60 on 10"
Chamber at bottom but leaning away from tank 10 on 10"

This seems to indicate that the top of the pptr is contaminated. Probably the line from the dissolver has some hot soln in it.

00 To clean dissolver line, 50 lb 70% $HNO_3$ pumped to dissolver. Jetted to pptr in with 100 liters of water.

1530 Outside filter - shielding washed

1535 Inside of Cell #4 washed with water

1400-1615 Soln in pptr was boiled by passing steam through jacket. The pptr soln is ~2 N in $HNO_3$.

1/4/48 830 The soln in the pptr was heated to boiling.

850 Manometer indicating pressure across pptr scrubber blew out indicating that the soln was boiling up into the scrubber. Steam off. Water on to jacket.

900 Soln jetted to neutralizer.

910 60 lb water pumped to pptr. Heated to boiling.

0915 2 liters of Hot Sat-Oxalic added to Reservoir

0945 water being jetted to N through filter disk

0955 neutralizer jetted to waste (water + dilute $HNO_3$)

1010 Beckmann Reading

| | | |
|---|---|---|
| 1) bottom pptatn | - north side | 6.5 on 10" |
| ~~2) bottom? "~~ | ~~north side~~ | ~~35 on 10"~~ |
| 2 b) bottom " | north side | 0.18 on 10" |
| 3) top of pptatn | | 0.09 on 10" |
| 4) side of reservoir | | 40 on 10" |

1145 240# Sat. Oxalic Acid added to PPtr - Soln. heated to 100°C, Agitating through filter disc

1500 Hot Sat-Oxalic jetted to N. PPtr washed with $H_2O$

1630 40# 5% $HNO_3$ added to PPTr - heated to boiling.

1910 $HNO_3$ jetted to Waste - 280# $N_2O$ added to PPTr - Steam turned on to jacket and $N_2O$ boiled all night.

1/5/45

0830 $N_2O$ jetted from P→N

0900 PPTr filled with $N_2O$ - Beckmann Readings

| | |
|---|---|
| North East Top of PPTr | 38 - 10" |
| East central Top of PPTr | 0.1 - 10" |
| South central Top of PPTr over filter disk | 39 - 10" |

1330 hole cut in top of pptator

1400 Beckmann readings, chamber perpendicular to top

| | |
|---|---|
| northeast top of pptator | 35 on 10" |
| top of " near inlet | 37 on 10" |
| east central top of pptator (4th hole) | 48 on 10", chamber flat |
| northeast top of pptator | 58 on 10" |

1500 Beckmann readings (tank full of water)

| | |
|---|---|
| northeast bottom ppt | 4 on 10" |
| northeast " " | 17 on 10" |
| south " " | 21 on 10" |

1530 Beckmann Readings (tank empty)

| | |
|---|---|
| Inside PPTr on the bottom | 19 - 10" |
| Inside PPTr near the top | 12 - 10" |

1/5/45 about 0900

| | |
|---|---|
| top Southwest corner | 14 on 10" |
| " North " " | 41 on 10" |
| " Northeast " | 52 on 10" |
| " South " " | 31 on 10" |
| ~~West~~ floor | 7.3 on 10" |
| North on floor | 3.3 on 10" |
| East on floor | 29 on 10" |
| South on floor | 0.1 on 10" |
| South in ditch | 21 on 10" |
| inside pptator near top | 10 on 10" |
| " " " bottom | 22 on 10" |
| " " " filter | 48 on 10" |
| top of reservoir | 30 on 10" |

Smears

| | |
|---|---|
| Top of PPTr | 200 mr at 6 inches |
| South side of PPTr near the bottom | cold |
| ~~Wall~~ south of PPTr | 2 mr at 3 inches |
| glass tube in the ditch | cold |
| Smeared inside tank near filter disk | cold |

1150 The Oxalic acid is removed from Reservoir and Washed with 2 liters of Hot $H_2O$.

1400 top pptor Scrubbed by brush using ~ 6N HCl, then rinsed with water.

1430 Beckmann reading

| | |
|---|---|
| northeast top of pptator | 30 on 10" |
| northwest top of pptator | 27 on 10" |
| southeast " " " | 16 on 10" |
| southwest " " " | 14 on 10" |

1450 Top pptator scrubbed again with 6N HCl and back down.

1520 Beckmann readings

| | |
|---|---|
| Northeast Top of PPtr | 13 - 10" |
| Northeast " " " | 21 - 10" |
| Southeast " " " | 9.6 - 10" |
| Southwest " " " | 10 - 10" |

1545 Top pptator scrubbed with conc $HNO_3$ 10 min, 5 min with Lanoklean, 2 min with HCl, then rinsed - 6½ divisions on decimeter

1600 Beckman readings

| | |
|---|---|
| Northeast top of PPtr | 11 - 10" |
| Southeast " " " | 11.5 - 10" |
| Northwest " " " | 12 - 10" |
| Southwest " " " | 9.3 - 10" |

Jan 8, 1944

1017 removing unions on lines from pptor so we can get top up. Jack Liegel man worked 7 min on pipes dose 40 mr.; went in again. He worked over hot spot on pptor.

1032 Man out of cell. Line to scrubber has to be cut and filter. Jack has to be worked on yet. He received 65-70 mr in this period

1115 Next [illegible] (Test) in cell. Oilcloth removed from lead shields - read over 200 mr/hr.

1119 Gest in process of sawing line to scrubber. Rec'd about 25-30 mr

1400 Zeil & Brady in cell removed top.
H2 - 14/37 of 1 mr

1438 EL.B - Removed the blade on the windshield wiper

1500 Ed & Sandy took pipe from wiper 20 divisions for Ed on meter. 1 mr = 36 div

1530 Filter disc removed with a lot of bubbles gave ~200 mr/hr at 6 inches (SLW removed)

1545 (SLW) scoped the pptr after the top was raised 400 mm at the top.

~~1605 Sd~~

Jan 9, 1945

0900 washed shields in cell 3
want to get in and look at manometer lines on dissolver

Jan 10, 1945

0930 Michener removed crude from hot drain, a pair of pliers, four lead strips and a steel rod.

0945 Witkowski cleaned the dirt from the bottom of the pptr.

1945 one light replaced in cell 4 - 2nd light replaced 1-10-45
gaskets replaced in filter disc - old alnxite disc being used again.

