BOOK42R

Notes:
"Water Analyses" on spine
-this logbook is not in the best of shape
-pages 1-48, 83-86, and 294-300 have been ripped out
-2 unnumbered-attached sheets between 97 & 98

Blank pages: inside front cover, 54, 56, 69, 70, 74, 112, 116, 161-238, 240-293, inside back cover sheets

-1 (8.5x11) sheet between pages 68/69
-pages 71/72 has big clip attached at top
-page 73 has 1 (8.5x11) stapled to it
-small piece of paper between 94/95
-1 piece of paper, 1 (8.5x11) graph sheet, 1 (8.5x11) sheet, and 1 small piece of paper are between pages 96/97
-1 piece of paper taped to page 97
-page 107 has 1 piece of paper taped to it
-1 (8.5x11) pink sheet between pages 108/109
-1 half sheet between pages 114/115
-7 various sizes of paper stapled together between pages 114/115
-page 116 has 2 sheets taped to it, and 1 small sheet stapled to the top sheet that's taped down
-page 136 has 3 pieces of paper stapled to it
-page 140 has 1 piece of paper stapled to it
-page 141 has 1 piece of paper stapled to it
-page 144 has 3 pieces of paper stapled to it
-page 145 has 1 piece of paper stapled to it
-page 147 has 1 (8.5x11) graph sheet taped to it
-page 149 has sheet paper clipped to the top
-page 152 has (8.5x11) stapled to it
-plant envelope with 1 small piece of paper inside between pages 154/155
-1 (8.5x11) sheet between pages 236/237
-half sheet between pages 252/253
-big sheet of paper in very back of book

Scanned by:
Sheila Finch
RSICC /Oak Ridge National Lab.
August 10, 1999

F. Cronin
10/18/1950

SHAW'S
PIONEERS SINCE 1831

Account Book

No. S 149

NO UNITS

Journal . . . . . .

Ledger, Single Entry . .

Ledger, Double Entry .

Record Ruled (27 Lines)

Made in 150, 200 and 300 Pages

MADE IN U. S. A.

TO REORDER, SPECIFY NUMBER, RULING AND THICKNESS INDICATED ON BACKBONE OF THIS BOOK.

Waste Storage Tanks "Full" Dates

	East	West
	1/7/54	1/15/54
	4/5/54	2/16/54
	7/2/54	6/17/54
	10/12/54	9/16/54
		2/24/55
	9/20/55	~~9/16/56~~
		11/27/55
	2/17/56	2/20/56
	2/28/56	
		3-6-56
plumbing fixing →	3/14/56	3/20/56
to stop ground water leak		
	4-4-56	~~4-13-56~~
	4-7-56	to 4-17-56
	4-17-56	
		4-24-56

Aluminum Spacers - with enough contamination to thicken Zuto off side were electrolyzed in an anodizing bath and cleaned to zero surface count - 3 baths were used

1 - H_2SO_4 alone - 10% by wgt.

1 - H_2SO_4 + Citric acid 3%

2 - Oxalic acid 2%

All seemed equally effective, so a larger rectifier - was built for use on slugs - results discouraging.

2 hot slugs with zero wipes were brought to Rm 208, and electrolyzed in a H_2SO_4 bath - one slug cleaned to > 500 c/m and the other to > 1000 c/m.

~~Other~~ other slugs (6) were cleaned 3 at at a time - difference was that bath was 1% H_2SO_4 and 0.1% HF (Dr. McLaurin's suggestion. The cathode were stainless steel plates which were counted at regular intervals

Conv

#	Time	c/min		angle
1	½ hr	1500	at 6 V	4 × 2 3/4
2	½ hr	1000	at 6V	3 1/4 × 2 7/8
3	1 hr	15000	at 6 V	2 1/2 × 2 3/4
4	½ hr	5000	at 1½ V	3 1/4 × 3
5	½ hr	7000	at 6 V	3 × 2 5/8
6	½ hr	15000	at 6V (	2 3/4 × 2 3/4

#5 + 6 were washed in $AgNO_3$ at 1 at

#6 - 5 min = 1500,

12 min = 14000

30 min = 15000

4-21- Sulfamic acid added to bath
to make it = 3N in H_2SO_4 + .05N HF

1/8

3/4 Slugs on cathode for 5 min at 3.3V
Then as anode for 10 min -
Slugs immersed in hot water for 15 min -

3/4

cathode counted on slugs taken and = 30 000 c/m
on each side of flat 3 1/2 x 4" cathode

#7
Cathode replaced in cell (no slugs) for 15 min
Cathode officials on Zeuto on x10 scale
(note a fine copper plate appeared on cathode)

Cathode #7 replaced in bath at reduced voltage (1.5V)
No apparent increase in count.

Slugs replaced as cathode in bath for 20 min.
Mond anode - #8 barely detectible count on anode -

Slugs ~~cathode~~ anodic to #8 which was cleaned
in HNO_3 conc + a flash Cu plate put on it
in 10 min - Off scale on Zeuto 5 on Hamilton Piggy
in 35 " " " " " 12 on H scale on Piggy
#8 was cleaned by dipping in conc HNO_3
and new flash Cu coat put on - back in
bath as cathode at 1.2V

4-23 Cathode #8 cleaned in HNO_3 + redipped in $CuSO_4$ then 3 slugs put into bath (each slug - off scale on +10 on Zinto -

Eslugs on cathode for 10 min at 2 1/3 amp per slug Then as anode with #8 cathode (total 31.5 sq" both side) at 1 amp total current - cathode gassing freely. current tends to fall off rapidly - adjusted until cathode has just visible gassing.

Cleanings from 18 silver cathodes were made up to 1 liter = 40 cc used to plate on one side of Ag foil 0.65" diam.

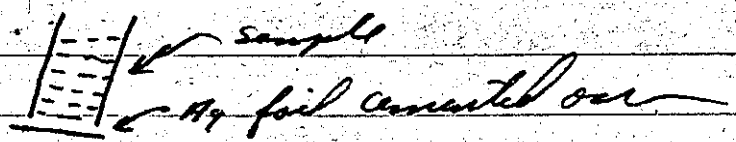
4-30 – Monday

Samples taken from demineralized water tanks by Fox on Saturday.

6) East tank – total volume 800 ml

West tank – (closest to Reaton with one manhole cover open) vol = 825 ml –

One-tenth (1/10) vol taken – HCl added to make 3N + allowed to stand over a Ag foil –



#1	East tank	20 ml sample	5.17 (Possibly contaminated
#2	East tank	80 ml "	7.8
#3	East tank	80 ml "	6.9
#4	West tank	82.5 ml sample	
#5	Blank –	85 ml sample H_2O	

UO_2

Physical Properties of

Report #	Author	Date	Density absolute	Density Tapped	Density Not Tapped	MP °C
S-47	Jenkins	3/9/43		4.51	3.76	
S-42	Compton	4/25/42	10.9-11.1		3	2600°
P-764	Latimer	10/46				2700 ± 200°
A-257	Priest	8/10/42	10.28	4.96		
A-329	Long et al					

Stability of hydrates -

$UO_3 \cdot 0.5H_2O$ - 323°C
$UO_3 \cdot H_2O$ 240°C
$UO_3 \cdot 2H_2O$ 130°C

} very easily oxidized

Table I from Report A-708 (Kilpatrick

Shevis - Monthly report. File # 23652

Solution Experiments

First "dry" run on system using water solution of Florescein dye (with Sodium nitrate plus HNO_3)

Tests included: Filling of storage tanks allowing liquid to run into manifold without venting, and venting one half of manifold at a time, then emptying tanks into Reactor using air pressure & then measuring: 1. Drain back time, and ht of drain back - ie System hold-ups under operating conditions

Tank #8 filled to 169.6 cm ht

#8 manifold valve open 163.7 cm

5.9 cm ≡ 871 cm^3

Drain back to #8 (only #8 valve open) = 151.5 cm

1st loss = 2,567 cm^3

2nd 2930

3rd 2895

4th 2850

Open & vent Rt half manifold = 135.4 ht

5100 cm^3

Left half manifold 7540 cm^3 total

Total hold-up = 7.5 liters approx.

Draw down times from the "A" reactor back into the single #8 storage tank were as follows:

Time	Total # of cu in "A" reactor storage tank
0	5 cu
38 sec.	55
87 sec.	115
120 sec.	145

3-5-52

Data collected on Fluorothene + samples made up.

3-6-7-52

Drain + feed data -

using # 8 tanks into 8" manifold filled

9# air on feed	Drain tanks	
73 cm in 0.80 min	time	ht
80 cm in 1 min	.01	0.9 cm
15# air feed	.03	1.7 cm
73.6 cm in 0.5 min	0.1	7.3 cm
24.1 cm in 0.2	0.24	17.4
8.8 in 0.1	0.5	37.4
1.4 in 0.05	1.0	72.2-76.4
0.4 0.035	0.8	52.7 cm
-0.6 0.02		
-1.5 .01 min		

60

3/5/52

Soln System re-worked:

5 Sprinner NO valves replaced -

5, 6, 7, 9, 12 tanks.