1200 SW and HZ tested the filter disc - it pulls ~22 cm in air.

~~Jan 19, 1945~~
RB ~~1430 Precipitator jet to N through filter was turned on till ppt manometer reads 0. Then 70 lb. of 70% $HNO_3$ were pumped into precipitator, and refluxed gently until when the steam was shut off. Condenser was left on slightly.~~

14 Jan.
RB
1430 Ppt. was dry (tested with a stick). 70 lb. of conc. $HNO_3$ were pumped into the precipitator. The coupling above the union connecting the reagent addition pipe to the pptator leaked somewhat during the addition. 8 cm. of air agitation was left on.

1500 The $HNO_3$ was transfered to the N and to Metal Waste Tank.
1/15/44

4th HL

1925 24 slugs in the Dissolver - 12 slugs in slug-bucket at top of Cell #3 Bank - 2.

Day

Witkowski
Lesch
Hawkins
~~Klatzbach~~
Humphrey

Swing Zeil
Vallado
Bersohn

Grave Yard

Willner
Michener
Goodman
KLOTZBACH

1200 A fine filter-disc replaced the old S.G. filter disc in the outside pt-Shield-

0400 45# xs $HNO_3$ were put in dissolver by mistake. Mistook 25 liters $HNO_3$ in $H_2SO_4$ make-up tank for 25#. After discussion it was decided to jet this xs $HNO_3$ to the neutralizer. Sample taken proved to be relatively cold. 1/20

(Reaction in dissolver had not started - temp was below 50°C)

1030 In making up the 6M-$H_2SO_4$ in the make-up tank, the $H_2SO_4$ attacked the stainless steel so rapidly that it was necessary to pour it down the N funnel.

A 3 liter portion of 6M $H_2SO_4$ was placed in the old Conc-acid bottle and added to the ppts. The dilute acid attacked the ppts reagent funnel as fast as it did the make up tank. Therefore, it was decided to go back to the old precipitation methods. Direct [illegible] 2 reverse strikes -

1-19-45

0445 It was discovered after about 2½ hrs of dissolving of HL48B the dis. condenser water was not on. The soln in the dissolver was down to 15l and had a density of 1.98. It was decided to add 8 l. of conc $HNO_3$ to the dissolver. This brought the solution to 23l w/ a density of 1.68. Density reading at intervals

(I)

5.6. will be taken to determine appropriate length of the dissolving time.

11/20/45

2015 In order to wash the outside filter disk, two portions of 300 ml each of hot 6N $HNO_3$ were poured into the upper reservoir and pulled through the filter. ~~Three hundred ml~~ The second portion went through the disk in 3 1/2 minutes. The solution was blown upstairs through the manifold to the hot drain. Air was then blown through the manifold to the hot drain.

2200 When the above washing was performed steam was turned on to the draw-off line from the upper reservoir to the outside filter disk. Then it was forgotten about and when the first portion of 2N $HNO_3$ was pulled up into the upper ~~re~~ reservoir and the ~~vac~~ aspirator turned on to pull the solution to the lower reservoir, ~~nothing~~ only a little solution came through the filter disk, followed by some frothing so it seemed as though the filtration were finished. Transfer of the second

portion of 2N $HNO_3$ to the upper reservoir was begun when the steam on the draw-off jacket was suddenly remembered. The transfer was stopped, the jacket cooled and the solution in the upper reservoir was filtered through to the lower reservoir. The solution went through like a bastard, requiring about five minutes. The transfer to 555T6 was made and it was found that the increase in volume was 350 ml. The removal of the second portion to the upper reservoir and from there to 555T6 was completed uneventfully. Filtering time was five minutes. The increase in volume in 555T6 was 150 ml, total increase in volume 500 ml, as it should be.

Before adding any nitric acid the union to the lower end of the condenser jacket was broken and the water in the condenser removed by applying suction to the end of the tube. The results above indicate that there may be a leak in the condenser jacket.

HL 45 C (couldn't find any data sheet) (we found some)

0530 slugs in
0545 coat removal soln in
0608 reaction took off
0650 washing complete
0652 73# $HNO_3$ in.
depth = 19.5
den = 11.9
ρ = 1.38
vol = 30l
0715 Reaction started.

1-21-45
2243 It was learned that all $HNO_3$ washes off pptor except the last one very made with 3N $HNO_3$ instead of 2N $HNO_3$

RUN 4 SHIPPED 1/23

HL 51D

1-27-45

0612 The sample that was taken from the Dis had UNH crystal in it — It is posible that the dissolver solution was not agitated enough or that the required amount of water was not added — The former seems to be the more logical of the two explanations. (see data sheet HL-51D

A second sample could not be taken as the solution had been gotten to the ppt.

2-2-45

1045 Transferred D → N

1100 Transferred P → N

1115 Added 40# conc $HNO_3$ to D. Started to Heat D.

1130 Added 30# conc $HNO_3$ & 120# $H_2O$ to P. Started to Heat

1430 $HNO_3$ Wash in Bottle #6 discharge to Hot Drain.

1530 Trans. N → W

1535 Trans P → N

1545 $K_2CO_3$ soln (60# $H_2O$, 10# $K_2CO_3$)
pumped to pptator
heat & agit n.

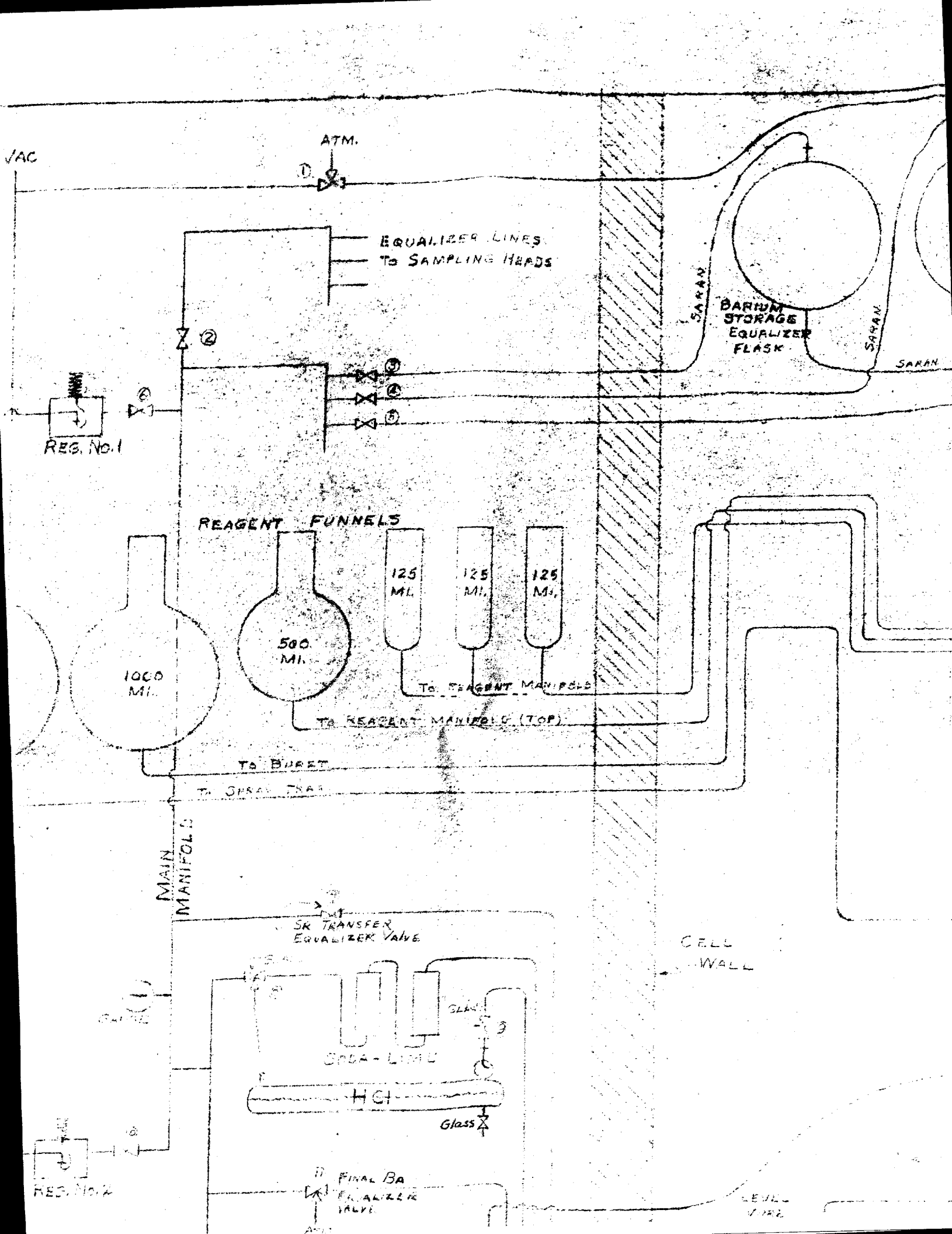
136
69

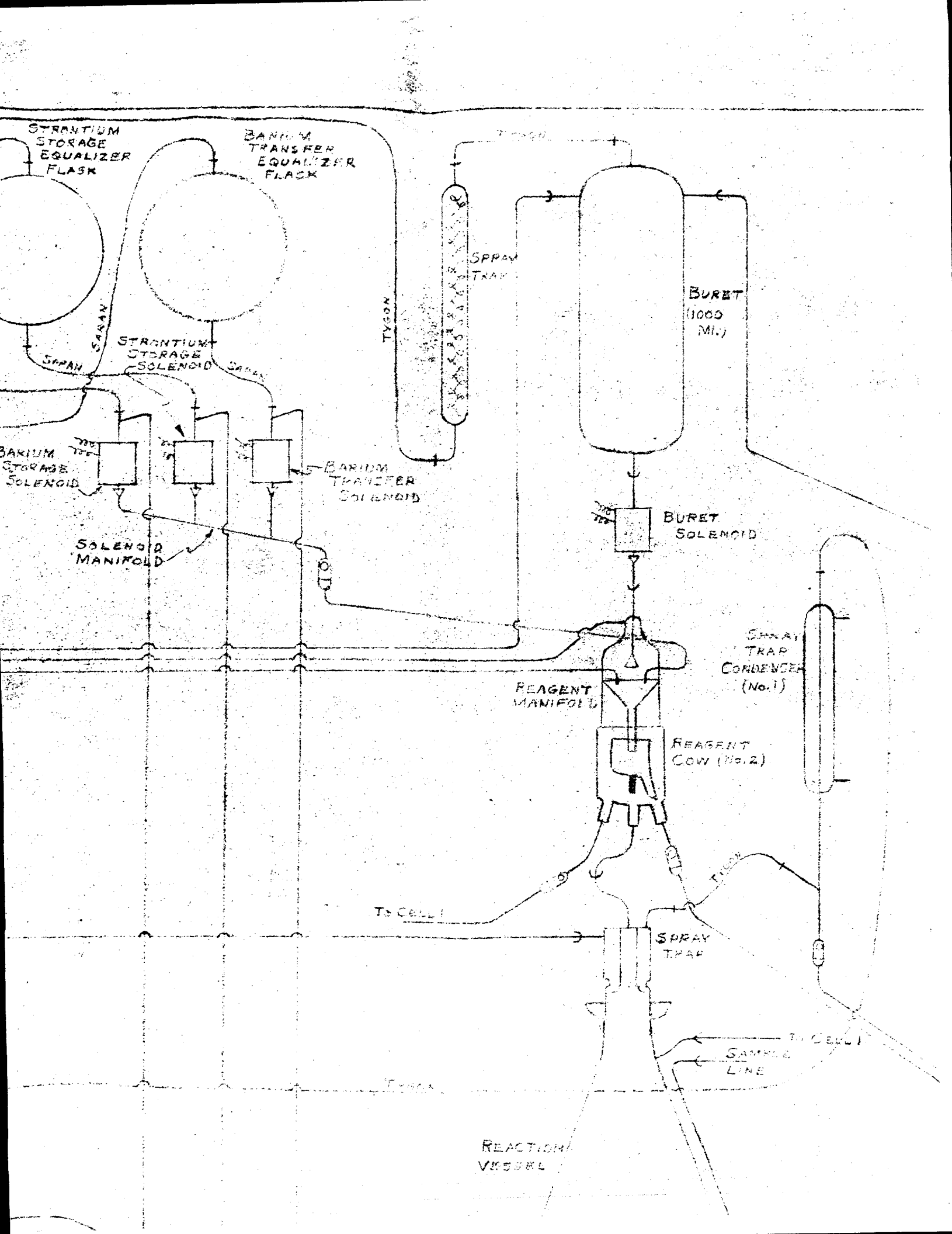
2-3-45

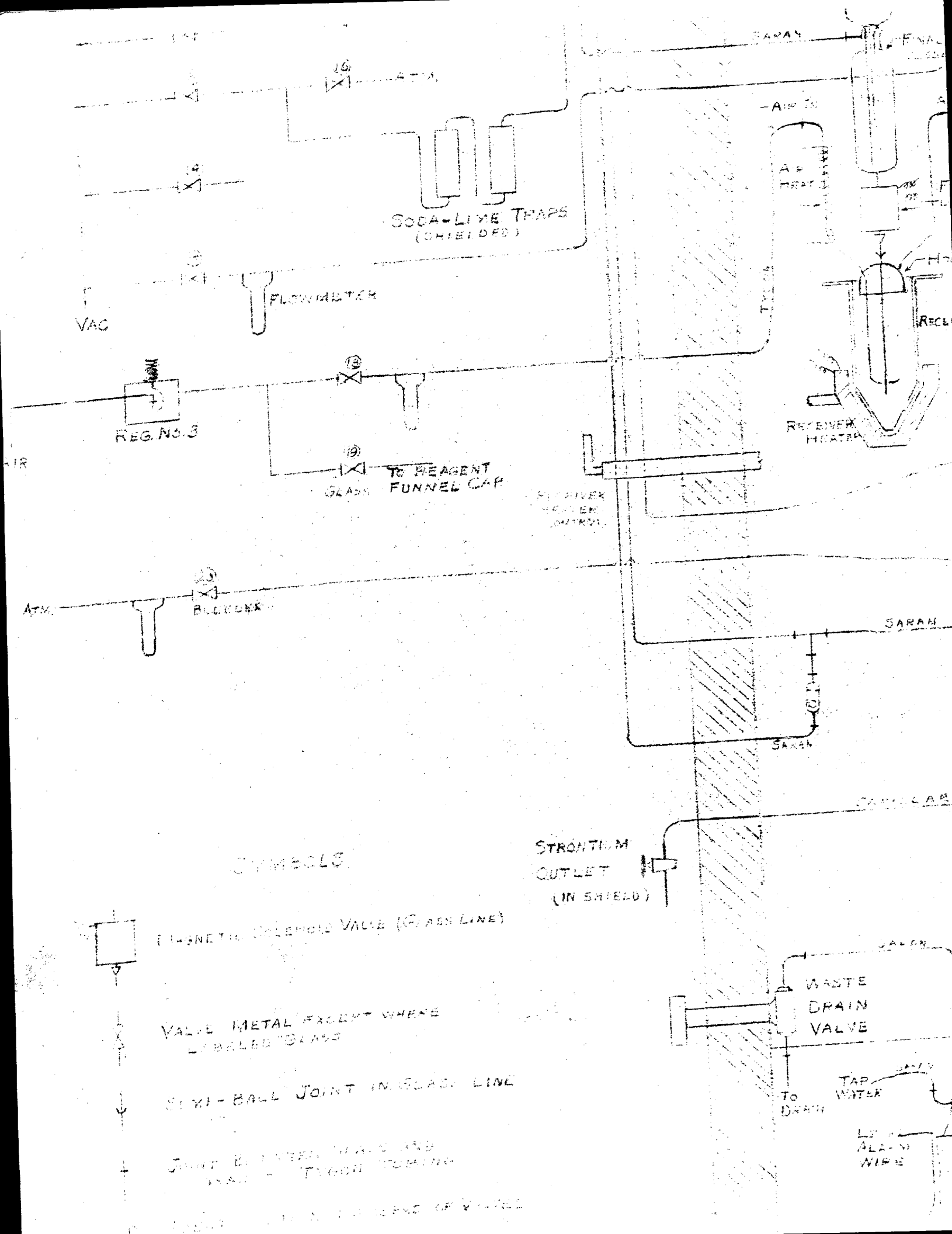
0815 $K_2CO_3$ soln heated to boiling - PPtr
$HNO_3$ + UNH soln heated to 104° C Dis
0920 Dil. $HNO_3$ 150# Jetted to waste