Scrubber opened, found glass wool wadded up - replaced by 3 baffles:

System now vents preferentially thru scrubber

Washed dye out of System - 4 mins - left no color.

Leaks developed at a gasket flange # 7 and at one NO valve #6

Orifice 1/8" inserted in feed line after last manual valve.

20" reactor in tank at present -

Plumbing 2/3 complete for water supply system - Thru 18" wall - None of electrical equipment in except 1 Minimax and 1 disconnect mounted on W. Wall.

3/28/52

Cylinder # 8

grams 11,985.0 / 100 cm scale

~~tare~~

~~6,~~

Scale reading = 170.5 cm

stop 70.5

net 100.0 cm delivered

after settling 10 min scale reads: 70.5

Scale 70.5

stop 0.0 8,427 grams / 70.5 cm

net 70.5 cm

	Tank # 5		Tank # 8
start	170.9 cm		0.0
at equilibrium	86.2 "		85.8 "
after transfer	2.1	119.3 cm³/cm	168.2
	168.8 cm	20.2 litres	168.2 cm 20.15 litres

	Tank # 10		Tank # 8
~~start~~	~~5.5~~		~~0.0~~
	170	118.0 cm³/cm	2.9
	0.6		169.6
	169.4	→	166.7 cm 20.0 l
	0.3		2.8
	165.8		
	165.5	118.6 cm³/cm	163.9 = 19.65 l

	Tank #11		Tank #8	
start	170.5		5.8	
	0.7		169.1	
	169.8	115.3 cm³/cm	163.3	
			19.56 L	
start	2.6		169.1	
	169.0		0.0	
	166.4	122 cm³/cm	169.1	
			20.3 L	
start	~~2.3~~		~~169.1~~	
	169.1		2.3	
	2.3	118.3 cm³/cm	167.1	
	166.8		164.8	19.75 L
start	5.0		167.0	
	165.4		4.1	
	160.4	121.6 cm³/cm	162.9	19.5 L
	165.4		167.1	
	3.0		4.1	
	162.4	120 cm³/cm	163.0	
				19.5 L

Tank #10

167.0
0.6
166.4 — 120 cm³/cm

167.0
0.1
166.9 — 120 cm³/cm

Tank #9

161.2
0.0
161.2 — 124.6 cm³/cm

161.2
0.0
161.2

172.2
0.0
172.2 — 119.9 cm³/cm

172.2
0.3
171.9 — 120.5 cm³/cm

Tank #8

167.1
0.4
166.7
19.98 L

167.5
0.4
167.1
20.02 L

Tank #8

167.5
0.0
167.5
20.1 L

160.4
0.6
160.4

172.5
0.3
172.2
20.65 L

173.0
0.3
172.7
20.7 L

Tank #7

172.6
0.1
172.5 120.1 cm³/cm

172.6
0.4
172.2 120.3 cm³/cm

Tank #6

172.6
0.2
172.4 120.0 cm³/cm

172.6
0.2
172.4

Tank #5

172.5
(-) 0.2
172.7 119.8

Tank #9

173.0
0.0
173.0
20.72 L

172.8
0.0
172.8
20.7 L

Tank #8

172.8
0.3
172.5
20.68 L

172.8
0.3
172.5
20.68 L

Tank #8

172.8
0.0
172.8 20.7 L

Tank #5

172.5
(-) 0.3
172.8

1.19.9 cm³/cm ht

Tank #85

173.0
0.0
173.0
20.72 L

Filling	#4	#5	#6	#7
to Sight Glass	ik			
to Zero		250 cm³		
to 1st Spark Plug		+180 cm³		
to 2nd Spark Plug		~~liter~~		
		+300 cm³		
		170.2 cm		

#8	#9	#10	#11	
—	—			63 Liters

Operation of Sol'n System

After "check list" is complete, adjust air pressure on tanks to: min 5# for slow feed, max 20# for fast feed.

Open air line to sol'n feed valve (located at valve).

Close top and bottom shut off values to all tanks except those needed.

On tanks to be used open top, bottom and sight-glass cut-off values. Check tanks sight glass and spark plug *1 operation - allow tanks to come to equilibrium height.

Turn on air pressure switches at station only *2 corresponding to tanks being used. Note: turn one ~~each~~ panel, being used either Rm 102 or 202 not both

Now, before feeding sol'n - check panel to see if: Dump valve, and Dump tanks drain value are in proper position, then feed - Up on the Switch is feed - neutral vents air pressure and stops feeding Down - vents and opens sol'n value allowing sol'n to drain back into tanks.

Note: periodic checks of dumps will should be made to insure against accidental filling.

Spark plugs may be grounded to check operation.

2. Be sure all switches are on. If one is off solution will feed into that cylinder.

8/20/51

68

5/29/52

Tank No	Delivery	Filling
4		
5	119.3 119.8	119.9
6	120.0	120.0
7	120.1	120.3
8	119.5 cm³/cm	119.85 cm³/cm
9	119.9 120	120.5 124.6 120
10	118.0 cm³/cm	118.6 cm³/cm
11	115.3 118.3 120	122.0 121.6

1/20/53 Exp# 8 on Slurries – Samples taken 10:00 AM – 3 45 PM
no words in Run 102.

1/21/53 AM - conc. slurry to 65 gm/ℓ
Exp# 9 started 3 12 PM

1/22/53 Set up for Exp in AM
Exp. started (#10 2 30 PM
Slurry stirrer stopped & fuel left in [redacted]
after draining reflector – Pwr left on.

1/23/53 Drained West Water tank – Rg # 130 330
Conc'y = .03 ppm Total = 1000 gal = approx 8000 lbs
or 40×10^5 gms = $4 \times 10^6 \times 3 \times 10^{-8} = 12 \times 10^{-1} = 0.12$ gm U
Red Lit on 9 24 AM Exp# 11 Slurries.
Red Lit off 9 40 – H.P. Instell Hand Counters.

1/24/53 AM – Spent fixing leaky dump valve (fuel dump)
on Sid.
Expt. started at 10 20 AM.

1/26/52 Exp stopped – Air Compressor broke down –
began installation of new stirrer on "Sid"

1/27/52 Installation of Stirrer on "Sid"
Water sample taken of demineralized Water
Sent to Lab 4 00 PM

1/29/53	We finished adjusting the new stirrer and then spent the day adjusting the liquid level indicator. (Bad tubes - probe dismantled
1/30/53	Completed adjustment on liquid level indicator. Recalibrated
2/2/53	No work done on slurry exp. Cromic out.
2/3/53	Run Exp. #12 to get data for curves of RPM vs M^{-1} with new stirrer. — G.W.S.

Lab. No. G-1146

INTER-COMPANY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY
Operated By
CARBIDE AND CARBON CHEMICALS COMPANY

(INSERT NAME) COMPANY _____ LOCATION Post Office Box P, OAK RIDGE, TENN.

TO D. F. Cronin
LOCATION Bldg. 9213

DATE February 12, 1953
ANSWERING LETTER DATE

ATTENTION
COPY TO C. D. Susano, File (2)

SUBJECT Analysis of Water Sample

MATERIAL: Water
SOURCE: Bldg. 9213
ACCOUNT NO: 1340-54
SUBMITTED BY: D. F. Cronin, 1-28-53

TEST RESULTS

LABORATORY NO. G-1146
IDENTIFICATION None

	Parts per million	Relative Standard Error, Percent
Chemical Tests:		
Total Solids (Dried at 125°C)	25	2
Ignited Solids (Ignited at 1000°C)	13	5

Spectrographic Analysis of Ignited Residue:

	Percent		
Aluminum, Al	10	Manganese, Mn	0.2
Barium, Ba	0.2	Molybdenium, Mo	0.04
Beryllium, Be	<0.001	Nickel, Ni	0.2
Boron, B	0.1	Potassium, K	1
Calcium, Ca	>5	Silicon, Si	5
Chromium, Cr	<0.04T	Silver, Ag	<0.04
Cobalt, Co	0.04	Sodium, Na	5
Copper, Cu	<0.04T	Tin, Sn	<0.04FT
Iron, Fe	1	Titanium, Ti	<0.04T
Lead, Pb	<0.08	Vanadium, V	<0.04
Lithium, Li	0.2	Zinc, Zn	0.6
Magnesium, Mg	3	Zirconium, Zr	<0.08

T--Trace

ANALYTICAL CHEMISTRY DIVISION - Y-12

lb

The spectrographic test results reported herein are semi-quantitative estimates which were obtained for use as a guide to chemical analysis and should not be interpreted or construed to be precise quantitative determinations.

H P House
H. P. House

THIS FORM FOR INTER-COMPANY CORRESPONDENCE ONLY

[redacted]

Waste Storage – West Tank

Ry # 215 25-3 4/24/53

< .01

Waste Storage - East Tank

Ry # 215-25-2

.000000002 4/24/53

Dilute Waste from East Tank

Ry # 130 345-

.000 00004 3/17/53

4/24/53 Tanks dumped + flushed out

5/14/53

5/15/53 Began attempt to clean up Reflector water tank

		Time	Req
Orig Sample = 8.7 ppm Cl			
1st Effluent =	.05 ppm	1 15 PM	(215257?)
2nd " =	0.36 "	4 30 PM	215258
3rd " =	.06	8 15 PM	215259
1st Composite =	.08	8 15 PM	215260

may be cont both

When 2nd effluent showed 0.36 ppm – suspected sample bottle (was in E 112 used previously for slurry) So drew sample taken of effluent, and composite out of tank – pump stopped until new analysis in. Flow rate before shutoff was 2600 ml/min

Time sample	Analysis From	Flow rate	Req #

Pump started at 9 40 PM Flow rate 2400 ml/min
set up to 2960 ml/min take Sample @ 10^{15} – 10^{30}

Time: 11:15 pm flow rate 2800 ml/min
Sample taken Req # 215261 0.05 ppm 11:30 pm
11:30 pm flow rate 2640 ml/min

5/16/53 12:30 pm 2480 ml/min
set up to 2940 ml/min
4th Effluent = .05 ppm 11:30 pm # 215261
1:00 am 2760 ml/min.
5th Effluent = .06 ppm 1:30 am # 215262
1:30 am 2640 ml/min 0.06 ppm.

5/16/53

pump operation O.K. as of 1:30 am. Jusk

5:30 AM · Flow rate 2400 ml/min Sample Req 215263 .05 ppm.

8:15 AM Flow Rate 2400 ml/min raised to 2800 ml/min - base value with open Resin column bypass 3/4 open.

9:00 AM Sample taken of effluent Req 215264 .05 ppm

10:30 Flow = 2840 cc/min

11:30 Flow = 2840 ✓

12:30P ✓ = 3220 ✓

1:10P ✓ = 3200 ✓

1:15 Sample 215265 ✓ 0.06 ppm. (2:55P)

2:15 Flow = 3120 cc/min

4:50P ✓ 3000 ✓ TMM.

Sample 215266 (T134). .05 ppm

8:15 Flow 3200 ml/min

8:45 Sealed in place below Dump Valve (Solid)

9:00 PM Sample 215267 (C-61) .05 ppm Flow = 2900 ml/min 0.05 ppm

10:05 PM Flow rate = 2800 ml/min

5/17/53 12:30 am Flow rate = 2740 ml/min Jusk

1:00 am Sample 215268 (C-38) = 0.04 ppm

Flow rate = 2780 ml/min Jusk

Pump operation O.K.

Good morning!

J/17/J3

J00A - Pump lighting noisy - not excessively warm - However, water is warm at discharge
Flow 2640 cc/min DC

J30 Sample C-216 - Req. 215269 0.04ppm

J45 Closed by pass valve (at resin column) 1/8 turn - increased flow to 2950 cc/min
Re: Outside of tank - as an index there is a prominent horizontal seam on north side - level is presently ~ 6" (slope) below it; bottom of tank barely visible with battery hand lantern from 202.

6:15 Flow 2900 cc/m
Closed by pass valve a second 1/8 turn
Flow 3060 cc/min DC

7:05 " 3040 " "

8:25 " 3040
Turned off main switch to outside tank heating circuit not knowing what effect the absence of water might have on thermocouple heater arrangement.

915 Flow 3000 cc/m
Sample W-39 Req 215269 0.04ppm JNN

5-17-53

10^{30} AM Pump greased

1^{00} PM Pump relatively cool
Flow. 2900 cc/min No change made in valve setting
Sample C-49 Reg 215270 0.04 ppm. JWM

5^{35} PM Pump still relatively cool
Flow: 2780 cc/min. Closed by-pass valve 1/8 turn.
Rechecked flow 4 minute later;
Flow: 2900 cc No further change made in valve setting.
Sample. X-119 Reg 215271 0.04 ppm ph 3.7 JWM

11:55 P Flow 2680 cc/min DC
Pump cool, motor warm - opened pump house door -
(Look out for black widow around pump house light) -
Closed by pass valve 1/8 turn
Flow 2920 cc/min
Closed bp another 1/2 turn
Flow 3220 cc/min.

5/18
12:15 A Sample T-149 Reg 215271 0.04 ppm ph 3.7
12:55 Flow 3220 cc/min
1:20 Examined large outside tank. H$_2$O level ~ 15" above bottom (lowest point). Tank will take ~ gals -
2:50 3080 cc/min -
Watch for lead bricks on top of measurement tubes!! DC
3:10 A Level in all tanks ~ 1 1/2" below top of suction connection DC

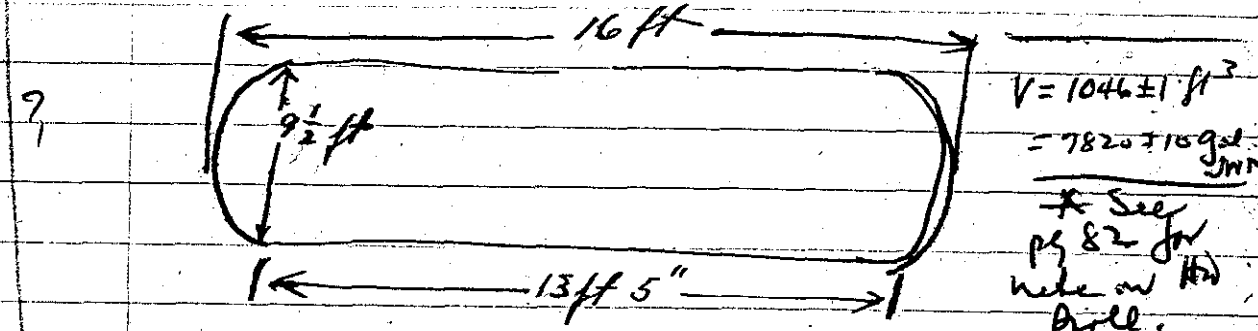
80

5/18 4 50/AM New Sample - flow rate = 2420 ml/min
Rg. 215272 .03 ppm

7 25/AM Tank essentially dry - pump scraping walls.

5/19/53 Outside reflector tank cleaned out
Contaminated water sent to 9212 WB 87-77-1

Outside Reflector tank dimensions:



V = 1046 ± 1 ft³
= 7820 ± 10 gal JNN

* See pg 82 for note on HW drill.

Cleaned up water in Big Sid =
6 ft 3" deep. diam. = 9 ft.
Center = 15" diam Reactor
also 4 - 6" diam tubes

Rg 215273 7.9 ppm U tankage water left in Big Sid before sending to 9212 as storage tank.

* JNN estimate of vol transferred on flow 10,201 ft
= 434 ± 10 gal, of this 210 were sent

Radius tank = 137.16 cm

R^2 = 18812.8656 × π = 59102.29248 cm^2

h = 190.50 cm

Volume = 11,258988.15 cm^3

11,259 Liters.

1-6" pipe = 184 cm^2 × 190.5 = 34.96 Liters

× 4

Volume 4 tubes 139.84 Liters

Vol Reactor = 1140 cm^2 × 190.5 = 217.17 L

11,259 — 139.8 — 356.9

357

10,902 Liters of cleaned up water

Water measured in Reflector Storage tank = 68 5/8" from top.

Sample taken after mixing for ppm U and Spectroscopic. Reg #215274

Result = 1.6 ppm U — 720

Resampled 8:30 AM (9/19) — Reg 215276 0.89 ppm.

9:30 AM — West Waste storage tank shut off + sampled — Reg 215278 0.09 ppm

Effluent on washing column = Reg 215277 — 33 ppm

82

Re: Water loss on 5/7

On 5/7 JWN measured depth of contaminated sol in AL tank & be 4'; on 5/8 it was again measured as 3' 8¼". The difference (= 434 ± 10 gal) is represented by ① 5 gal sent to X-10 ② 7 gal sent to Y-12 for analyses on 5/7 ③ 210 gal mopped up from floor, 5/8/61; ④ 117 gal estimated lost out truck door. — JWN

5/22 - This material added to other waste liquids ←

5/10/53 Blanked off dump line downstream of Sol & Neil. added - 50 gal fresh demineralized H2O to Sol & Neil.

Second Run thru resin column

5:15P Start flow 3 l/m

5:25 Sample Bottle # F-54 Gross 109.9
Tare 53.8
Net 56.1 gms <0.01 ppm.
Reg # 215296

9:30 Flow 2.8 l/min.
Increased to 3 l/min by closing by-pass 3/8 turn

Sample Bottle F-77 Gross 111.2 gm
Tare 51.9 F
Net 59.3 <0.01 ppm.
Reg. #215291

10:00 Flow 3.16 l/m. pump Cool JC

5/21/53 5:45A Flow 3.0 l/min — pump ok.