after being Neut. with carbonate N
1000 4l $H_2O$ added to dissolver
$\rho$ = 1.32 V = 17 liters
1200 $K_2CO_3$ soln - Jetted to N

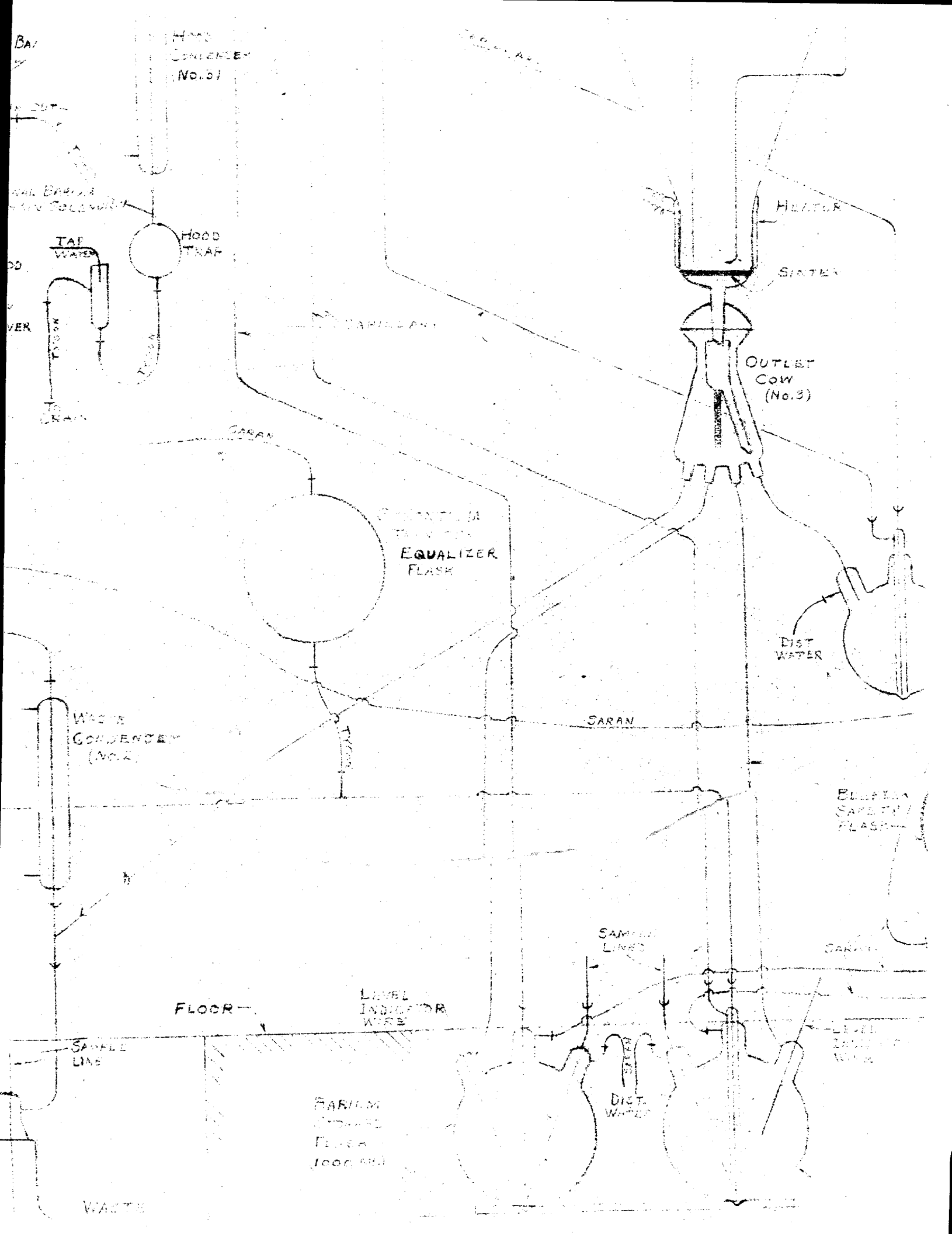
Cell Washed - with $H_2O$
1330 Cell #4 " " "
1430 adding conc $HNO_3$ through filter disk as it seems clogged

1450 conc. $HNO_3$ seems to have cleaned the filter disc.
~60# dil $HNO_3$ pumped to pptator and heated.
agitated
1500 750 ml 6N $HNO_3$ put in upper res.


VAC
ATM.
EQUALIZER LINES
To SAMPLING HEADS
SARAN
BARIUM STORAGE EQUALIZER FLASK
SARAN
SARAN
REG. No. 1
REAGENT FUNNELS
125 ML.
125 ML.
125 ML.
500 ML.
1000 ML.
To REAGENT MANIFOLD
To REAGENT MANIFOLD (TOP)
To BURET
To SODA TRAP
MAIN MANIFOLD
SR TRANSFER EQUALIZER VALVE
CELL WALL
SODA-LIME
HCl
Glass
REG. No. 2
FINAL BA EQUALIZER VALVE


STRONTIUM STORAGE EQUALIZER FLASK
BARIUM TRANSFER EQUALIZER FLASK
SARAN
STRONTIUM STORAGE SOLENOID
SARAN
TYGON
SPRAY TRAP
BURET (100 Ml.)
BARIUM STORAGE SOLENOID
BARIUM TRANSFER SOLENOID
SOLENOID MANIFOLD
BURET SOLENOID
SPRAY TRAP CONDENSER (No. 1)
REAGENT MANIFOLD
REAGENT COW (No. 2)
TYGON
To CELL
SPRAY TRAP
To CELL
SAMPLE LINE
TYGON
REACTION VESSEL


SARAN
SODA-LIME TRAPS
(SHIELDED)
FLOWMETER
VAC
REG. NO. 3
To REAGENT
FUNNEL CAP
RECEIVER
HEATER
SARAN
ATM.
SARAN
STRONTIUM
OUTLET
(IN SHIELD)
WASTE
DRAIN
VALVE
To
DRAIN
TAP
WATER
SYMBOLS
VALVE METAL EXCEPT WHERE
LABELED GLASS
SEMI-BALL JOINT IN GLASS LINE


HOOD
CONDENSER
(No. 3)
HOOD
TRAP
TAP
WATER
TO
DRAIN
HEATER
SINTER
OUTLET
COW
(No. 3)
SARAN
EQUALIZER
FLASK
DIST
WATER
SARAN
WATER
CONDENSER
(No. 2)
SAMPLE
LINES
FLOOR
LEVEL
INDICATOR
WIRE
SAMPLE
LINE
DIST.
WATER

1715 dil. $HNO_3$ jetted from P-N, neutralized, jetted drain
1.5 l. conc. $HNO_3$ added to P upper reservoir.

1730 go* conc. $HNO_3$ placed ppt.

2/4/75 1430 Beckman readings: Over PPt
Just inside cell ceiling 1R.
1/2 way between ppt + ceiling 3R.
6" above PPt ~~wf~~ 10R
2½ feet above ppt 3R ≡ next to reservoir

1510 = UNH and jetted to N

1530 ~~HNO~~ Lower reservoir blown out to hot drain:
Then aspirator turned on for 1/2 hr. + we could not tell whether
$HNO_3$ was filtering or not.
1600 Precipitator sprayed again, cell walls appear

D to N steam valve leaks badly
Have REG put in an order

2-5-45
0945 put 1 liter $H_2O$ in upper res
and washed through
filter to lower P and
thence to hot drain

noticed dissolves crystallized
blow manometer heated and
diluted jetted to N
all ok

0950 jetting out $HNO_3$ in pptor

1015 neutralizing $HNO_3$ and jetted
to waste

~~1045 Flat on top~~

1045 Beckman readings in Cell 4.
Chamber flat on top of plate
welded on top of pptr — .8 r/hr
southeast of pptr at bottom, may
be in ditch 0.26 on $10^8$
At bottom of pptr 0.15 on $10^8$
side of reservoir 53 on $10^{11}$

1330 scrubbed top of pptor with
6 N HCl and washed with
$H_2O$

1420 Beckmann readings
Chamber flat on top of pptr just
south of welded plate 0.09 on $10^8$
Northeast quarter of pptr
0.13 on $10^8$
West portion of top 0.09 on $10^8$

1445 made 250, 5% $NH_4HF$ pumped to pptor
left agitation on and heated
1330 " " " all night
2-6-45
0807 heated up pptor
0910 pumping 250# $H_2O$ to pptor and a slight excess, enough to cause overflowing. (approx 120 liter)
0935 jetting p → N
0945 finished jetting, didn't use filter disk
0945 washing with 100# $H_2O$
1005 jetting pptor wash to N
1025 washed cell #4 with $H_2O$

1110 Beckman readings in cell 4:
Chamber flat on top of pptr west of reagent line 12 on 10"

Chamber next to reservoir, no lead in between 10 on 10"

Chamber two feet above pptr 35 on 10"

Chamber level with top of pptr but not flat 51 on 10"

Chamber at bottom of pptr 32 on 10"

2-7-45

1130 halfway between res & pptor
17 on 10"
level with top on pptor
38 on 10"
flat on pptor near east
64 on 10"
flat on pptor near center pptor
54 on 10"

10.45 washed pptor with conc HCl and scrubbed by brush

2-8-45

1000 cell #4 - top pptator washed with conc HCl using brush.