7:25A Sample Bottle F-238 Gross 116.9 gm
Tare 57.2
Net 59.7 <0.01 ppm
Reg #215298

8:00 AM Rinsed out Sight Glass Line — sampled
Reg #215299 approx 1/2 l. left. 9.7+12.7 av = 11 ppm

11:30A Increased flow from 2980 to 3960 cc/min

1:20P Sample Bottle F-95 Gross 109.7
Tare 56.1
Net 53.6
Reg 215300 >.01 pH 3.4

4:00 P.M. Flow rate 3940 / min. L.W. Gilley

11:10 PM Pump relatively cool & running smooth
Flow rate 3960 cc/min
Sample taken Cath. T-104 Gross 117.0 g
Sample discarded 5/27 Tare 54.7
Net 62.3 g

88

J-M53

6:35A Flow 3990 cc/min

Pump OK

6:50A Sample Bottle F237 Gross 121.7 Tare 57.1 Net 64.6

✓ Req #15304 <.01 PPM; pH 3.4 DC

8:26 Flow 3800 cc/min

1:35P " 3900 cc/min

2:15PM Ran crude test on Amt NaOH Required to neutralize effluent water going into Sed. Weighed out 2 gm NaOH into battery jar. Required from 32-40 liter water to neutralize pH using test paper

Estimated Total Vol 11,000 liter

On basis of 1 gm NaOH per 20 l.

We added ~550 gm NaOH in soln form, spreading over surface of water in Sed & stirring up & down with squeegee stick. Top layer probably still alkaline. Water was noted to be slightly cloudy.

7:25 PM Pump shut off. ~~at~~ at shutdown
Rate just before shut down: 3950 cc/min.
Sample left in 2l graduate on platform.
By-pass valve closed. Valve in line between
tanks (blue line) valve closed also. JHM

Sample in Bottle C-102 Gross 114.3 g.
Sample discarded 5/27 Net 14.1
Tare 5.9.7 g

5/23 8:20A Restarted flow-
Water in Sid is definitely green — (Fe?)
Slight scum on top
Set flow at 3800 cc/m
Sight glass = 165 cm. (Estimated vol. of Hydrobe present - 1200 cc.

10:00A Sight glass flushed by hydro. pressure in Sid.
4 liters discolored followed by 4 liters clear
Calculation indicates that contamination
from tank could have been caused by as
little as 45. mg/cm² of Fe on tank surface.

10:25A Sight glass 172 cm.

11:00A. Level in ac tank so low pump began to
pull air. Used squeegee to get water to
balance out.

90
1/23/53

Sides of tank (SE) showed two "water-marks" about midplane ~ 8" apart. Marks top one is original H₂O level & lower is level of pH 3.7 slurry dumped in on 1/21/53 — Lower part of tank badly pitted

Surface count in 8" band > 25000 d/m — upper part ~ 200 — lower ~ 2000 — Wipe in mid region +-

Inside of tank washed down with 1N HNO_3. These washings (as rinse water) pumped thru filter & resin column & collected in S.S. vessel (~ 8 gal). Effluent was cloudy —

Wipe test in tank (—).

Surface: upper section ~ 200 d/m
mid "(band between "high water" marks) ~ 400 d/m
lower section ~ 1000-1500 d/m
(believed to be in pits).

Hosed out tank with top water — discharge to ground. Closed drain valve at bottom of tank: Closed valves to resin column
Removed by pass line
Drained sight glass (WW) (to SS drum).
Both sight glass valves closed

3:15P Sample Bottles Wash.

#B-92 Gross 104.1 Tare 63.5 gm Net 40.6 } From Ind-ie "Composite" of recently cleaned H_2O) <0.01 ppm >7

Req. 215305
+ Lab 7/24/53 11P

#P-75 Gross 153.4 Tare 25.6 gm Net 127.8 } From effluent from pass of HNO_3 thru column - see preceding page — in SS (8L) container on balcony — 0.33 ppm (probably contaminated from P b. #18) -

Req. 215306
+ Lab 7/24/53 11P

5/25- Resample of acid washings in 8 gal S.S. vessel (ie P-75 above) -

P-30 K Bottle #F-40 Gross 102.3
Req 215307 (+ Lab 7/25). Tare SS.V
Net 47.1; 1.6 ppm

~ 1½" H_2O in al tank - probably drained back thru feed valve & pump
~ 1000 #/in surface overall tank.
~ 200 #/in² wgt below lower "water mark".-

Kleenex dipped in H_2O in bottom of al tank
Dried — No counts

Dumped water from al tank to ground. This water probably came from well thru leaky feed valve

7/15/53

Removed blank flg in ~~feed to~~ dump line
Opened valve to ground at pump
Drain back thru pump for rinsing.
Dumped S.D.
The S.S. drum which had been left in S.D. has an iron ring around base - Hence much resting -
2" hrs left in S.D. intending to drain it thru feed line - However Well feed line erroneously opened & 12 ft³ of new water went out on ground!!
Scrubbed out S.D. & flushed with tap water. Removed S.S. drum & annulus block

Pumped Hrs from all tank & S.D.

Sample Bottle #C-94 Gross 102.5
Reg #215368 Tare 52.1
To Lab 7/15/53 - Net 50.4

0.01 ppm T

pH on C-94 by phone = 9.8
Reg. 215368
On the assumption that I had originally added approx. twice the right amt. of Na OH,

$NaOH + \frac{1}{2} H_2SO_4 \rightarrow Na_2SO_4 + H_2O$
40 ~50

5/26 x 300 = 375 gm H_2SO_4 was added to Sed & water drained back

Pumped mix Sed & Samples

Bottle # H84	Gross	102.6 gm
Reg #5309	Tare	94.9
0.01 mm V	Net	7.7
PH 6.4		

5/26/53 Mud now less cloudy percentage — was filtered thru cloth filter

5/26/53 Three (3) bottles tare weighed for use in eluting columns D.W.G.

Bottle #	Tare (gm)
IX	966.5
IV	914.0
I	884.5
X	856.0

(over)

5/27/53 Drained both tanks into storage tank.
Washed sight glass lines down from Sid (Nell) & top of glass with dilute HNO_3 & rinsed

5/27 Summary of Column Elutriant - (Rainey, Gilkey) -

#	Gross Tare	Net	Acid ppm	Source
8L White Poly-Bottles I	9.7850 Kg	9[illegible].5 gm	6.8185 Kg	3.v. Displacement Water Wash.
IV	9.7605	914.0	8.3465	1.v93 1st Acetate Cut
IX	9.4433	884.5	8.5588	759 2nd " Cut
X	6.9950	856.0	6.1390	6.4 3rd " Cut & Recond.-

5/27/53 Weight of Salts from MCM Clean-up in Stainless Steel drum

Gross 435.3 lb. = 197,543. gm
Tare 69.7 " 31,616
net 365.8 lb. net 165,927 gm.

6/3/53 Rainey Reports:

① Air removed from resin column
② Re-elutriated with acetate
③ Re-washed
④ Eluate 50 L at 1.1 ppm = 55 mg
" L at 2.5 ppm = 65 mg
120 mg -

Indicating that resin has been well cleaned.

7/30/53 Req. 635263 - 0.42 ppm Autoclave Reflux tank
Req. 655265 - Sample from East Waste Storage tank
approx 4 Sites.

Req. 655265
7/30/53
East Waste tank

Jan - 1954	Reg #	Sample of		
	215364	lab. ~~cooling~~ waste	West tanks	0.17 ppm
	215365	contam. bay water	Reflector	0.20 ppm
12-29-53	215349	East tanks	lab waste	0.31 ppm

REPORT OF ANALYSIS LAB. NO. G-4143-44

Cronin DATE REC'D 1-9-58

ASSIGNED TO:

IDENTIFICATION						
						micromhos 25°C
		Conductivity			11.34	$\times 10^{-5}$
De-Ionized H2O (A)			PH	7.80	at 25°C	
Conductivity and PH of			Cu	6.8*		
			mg	~~6.4~~	6.4*	
			Fe	<0.2*		
De-Ionized H2O (B)			Al	<0.2		
Spec Sample						

* Repeat

STANDARD ERROR AT 99.5 PERCENT CONFIDENCE LEVEL

REPORTED BY EG DATE 1/13/58

ISOTOPE ANALYSIS LABORATORY

Requested for Report of Spectrographic Analysis

Submitted by: _____ Bill. No. _____ Phone _____ Date 3-30-7

Charge No. _____

Copy of report to: _____ Bill. No. _____

Sample No. _____

Composition of sample if known _____

Type of analysis desired: Qualitative ☐, Semi-quantitative ☐, Quantitative ☐

Elements Desired _____

Analysis performed by _____ Date received _____

Approved by _____ Date reported _____

Comments: _____

1958 APR 1 PM 4:05

☐ Department Analysis - The D.F. reported are applied by practical analysts experienced in the method used. Precision is about ± 20% or better.