1300 pptator washed w HCl again

1400 Readings:
0.08 m 10" - west top of ~~pptor~~
50 m 10" - northeast top "

4X

2-9-45

Neutralization

0945 manometer

dep 25.5 + 25 = 50.5

den 17.5 + 18 = 35.5

$\frac{15}{12} = 1.25$ C

Vol = 940 gal

1015 adding 100# $Na_2CO_3$ 30% sol

1045 adding 100# $Na_2CO_3$ 25% sol

30% sol seemed too conc

have mixer on now will ~~add~~ make 30% next batch however

1115 The 3rd 100# of $Na_2CO_3$ is 30% - The lightning-mixer has been placed on make up Tank.

1135 The 4th 100# $Na_2CO_3$ is 30% being made up.

1200 5th 100# $Na_2CO_3$ is being made up - 30% Solution

1225 6th 100# $Na_2CO_3$ has been made up - 30% Sol.

1245 7th 100# " " " " " " "

1305 8th 100# " " " " " " "

1330 9th 100# " " " " " " "

1406 10th 100# " " " " " " "

1520 11th 100# " " " " " " "

1535 12th " " " " " " "

1600 13th 100# " " " " " " "

1615 14th 100 " " " " " " "

1.17

1650 A sample of the waste was taken to determine the pH of the solution — pH 1.28

Agitation on all night

2-16-45

0845 A second sample taken of waste pH = 1.65

1000 15# 100# $Na_2CO_3$, made up and pumped to Lot tank

1040 A waste sample was taken and the pH checked pH - 3.98

N Vol - 940 gal $\frac{1500\#}{100\#} \times 40$ gal = 1540 gal

1250 Jet From waste to W-11 — ON — Hot Drains Closed

1430 Jet to W-11 OFF " Hot Drains Open

1515 400# $Na_2CO_3$ pumped to W-11 - 36% Sol -

1530 The Jet from the waste tanks was turned off after the depth became constant. There seems to be ± 6" of solution left in the tank.

2-12-45

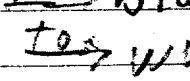
1015 Reading in cell #4

East top of North - 55 on 10"

West top of North - 88 on 10"

1100 top of partition scrubbed w. HCl and washed down w. $H_2O$.

2-12-45
1115 The PP[illegible] [illegible] Lt-Cycle and
Steam on To PP[illegible] [illegible] [illegible]



Pump < red and Green To → black R G B
yellow and black To → white Y B W

2-13-
0830 pumped Oxalic from
pptor to N
0848 washing pptor with
$H_2O$

| | | | |
|---|---|---|---|
| 1030 | Opposite Reservoir | 29 | - 10" |
| | North West Top of PPTr | 21 | - 10" |
| | North east Top of PPTr | 35 | 10" |
| | On the Floor - North Side of PPTr | 11 | 10" |
| | West Top of PPTr | 27 | 10" |
| | South West Top of PPTr | 36 | 10" |
| | South top of PPTr | 34 | 10" |
| | On the Floor South west side PPTr | 34 | 10" |
| | Outside Pb Shield | 2.5 | 10" |
| | West Side of Lower Reservoir | 14 | 10" |

1100 1500 ml of 70% $HNO_3$ put in Reservoir
2/20/45 1500 ml " " " Transfered to lower Reservoir
1500 ml of $H_2O$ put in upper Reservoir
2/22/45 Solution filtered into lower Reservoir and transfered to
Storage Tank - Storage tank to Act Drains

HL - Run #6

1815 - The steam jet to the off-gas line was turned off and the condensate collected.

0340 The steam jet was turned off at 1230 AM. and contents of line drained and stored in Semihot cell.

3-20-45 In loading the dissolver for HL 61C the 9th slug lodged crosswise in funnel. The slug carrier was removed and the slug dislodged by means of long steel hook. No one apparently received any over dose from radiation. Time was lost in this mishap

3-21-45 0215
The first batch of 12 slugs for 62A were dumped the last one stuck in the funnel again as last night (please pass the aspirin) it was removed by using the hook all ok
The slug bucket has a loop on the side which needs welding

Neutralization of Waste
Run # 6

1800 1st 100# $Na_2CO_3$ in Metal Storage Tank
1830 2nd 100# " " " "
1910 3rd 100# " " " " "
2140 4th 100# " " " " "
2225 5th 100# " " " " "
2340 6th " " " " " "

2400 850 ml of 0.5 N $HNO_3$ - added ~~to~~ ppts - 250 ml via filter - 600 down splash plate,

3-25-45
0045 7th 100# $Na_2CO_3$ in Metal Waste tank -
0115 A sample was taken of the waste -
pH = 0.5 -
1645 8th 100# $Na_2CO_3$ in Waste Tank
pH = 2.0
1700 9th 100# $Na_2CO_3$ in Waste Tank,
pH = 3.96
1730 Jetting To W-11
2010 Jetting finished - 300# of carbonate pumped to W-11

4-3-45

jetted Keels HL75A to pptor

took a survey of engineering panel with a back ground of 15 mr/hr

1855 ELB says Keels HL75A are now in neutralizer. In dissolver is an unspecified amt of 70% $HNO_3$. We found the temperature was 80° and the density was $\boxed{2.01}$ which means that the $HNO_3$ had reacted all by itself.

1720 Condensate drained from off gas line. Great clouds of $NO_2$ come from pipe. $HNO_3$ was left in tank, no stopper in funnel ∴ unknown amt of activity into 706-C instead of stack. Nobody should ever leave $HNO_3$ in a dissolver unless he is certain no reaction can take place

1740 Diluted dissolver and jetted to neutralizer. Jetted neutralizer to our waste tank.

Jet D to N is very slow. Should be replaced when we decontaminate.

2025 70# of 70% $HNO_3$ added to dissolver. No apparent reaction. Solution was refluxed till 2400, then allowed to cool.