☐ Quantitative Analysis - The values reported are obtained by visual comparison of the sample with standards similarly prepared. Precision is about ± 50% or better.

☐ Semi-quantitative Analysis - The values reported are estimated roughly from a standard plate and usually a common ferric chloride matrix. These values are to be interpreted as ~~approximate~~ indicating only. Precision is about ± 100% of the amount present.

☐ Qualitative Analysis - Estimate only as follows: F-major: S-minor: T-trace:

☒ Semi-quantitative Analysis - The values reported are visual estimates taken from

Symbols used: P-present; T-Trace; < - less than; > - greater than; bd - not detected;
no analyses made on all other cases.

Explanation of Analysis:

Ag	Ir	Sc					
Al	Fe	Si					
As	K	Sn					
Au	La	Sr					
B	Mg	Ta					
Ba	Mn	Te					
Be	Mo	Th					
Bi	Na	Ti					
Cb	Ni	Tl					
Cd	Os	U					
Co	P	V					
Cr	Pb	W					
Cu	Pd	Zn					
Fe	Pt	Zr					
Ga	Rh						
Ge	Ru						
Hf	Sb						
Hg	Sn						

Ce	Ho	Nd	Tb
Cl	In	Pr	Tm
Dy	La	Sm	Y
Er	Li	Ta	Yb
Eu	Lu	Tb	
Gd	Nb	Tm	

Ba	Ge	Sb	Zr
Be	In	Sc	
Bi	La	Sn	
Cb	Li	Sr	
Ce	Mo	Ta	
Cl	Nb	Te	
Co	Nd	Th	
Cr	Ni	Ti	
Cu	P	Tl	
Dy	Pb	V	
Er	Pd	W	
Eu	Pr	Y	
Ga	Sb	Yb	

GENERAL ANALYSIS | RARE EARTH ANALYSIS | METAL ANALYSIS

(over)

(12-8)

Laboratory No. 7162

ISOTOPE ANALYSIS METHODS LABORATORY
Building 9734 - Telephone 7168, 7298 1954 MAR 30 PM 12:41

Request and Report of Spectrographic Analysis

Submitted by: J J McCown Bldg. No. 9737-4 Phone [redacted] 7996 Date 3-30-54
Charge No. 4405-26-1047
Copy of report to: Cronin Bldg. No. 9213
Sample No. 5240
Composition of sample if known residue in outside storage aqueous waters.
Type of analysis desired: Qualitative ☐, Semi-quantitative ☑, Quantitative ☐
Elements Desired Complete

GENERAL ANALYSIS (values in 0/0)			RARE EARTH ANALYSIS (values in ____)	METAL ANALYSIS (values in ____)
Ag ____	In ____	Sc ____	Y ____	Type SS ____
Al >5	Ir ____	Si 5	La ____	Cr ____
As ____	K ____	Sn <.05	Ce ____	Ni ____
Au ____	Li ____	Sr ____	Pr ____	Fe ____
B ____	Mg 1	Ta ____	Nd ____	Mo ____
Ba .04	Mn .2	Te ____	Sm ____	Cb ____
Be .002	Mo <.05	Th ____	Eu ____	Ta ____
Bi ____	Na 5	Ti <.05	Gd ____	Mn ____
Ca 4	Ni .1	Tl ____	Tb ____	V ____
Cb ____	Os ____	U ____	Dy ____	Cu ____
Cd ____	P ____	V <.02	Ho ____	Al ____
Co <.05	Pb >5	W ____	Er ____	Mg ____
Cr .5	Pd ____	Zn .7	Tm ____	Sn ____
Cu .5	Pt ____	Zr <.1	Yb ____	Pb ____
Fe 1.5	Rb ____		Lu ____	Zn ____
Ga ____	Re ____		Th ____	Bi ____
Ge ____	Rh ____			
Hf ____	Ru ____			
Hg ____	Sb 0			

Explantaion of Analysis:
Symbols used: P-Present; T-Trace; < - less than; > - greater than; nd - not detected; no analyses made in all other cases.

☐ Qualitative Analysis - Estimate only as follows: 1-major; 2-minor; 3-trace.

☑ Semi-Quantitative Analysis - The values reported are visual estimates taken from a standard plate and using a common graphite matrix. These values are to be interpreted as approximations only. Precision is about ± 100% of the amount present.

☐ Quantitative Analysis - The values reported are obtained by visual comparison of the sample with standards similarly prepared. Precision is about ± 50% of the amount present.

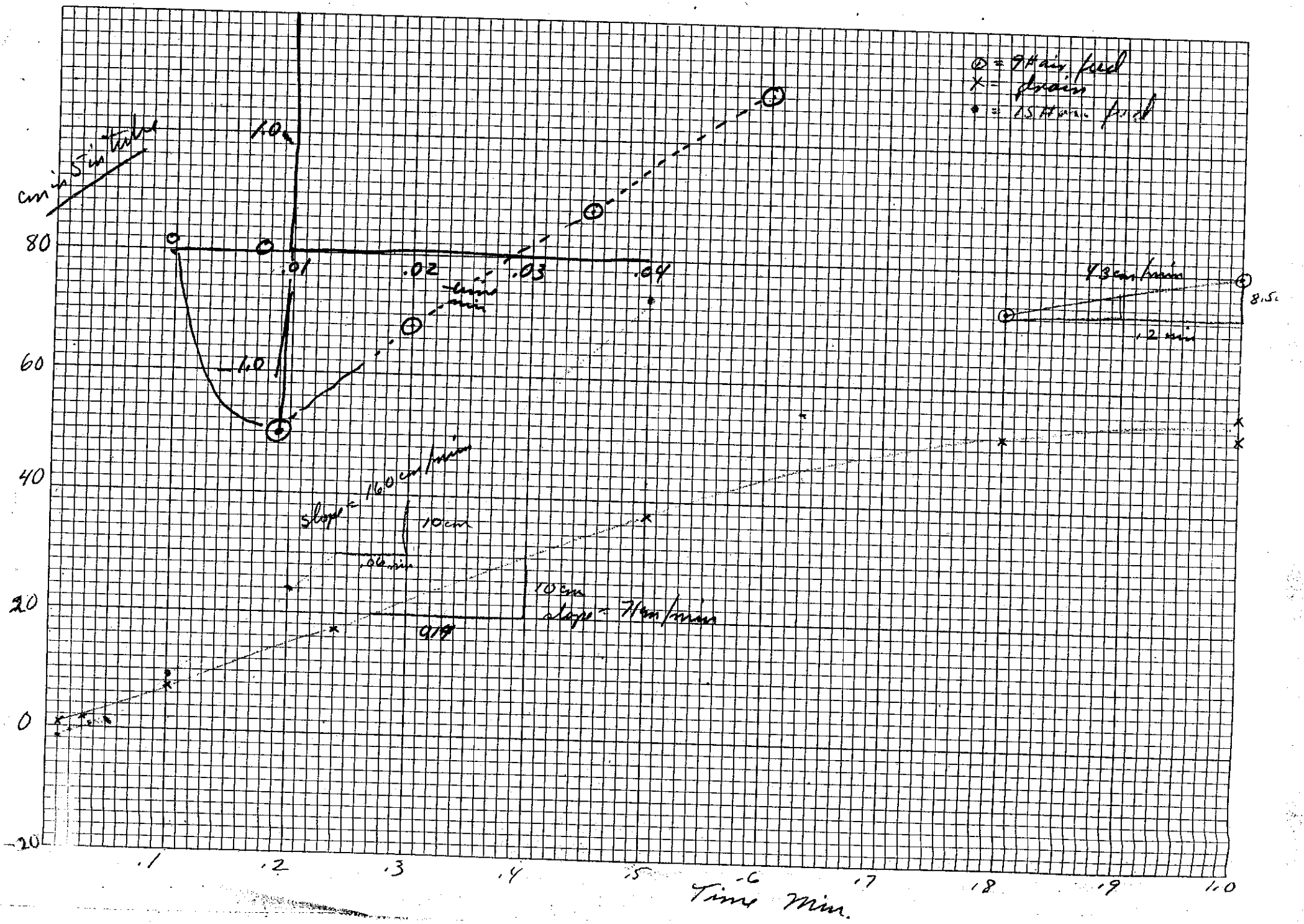
☐ Densitometric Analysis - The values reported are obtained by precise analytical spectrochemical methods. Precision of the method varies but is of the order of ± 10% or better.

1954 MAR 31 AM 8:02

Comment: ____

Analysis performed by MRS Approved by G Morris
Plate No. A1685 Date reported 4-1-54

2073 (8-52)



4, 5, 6, 7, 8, 9, 10 just light S.P.

11 - (53 cm) 47.5 cm above spark P.

12-13-14 - have 104 cm " "

2/16/54 Req #215377 Sample of West Storage Tanks
.000 000 07 gm U/gm

2-54 Tap water run through cation column into Reflector tanks after dumping 0.2 ppm contaminated.

3-17-54 Sample from Reflector tanks – at end of U. E. experiments –
for Uranium analysis – Req. 215382 0.23 ppm U
for other: Lab # (9733) G-5244

REPORT OF ANALYSIS LAB. NO. G5244

Cronin DATE REC'D 3/17/54

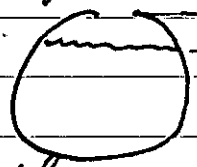
ASSIGNED TO: 8

IDENTIFICATION		mg/liter
Water from storage 3/17/54	Solid at 110°C	79.8
	Solids at 1000°C	40.9
	PH	4.50
	Residue sent to spectrographic Lab for analysis	

STANDARD ERROR AT 99.5 PERCENT CONFIDENCE LEVEL

REPORTED BY E.C.P. DATE 3/31/54

6-3-54 Sample from outside Reflector Storage tank:
Reg # 215389 11:00 Am 50 cm sample 0.33 ppm U
from inside of manhole to water = 4½ ft



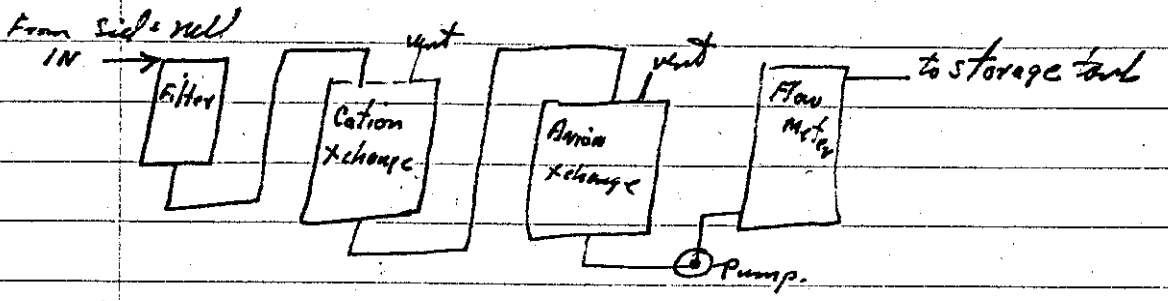
Volume outside approx 10,000 liter water ≅ 3.3 gms U.
suggest a single pass thru resin column.

6-7-54 Resin column Regenerated with acid wash (HNO3 6 N)
Ready for use.

June 17-54 - Anion resin column reactivated and installed
Outside water tank pumped into inside reflector
tanks approx 3500 gals -

3:00 Sight glass = 102 cm
flow rate at 3:00 ≅ 38 gal/hr -

Column hookup:



6-17-54

2^55 PM water ck'd with pH paper = 7.0 no trace of chloride.

Water started flowing between 2^00 PM – 2^30 PM

3^60 PM Sight glass = 100 cm

4^25 S.G = 97.5 cm small Centrifugal pump bypassed for over nite. Flow rate = 10% of 2.7 gal/min.

4^40 PM S.G. 96.5

6-17-54 5^33 PM 94.6

8^11 81.5 Water Sample taken (B-92)

8^15 AM started small pump flow = 25% of 2.7 g/min

9^08 80.0

10^00 78.5

10^50 AM West Lab waste storage tanks full - closed off and Sampled Req # 21553 91 = 0.54 ppm 1000 gal or 2.16 gms U

East tanks opened.

98

6-19-54

12 ^{40}/AM — Sample of effluent from column Reg # 215390 pH = 6.5 less than 0.01 ppm U

1 ^{20}/PM — 73.0 cm on S.G.

2 ^{40} — 70.5

4 ^{35}/PM — 67.0 cm Note Leak from dump line into outside tank (dips only) so pressure on Hills McCanna valve increased from 20 to 28 lbs. Pumps disconnected flow rate now 13% of 2.7 gal/min DK

7 ^{00}/AM — 53 cm Sample taken

6-20-54

8 ^{15}/AM — 33 cm Sample taken

6-21-54

8 ^{10}/AM — 18 cm Sample taken Reg # 215395 C-216 .03 ppm U pH = 2.95

12 ^{25}/PM — 15 cm Anion column had short ~~NaOH~~ NaOH wash — pH zero next run.

1 ^{14} — 14 cm rate = .1 cm/49 min

Tank should empty at 12 ^{45}/PM

2 ^{30} — 12 cm

7 30 AM approx 1 cm water left in tanks & monitor probe beside cation column reads 0.5 mm/hr

8 40 Solutions made up ready for elution

June 23 1 30 PM Finish eluting and Regenerating columns:

Sample	#	Gross	Tare	Net	Reg #
Cation #1 Elute	L-3 p-115	116.5510	31.1382	85.4128	215397 = 72 ppm
Cation #2 Elute	L-2 cation p-81	120.0729	31.2153	88.8576	215398 = 16 ppm
Cation #3 Quadrafol Elute	L-4	U-18	104.3705	22.6419	81.7286	215399 = 1.1 ppm
Cation Regen	F-3	C-15	50 ml sample			354650 = 0.23 ppm
Anion Regen #1	B-92	"	"			354651 = 0.21 ppm
Anion Reg #2	M066	"	"			354652 = 0.24 ppm

Time for cleaning up water from 3 PM 6-17 to 9 AM 6-21-54 = 90 hrs from start of water thru columns To end. Volume = approx 10 000 litres

Elution and Regeneration time on columns 8 ~~hrs~~ hrs - included making up solution and heating of solution & columns. Heating time @ 2 hrs — The 8 hrs includes sample taken

3 10 PM Sample from Reflector Tanks C-102 Reg 354653 water in Sid = 178 cm Null = 20 cm. = 0.19 ppm 10,520 litres 669 litres pH 4.0

6-23-84 Total water = 11189 liters in 90 hrs
90) 11,189 (113.2 liters/hrs.

Spec. Bill Burns - 7171

conts L-3 12,500
1886
Net 10,614 gms × 72 × 10^{-6} = .764 gms

L-4 11980
1867
10113 × 1.1 × 10^{-6} = .011 gms

L-2 13399
1873
11526 × 16 × 10^{-6} .184 gms
0.959

Samples
354654 pH = 4.22
655 pH 3.90

6-24-54 Since Columns evidently loaded up with other cations at first -

10 00 AM Water started flowing at 75% of 2.7 gal/min which is approx 2.01 gal/min = 8-9 liters/min or ~~240~~ 480 L/hr Time = approx 2 hrs needed. pH = 5-6 approx.

11 15 Flow Rate = 0.82 x 2.7 gal/min pH = 6-7

11 30 " " 81%

1 00 PM " " 81% pH = 6.5

1 05 PM Pumps shut off system Valved off to perform soln exp.

6-25-54

8 10 AM Pumps on Valve open - Flow = 75% of 2.7 gal/min

11 00 Pumps off - Inst Screen - Valved off.

11 05 Pumps on valve open pH = 6.5 flow = 78%

6-28-54

Pump started 8:15 AM water going into Well.
Flow = 70% pH = 5-6

Sample at 9:15 AM Sample 354656 pH = 3.4 7.01 ppm Approx 0.9
10:30 AM Pump off - Reg Anion column with 5 Molar NaOH
11:45 A Pump on Flow = 72% pH = 7.0

3:00 PM Well = 150.5 cm = 5,033 liters
Switched to storage tank in Rm 101
Samples 354659 Cation - .05 ppm H pH = 3.2
354660 Anion - .04 ppm H pH = 6.8
5:30 PM Pump shut off.
6/29 - 5:50 AM Started hot plate for Regen.
7:00 AM Started flow - Clear column into bbl - tare = 70 lbs
colors of effluent NH4Ac + HAc only
reddish brown
pale yellow (straw)
6 liters → greenish blue (ferrous ion)
7 liters deeper green
8 liters pale green
8½ almost clear
9 l very pale yellow
10 l almost clear
11 l reddish brown
8:30 AM flow = 75% pH = 7

1. 10:57 AM — Flow 822 pH = 7

4:15 PM — Shut off

6-30-54

7:00 AM — Start up

12:05 PM — Stop – Water = 4½" drop in water tank
approx 200 gallons dumped at 0.19 ppm U

2
8

7-1-54
11:45 AM — Finished Regen. Calumno + tap water
started flow at 1.35 gal/min = 81.0 gal/hr.