2300 A few liters of acid withdrawn from dissolver, heated & agitated a while in precipitator & then jetted to Neut.

4-4-45 Acid in dissolver heated for
1250 4½ hrs density = 1.59

1600 jetted to Neutralizer
Very slow jetting

4/5/45
1100 1st 100# $CO_3$ into outside tank
1120 2nd " " " " "
1138 3rd " " " " "
1300 4th " " " " "
1320 5th " " " " "
1340 6th " " " " "
1400 7th " " " " "
1420 8th " " " " "
1500 9th " " " " "
1530 10th " " " " "
4/6/45 11th " " " " "
1410
1530 finished pH = 4.85
4-7-45 ~~jetting~~
0820 jetting to W-11
1025 " " W-11 complete
washed with three 100# portions
$Na_2CO_3$

4/8/45 0910 70# $HNO_3$ 70% added to dissolver.

1940 depth 19.6
density 12.2
7.4 or 1.36 - 28 l.
but $NO_2$ was pouring ~~the~~ from ~~off~~ slug downpipe in cell ~~so~~. Fans were left off. Apparently a lot of FO ing ∴ jetted dissolver into N.

4/10/45 0940 - Beckman readings

Horizontal on top of dissolver .36 on $10^8$
" " back of " .33 on $10^8$
on side of dissolver at leak .41 on $10^8$
on top of neutralizer .31 on $10^8$
cyclone separator .31 on $10^8$
floor between discard nut 2.1 on $10^8$
floor in front of dissolver 1.6 on $10^8$

1015 - Steam to dissolver 70# more acid added - Beckman readings show heals remain

| | | | | |
|---|---|---|---|---|
| 28.3 | 24.8 | 28.9 | 24.6 | $\rho = 1.39$ |
| 5.2 | 8.7 | 4.8 | 8.4 | |
| 23.1 | 16.1 | 23.4 | 16.2 | |
| 16.3 | | 16.2 | | |
| 6.8 | | 7.2 | | |

2300 Steam off dissolver. Soln. cooled and 1 ml sample taken lt. yellow in color but only gave 85 mr with window open + directly against it, most of the yellow color must be $HNO_2$ then and all the metal must be dissolved. mostly

Cell sprayed thoroughly twice in evening. Smears would be good tomorrow morning when cell is dry.

0930 dissolver jetted to N + N to waste
sample taken by Bersohn
read 240 mr/hr seems there
could be some UNH!!!

| | | Reading | Scale |
|---|---|---|---|
| 0945 | Beckman readings | | |
| | Horizontal on top of dissolver | .25 | $10^8$ |
| | " " back " " | .25 | $10^8$ |
| | On side of dissolver at leak | .22 | $10^8$ |
| | Top of neutralizer | .1 | $10^8$ |
| | cyclone separator | .13 | $10^8$ |
| | floor between dissolver + neut. | .85 | $10^8$ |
| | floor in front of diss. | .62 | $10^8$ |

1005 70# 70% $HNO_3$ added (Pump repacked - goes like a bastard!).

1010 steam to dissolver

1530 steam off dissolver - diluted - jetted to N
Sample gave 9 MR/HR.

1535 jetting to N
1615 " " " complete.

1730 Dissolver washed with 100 lb. $H_2O$. Jet D to N
1900 Jet N to W, 100 more # $H_2O$ into dissolver, agitate.
1950 Jet D to N, jet N to W.
2030 150 # $H_2O$ to neut, agitate.
2050 100 lb. 5% $Na_2$ cit to D, agitate

2100 sprayed cell with $H_2O$
2230 sprayed cell with 100 lb. hot $Na_3$ citrate 5%
jetted N to W
2240 jetted D to N, agitate

2330 made up 200 lb. - 25% $Na_2CO_3$ soln. in make up tank
2345 sprayed cell with $H_2O$

4/[illegible]/45 0810 N → W
0820 40 L of $H_2O$ added to N - N → W.
0845 Beckman readings

| | | |
|---|---|---|
| Horizontal - top of D | .21 | $10^8$ |
| " - back of D | .15 | $10^8$ |
| Side of D at leak | .13 | $10^8$ |
| Cyclone Separator | .09 | $10^8$ |
| Top of N | 69 | $10^{11}$ |
| Floor between N & D | .43 | $10^8$ |
| Floor front of D | .5 | $10^8$ |
| Top of Filter Disk | .45 | $10^8$ |
| Far side of N | 68 | $10^{11}$ |

09[illegible]5 - $Na_2CO_3$ pumped to dissolver
Jetted through filter disk to ppt.
1100 6N $HNO_3$ - 175# made and pumped to D
1115 jetting to P via disk
1315 jetting P to N

| | | Reading | scale |
|---|---|---|---|
| 1410 | Beckman Readings | | |
| | Horizontal - D. | 83 | $10^{11}$ |
| | " back of D. | .14 | $10^{8}$ |
| | Side of Cat leak. | .1 | $10^{8}$ |
| | Cyclone Sep. | 65 | $10^{11}$ |
| | Top of N | 66 | $10^{11}$ |
| | Floor between D & N | .19 | $10^{8}$ |
| | Floor from of D. | .42 | $10^{8}$ |
| | Top of filter pick | .11 | $10^{8}$ |
| | Jet side of N. | 49 | $10^{11}$ |

1445 Made up 100# Oxalic Acid 3% to D

1450 Pumped " " " " to D

Steam on

Made up 200# $HNO_3$

1520 Sprayed down inside of cell with dil $HNO_3$

1700 Started Oxalate getting to N, over at 1745

1750 Pumped 100# $Na_2CO_3$ solution to D.

Jetted to N → W

Jetted D to N

Jetted D to W

1900 Added 100# 2.5% Ammonium Bifluoride

1930 Washed down cell

1945 took background readings

| | reading | scale |
|---|---|---|
| front of D | .25 | $10^{8}$ |
| between N & D on floor | .165 | $10^{8}$ |

104

0845 NA4HF jetted to N
0900 washing D jetting to N
0925 N → W washing completed

Beckman readings

| | reading | scale |
|---|---|---|
| Horizontal D front | 72.5 | $10^{11}$ |
| " back D | 34 | $10^{11}$ |
| Side D at leak | .1 | $10^{8}$ |
| Cyclone separator cond | 28 | $10^{11}$ |
| top N | 19 | $10^{11}$ |
| Floor between D + N | 69 | $10^{11}$ |
| " Front D | 47 | $10^{11}$ |
| top filter disk | .14 | $10^{8}$ |
| far side N | 21 | $10^{11}$ |