Sample of Eluit in 54 gal drum
L-813 604.13
tare 289.087
Net. 315.04 Reg # 354-663 13 ppm

4:15 PM — Shut off — approx 354662 2-0.05 ppm pH = 4.4
Cast Waste Storage 354661 1- .33 ppm

7-2-54 — Start up at 8:15 AM
Shut off at 3:00 PM 11 hrs running time

7-2-54

Contr

Summary of U Recovery from Reflector

	Gross	Tare	Net	Req	U
7-3	14550	1950	12600	351650	0.24
L-3	12510	1886	10624	215397	72 ppm
L-4	11990	1867	10123	215399	1.1
L-2	13400	1873	11527	215398	16 ppm
drum C-2444		70 lbs	3774 lbs	354663	13 ppm (Fine)
	179959	31520	168439 gms		- Total

Avg Ext of U = 0.33 ppm = 11 x 10⁴ cc = 3.63 gms U

Final Water = Req 354662 U = 0.05 ppm pH = 4.4

Spec = as ppm of liquid

Al = ~~<~~ 0.6		Fe = 2.5	
B =	0.035	Li = <0.2	
Be =	<.01	Mg = 0.4	
Ca =	0.9	Mn = <1	
Cd =	0.075	Na = 0.45	
Co =	<.1	Ni = 1.25	
Cr =	0.60	P = <50	
Cu =	0.4	Si = 3.0	
		V = <0.5	

gms U

.003
0.77
.01
0.18
2.19 gms
3.163 gms

dumped into waste tanks 7-3 and 4-4

0.98 gms

7-12-54
Resin Columns regenerated

7-13-54 – Tap water started thru columns at 8:30 AM shut off at 4:05 PM

7-14-54 Started 8:10 AM
East tank approx 1000 gal
at 2:15 started filling West tank.

7-15-54 Shut off columns.

8-3-54 Sample from used reflector water Reg 354666
Lab result = .02 ppm U

9-8-54 Water Sample from Rff. tank Reg 354668
Lab = <.01 ppm U - Total inp metal = 10 ppm

9-16-54 Reg 354670 sample (gal) from 1000 gal West Waste tank
9/21/54 ans = 0.56 ppm ≡ 2.24 gms U letter written to accountability
ready to dump.

[redacted]

Sample [redacted] 554669

151.8822
25.8484
146.0338 } sample
.00458
0.6399 gms

Salvage 9/16

G 3.995,85
Tare 1.472.7405
1523.11
.00438
6.6742 7 gms U

Misc cleanups

10/4/54 Anion + Cation columns regenerated flushed out with deionized water - tubing inspected -

Sample sent to lab from Reflector tank

Reg. 354678 | 102 ppm U at 1/10 rpm

Water pumped into S.d for measuring - Start 11 15 AM

Resampling water -

354679 = 117.3 ppm

Height in Sid = 237.3 cm
9 1/2 ft diam = 59,102.3 cm² Area } 14,000 liters.

Rinsed tank with 2 gal deionized water adding to Sid -

Semabled reflector tank with:

1. Na_2CO_3 container A-1 Sample 7-184
approx. 50 gal Reg 354681
41 ppm

2. H_2SO_4 dilute container B-1
C-1

Sample of B-1 [last week - C-78] Reg 354680
8 ppm

260-6

Reg 354679 = 111.3 ppm

Soil is 9½ ft diameter = 59,102.3 cm² Area

less area of 6" pipe 730

Net A = 58.372

10-6-54
1 30 PM Tank truck Start = 225.5 cm (on sight glass)
Stop = 160.5
65.0 cm
= 3796.180 Liters

10-7-54
9:18 Tank Truck Start 158.7
Stop 94.0
64.7 cm
3776.67 Liters

10-8-54 Tank Truck Start 82.5
Stop 18.2
64.3 cm
3753.32 Liters

4 00 PM Last trip of Truck = 18.2 cm from Soil Pumped with Tap water.

65.0
64.7
64.3
18.2
212.2 cm
× 58372 → Used 58.4
12,386538
× 117.3
1452.9

1062.37
3753.32
3776.67
3796.58
12,388.54

Recovered by column = 147.71 gms U
Orig in tank 13,852 L
Shipped 12386
Chem column = 1466 L
= 147.71 / 1466 = 100.76 ppm U
12386 × 100.76 = 1248 gms U

10-5-54

10 40 AM Still Scrubbing Outside Tank—
started water thru columns into East inside
storage tank Flow rate = 10% of 2.7 gal = 0.432 gal/min
0.~~432~~ 350 gal/min × ~~3.79~~ = 1.35 1.35 ~~1.63~~ L/min
approx ~~98~~ 81 Liters/hr.

1 40 PM Flowrate 1.35 ~~1.66~~ L/min
Radiation = 20 on 2 mr/hr unit at bottom of plastic wool filter
= 10 on 0.2 mr/hr at top of resin (cat) column
none otherwise
Sample taken of effluent—

Shut off at 2 40 PM Sample Req # 354682
and Results — .02 ppm

10-6-54
8:30 AM Started up again.
Pumped West tank into outside tank
dumped West waste storage tanks.

9 45. Sample
10 45 Req # 354683 > .01 ppm U

1 PM Shut off column— SG. = 237.3 / 225.5 cm
Area of Soil = 59,~~345~~ 102.3 cm² / 11.8 cm
- area of 6" pipes (4)
182.6 × 4 = 730
Net Area = ~~58,687~~ 58,372 = ~~6935~~ 689 Liters
× 117.3
approx ~~824~~ gms on column
80.5 gms (corrected)

8½ hrs × 79 = 672 ℓ hr flow rate

1 30 PM Drained into tank: Start = 225.5 cm

58.372 " Stop = 160.5

65 3/4 ".5. 65.0 cm

291860

350432

3796.180 Liters

.117

3 10 Started column

4 10 P Stopped column - Sample Req # 354684

10/1/54

8 30 Started Column -

9 15 Shut off

9 18 Filling tanks Tank - SG = 158.7

9 50 133.3

Rate = 0.784 cm/min

10 47 Shut off 94.0

64.7 cm

11 00 Column restarted.

1 45 Stopped 354685

4 50 after Regenerating both columns turned back on - flow = 1.6 ℓ/min

11 35 PM Pump shut off but gravity flow still thru column —

10-8-54 Sight Glass = 83.6

8 10 AM SG = 83.0 Restarted pump R354686 .21 rpm

8 50 AM SG = 82.5 Stopped pump started filling trucks

10 50 AM SG = 18.2

64.3

4 00 PM Cation column regenerated

Anion column not Regenerated - filter not cleaned —

Total into column = 689 Liters 1st run

+ 68.2

133 1 Liters total

equiv to 156.1 gms U est.

in Containers 1, 2, 3, 4 — Tailings + rinsings into 54 gal drums.

To trucks = 65.0 cm

64.7 cm

64.3

48.2

212.2 cm x 58.4 = 12,392.5 Liters Kilograms

Reg. 354679 117.3

Est. 1453.6 gms U

In tank dry:

13,852

Shipped 12388

1464 2 Liters column? recovered = 147.71 gms = 100.8 ppm U

10-12-54

Sent to lab:

1. Sample from East Storage Tank Reg. 354687.
2. " from Drum B-2 0.14 ppm U.
Sample MO-48, Reg nos. 354688.

10-14-54 Resin columns regenerated + tap water sent them into storage tanks in Rm 101
Flow = 30% of 2.7 g/m = 54 gal/hr.
Regenerate again at 1000 gal-

7-7-55 Resin columns regenerated and washed
Flow started at 4:30 PM 30% of 2.7 gal/min or 54 gal/hr- run for approx 18-20 hrs before shutting down-

4 PM flow cut back to 26% of 2.7 gal/min: 42.1 gal/hr-

9 PM flow 25% of 2.7 gal/min- storage tank temp 26°C

7-8-55

8 AM flow 25% of 2.7 gal/min storage tank temp 25°C
at 8 AM = 607.5 gal water thru column.
Stopped at 3 PM and Anion col. regen + washed

7-11-55 Both columns regenerated
& ohmeter in discharge line -
9 15 AM started flow - 37% of 2.7 g/min into Wint 1000 gal/min tank
Resistance = 5-6 x 10^5 Ω using simpson meter
9 30 " 2 x 10^6 Ω
10 30 " 2 x 10^6
12 30 PM " 2 x 10^6
3 00 PM " 1 x 10^6 flow now cut back to
28% of 2.7 gal/min
4 00 Shut off Resistance still 1 x 10^6 Ω
7-12-55
9 00 AM Started flow again - R still 10^6 Ω
11 00 AM R = still 10^6 Ω
12 00 AM R " " "
4 30 PM R still 10^6 Ω
7-13-55
8 00 AM Flow started R = 10^6
9 30 AM automatic shut off installed -
11 00 AM R still 10^6 Ω
4 30 PM Shut off & Regen -
5 00 PM Started at 30% of full flow -
8 00 PM 35% flow - R = 8 x 10^5 Ω

Req. nos.	Batch nos.	Results
5-62819	677-1	7.9 pH 100 micromhos Conductivity
5-62820	677-2	7.7 pH 102 micromhos Conductivity