0900 pulled out filter disk
0930 removed all cloth from floor and shields high contamination

3/26/45
Reading cell #3
(central) R on ditch
450 mm - head & waist level
900 mm - knee level

5-7-45

1. The iron steam and $H_2O$ lines in cell #3 were painted with glyptol. Two coats.
2. The dissolver - ppte and Nents. well calibrated depth - dens.
3. all the jets were cleaned.
The old jetting dissolver to ppte, has a loose union. The jet from Dissolver to Nent. is rather slow.
4. In the condenser - cyclone separator system there are at least four leaks.
There is a leak in the bottom of Condenser,
5. there is a leak in the union on the water outlet line from scrubber.
6. In jetting from N to Waste the pressure across Scrubber and Condenser becomes positive.
7. At 80PSI steam on Dissolver Jacket - 95# $H_2O$ in dissolver - the temperature rise is ~15°/5 min.
cooling down 7°/5 min.
8. Jacket of ppte - is working properly as well as condenser and scrubber in cell #4.

5/9/45 Load up for HL 80

5/17/45 Reading on waste Tank

Vol manometer 15+14 = 29
SpGr " 3.4+6.2 9.6
~~[illegible]~~ = SpGr = 1.27
Vol = 550 gal

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1st | 100# $Na_2CO_3$ | add to | Waste | tank | — | 25% | Solution |
| 2nd | 100# $Na_2CO_3$ | " | " | " | " — | " | " |
| 3rd | 100# $Na_2CO_3$ | " | " | " | " — | " | " |
| 4th | 100# $Na_2CO_3$ | " | " | " | " — | " | " |
| 5th | 100# $Na_2CO_3$ | " | " | " | " — | " | " |
| 6th | " | " | " | " | " | " | " |
| 7th | " | " | " | " | " | " | " |
| 8th | " | " | " | " | " | " | " |
| 9th | " | " | " | " | " | " | " |
| [illegible] | " | " | " | " | " | " | " |
| [illegible] | " | " | " | " | " | " | " |
| [illegible] | " | " | " | " | " | " | " |
| 13th | " | " | " | " | " | " | " |
| | pH = 2.0 | | | | | | |
| 14th | " | | | | | | |
| | pH = 2.0 | | | | | | |
| | 50# $Na_2$[illegible] | | | | | | |
| | pH = 4.0 | | | | | | |

Vellan [illegible] W-11 [illegible]

1st 100# [illegible] wash pump [illegible] W-11.

[illegible] 100# [illegible] wash pump [illegible] W-11

3rd 100# [illegible] wash pump [illegible] W-11

[illegible] 50# $Na_2CO_3$ (25% solution) wash pump [illegible] W-11

5 - 27-45

500# of $Na_2CO_3$ added to waste tank -

A-633

DATE 1-30-45

BLDG. NO. 706-C

## SPECIAL MAINTENANCE PERMIT

REPORT TO OPERATING DEPARTMENT FROM HEALTH GROUP

Description of Job:

Transfer of Material from 105 to 706-C

Hazard Involved:

Survey readings:

3 + 5

Signature Robert R Coleyer
(Health Section)

# Repair, additions, & Alterations

replace the trap

1. Replace ~~pptr steam out let valve.~~ prod line trap.
2. Check pptr. window wiper.
3. Replace reagent add. bottles for $H_2SO_4$ + $Pb(NO_3)_2$
4. Check water valve to jacket on ~~product~~ cooling line - water leaks into jacket - trap N.G.
5. Fasten lead drain tray (under funnels) and connect drain line to ditch
6. Fix ~~water~~ make-up tank paddle - replace wood with metal
7. Check agitator line to dissolver for corrosion should be stainless or monel.
8. Test viewing glass in canal
9. Good idea to have thermocouple in neutralizer. — (water jacket and air jet too)
10. ~~stop cocks on [illegible] to filter drain of pptr jump cut when a head put into [illegible] - put rubber gasket on~~
11. New steam filter.
12. Check flow rates of jets.
13. Replace 3 way stop cock - pptr. off gas manometer

work done on 9/18/44

Washed filter drain with alternate portions of hot water and $6N\ HNO_3$ then washed with 5% Oxalic acid, washed dissolver & neutralizer well with water dissolver was last washed with dilute hydrofluoric acid.

Checked radiation levels in cell 2; about 2.2 R on floor, 3 feet from floor between 250 & 300 MR/hr

Checked steam jets for flow, dumped 12 slugs into canal. Also checked several manometers.

# Slug Record.

[Run 2] started 10/10/44

Discharged from pile on 10/7 = C-2, B-1, V-1, T-1.
" " " " 10/8 = O, T, P, Q, H, K-1.
(26 slugs in each Bucket - taken in above order)

| Bucket NO. | Date & Time | No Taken | No left | Rejects |
|---|---|---|---|---|
| C-2 | 10/9 1300 | 12 | 14 | 0 |
| C-2 | 10/9 1430 | 12 | 2 | 0 |
| C-2 | 10/9 1600 | 2 | 0 | 0 |
| B-1 | 10/9 1600 | 10 | 16 | 0 |
| B-1 | 10/10 1400 ✓ | 12 | 4 | 0 |
| B-1 | 10/10 1930 ✓ | 4 | 0 | 0 |
| V-1 | 10/10 1930 ✓ | 18 | 12 | 0 |
| V-1 | 10/11 0415 | 12 | 6 | 0 |
| V-1 | 10/11 930 | 6 | 0 | 0 |
| T-1 | 10/11 930 | 6 | 20 | 0 |
| T-1 | 10/11 1600 | 12 | 8 | 0 |
| T-1 | 10/ 2100 | 8 | 0 | 0 |
| O | / 2100 | 4 | 22 | 0 |
| O | 10/12 0400 | 12 | 8 | 2 |
| O | 10/12 1000 | 8 | 0 | 0 |
| T | 10/12 1000 | 4 | 22 | 0 |
| T | 10/12 1430 | 12 | 10 | 0 |
| T | 10/12 2030 | 10 | 0 | 0 |
| P | 10/12 2030 | 2 | 24 | 0 |
| P | 10/13 0200 | 12 | 12 | 0 |
| P | 10/13 1030 | 11 | 0 | 1 |
| Q | 10/13 1030 | 1 | 25 | 0 |

| Bucket No. | Date + Time | No Taken | No Left | Rejects |
|---|---|---|---|---|
| 9 | 10/13 0100 | 11 | 14 | 0 |