SPECIAL SAMPLES LAB.
BUILDING 9215

REPORT OF ANALYSIS LAB. NO. G4128

Cronin DATE REC'D

ASSIGNED TO: 8

IDENTIFICATION	mg/ppm
Storage H_2O #1	7.2

Corrected Report

Reported as 11 the first time

STANDARD ERROR AT 95 PER CENT CONFIDENCE LEVEL

REPORTED BY EC DATE 1/13/58

	562819		562820
Al	1.5		1.7
B	.02		
Be	<.001		
Ca	8.5	—	10
Cd	.1		
Co	<.1		
Cr	<.2	~	
Cu	<.1		
Se	<1		
Li	<.02		
Mg	8	—	8.5
Mn	<.1		
Na	4	—	4
Si	1	—	
Fe	<1		<1

REPORT OF ANALYSIS LAB. NO. F4146

Cronin DATE REC'D 1-13-58

ASSIGNED [redacted] 103°C

IDENTIFICATION				
		[redacted]		
		Same		
De-Ionized H_2O	Ca	<1		
	Mg	<1		
	Na	<0.05		
	Fe	<0.03		
	Al	<0.06		
	pH	6.80		
	Conductivity		4.25×10^{-6}	at 25°
	~~micro mhos~~			
	Sent sample to Spec			

STANDARD ERROR AT 99.5 PERCENT CONFIDENCE LEVEL

REPORTED BY ECS DATE 1/16/58

~~9.9087~~
9.9087
9.8928
0.0109
.0100
0.09 wt reside 100 mg sample Crucible C19

SPECTROSCOPY RESEARCH LABORATORY
BUILDING 9734 - TELEPHONE 7168, 7-8213

Laboratory No. 12897

1958 JAN 17 PM 1:15

REQUEST AND REPORT OF SPECTROGRAPHIC ANALYSIS

1958 JAN 15 AM 10:43

Submitted by: C E Lyon Bldg. No. _____ Phone _____ Date _____
Charge No. 4410-28
Copy of report to: D.F. Cronin Bldg. No. _____
Sample No. G-4146 Cerium metal Crucible submitted 1/13/58
Composition of sample if known _____
Type of analysis desired: Qualitative ☐, Semi-quantitative ☐, Quantitative ☐, Photoelectric ☐
Elements Desired _____

GENERAL ANALYSIS
(values in ppm/originalsample)

Ag		In		Sc			
Al		Ir		Si	.05		
As		K	.001	Sn			
Au		Li		Sr			
B		Mg	.003	Ta			
Ba		Mn		Te			
Be		Mo		Th			
Bi		Na	.005	Ti			
Ca	.003	Ni		Tl			
Cb		Os		U			
Cd		P		V			
Co		Pb		W			
Cr		Pd		Zn			
Cs		Pt		Zr			
Cu	<.005T	Rb					
Fe	<.002T	Re					
Ga		Rh					
Ge		Ru					
Hf		Sb					
Hg							

RARE EARTH ANALYSIS
(values in _____)

Sc	
Y	
La	
Ce	
Pr	
Nd	
Sm	
Eu	
Gd	
Tb	
Dy	
Ho	
Er	
Tm	
Yb	
Lu	
Th	

METAL ANALYSIS
(values in _____)

Type alloy	
Cr	
Ni	
Fe	
Mo	
Co	
Cb	
Ta	
Mn	
V	
Ti	
Cu	
Al	
Mg	
Sn	
Pb	
Zn	
Bi	
Si	

Explanation of Analysis:
Symbols Used: P - Present; T - Trace; < - less than; > - greater than; nd - not detected; no analyses made in all other cases.

☐ Qualitative Analysis - Estimate only as follows: M - major; m - minor; t - trace.

☑ Semi-Quantitative Analysis - The values reported are visual estimates taken from a standard plate and using a common graphite matrix. These values are to be interpreted as approximations only. Actual value should be within the range times 1/2 to times 2.

☐ Quantitative Analysis - The values reported are obtained by visual comparison of the sample with standards similarly prepared. Precision is about ± 50% of the amount present.

☐ Densitometric Analysis - The values reported are obtained by precise analytical spectrochemical methods. Precision of the method varies but is of the order of ± 10% or better.

☐ Photoelectric Analysis - Rapid electronic method. Precision _____ %.

Comment: 10 ppm? total solids

Analysis performed by JDM Approved by J.A. Norris

Plate No. 2774 Date reported 1/17/58

WCX-2073 (12-56)

DF Gonin
9213

proposed property

proposed

Crucible #20 0.0176 graphite solid 100 ml Sample
~~10.1113~~ 0.0100 graphite
10.0936 0.0076 ~~graphite~~ solid
0.0176

Laboratory No. 12896

SPECTROSCOPY RESEARCH LABORATORY
BUILDING 9734 - TELEPHONE 7168, 7-8213 1958 JAN 15 AM 10:42

REQUEST AND REPORT OF SPECTROGRAPHIC ANALYSIS

Submitted by: E. C Lyon Bldg. No. 9733-4 Phone _____ Date 1/15/58
Charge No. 4410-28
Copy of report to: D. F. Cronin Jr. Bldg. No. 9213
Sample No. G 4144 (De-ionized water B submitted 4/8/58 1958 JAN 17 PM 1:15
Composition of sample if known Solid on 100 ml de-ionized water
Type of analysis desired: Qualitative ☐, Semi-quantitative ☐, Quantitative ☐, Photoelectric ☐
Elements Desired _____

GENERAL ANALYSIS (values in ppm/orig sample)						RARE EARTH ANALYSIS (values in _____)		METAL ANALYSIS (values in _____)	
Ag	_____	In	_____	Sc	_____	Sc	_____	Type alloy	_____
Al	1.5	Ir	_____	Si	.4	Y	_____	Cr	_____
As	_____	K	.4	Sn	.08	La	_____	Ni	_____
Au	_____	Li	.05	Sr	_____	Ce	_____	Fe	_____
B	.015	Mg	>4	Ta	_____	Pr	_____	Mo	_____
Ba	.015	Mn	.015	Te	_____	Nd	_____	Co	_____
Be	_____	Mo	_____	Th	_____	Sm	_____	Cb	_____
Bi	_____	Na	1.5	Ti	_____	Eu	_____	Ta	_____
Ca	4	Ni	_____	Tl	_____	Gd	_____	Mn	_____
Cb	_____	Os	_____	U	_____	Tb	_____	V	_____
Cd	_____	P	_____	V	_____	Dy	_____	Ti	_____
Co	_____	Pb	.08	W	_____	Ho	_____	Cu	_____
Cr	_____	Pd	_____	Zn	_____	Er	_____	Al	_____
Cs	_____	Pt	_____	Zr	_____	Tm	_____	Mg	_____
Cu	.04	Rb	_____		_____	Yb	_____	Sn	_____
Fe	.4	Re	_____		_____	Lu	_____	Pb	_____
Ga	_____	Rh	_____		_____	Th	_____	Zn	_____
Ge	_____	Ru	_____		_____		_____	Bi	_____
Hf	_____	Sb	_____		_____		_____	Si	_____
Hg	_____		_____		_____		_____		_____

Explanation of Analysis:
Symbols Used: P - Present; T - Trace; < - less than; > - greater than; nd - not detected; no analyses made in all other cases.

☐ Qualitative Analysis - Estimate only as follows: M - major; m - minor; t - trace.

☑ Semi-Quantitative Analysis - The values reported are visual estimates taken from a standard plate and using a common graphite matrix. These values are to be interpreted as approximations only. Actual value should be within the range times 1/2 to times 2.

☐ Quantitative Analysis - The values reported are obtained by visual comparison of the sample with standards similarly prepared. Precision is about ± 50% of the amount present.

☐ Densitometric Analysis - The values reported are obtained by precise analytical spectrochemical methods. Precision of the method varies but is of the order of ± 10% or better.

☐ Photoelectric Analysis - Rapid electronic method. Precision _____ %.

Comment: 76 ppm solids

Analysis performed by JM Approved by J A Norris

Plate No. 2774 Date reported 1/17/58

WCX-2073 (12-56)

Req. No. 562820

N.C.		PYRO		AVG.
Be		Be	<.001	
Ni		Ni	<.1	
Sn		--	--	
Si		Si	1.5	
Li		Li	<.02	
P		P		
Na		Na	4	
Mo		--	--	
Mn		Mn	<.1	
Mg		Mg	8.5	
K		--	--	
Fe		Fe	<1	
Cu		Cu	<.1	
Cr		Cr	<.4	
Ca		Ca	10.0	
Ba		--	--	
B		B	.02	
Al		Al	1.7	
Ag		--	--	
		Cd	.05	
		Co	<.1	
		V	<.1	
		Hg		
		In		
		C		
		F		

Non-U
Deionized
Water

5234
363

Spectrographic Report
All results in ppm.

677-2 — 562820

BATCH NUMBER — REQUISITION NUMBER

JAN 1950

REPORT TO: Cronin

BUILDING NO. 9213 PHONE:

DESCRIPTION OF MATERIAL:

De-Ionized Water

ASSAY REQUESTED AT ☐ DT ☐ — AT CODE NO.

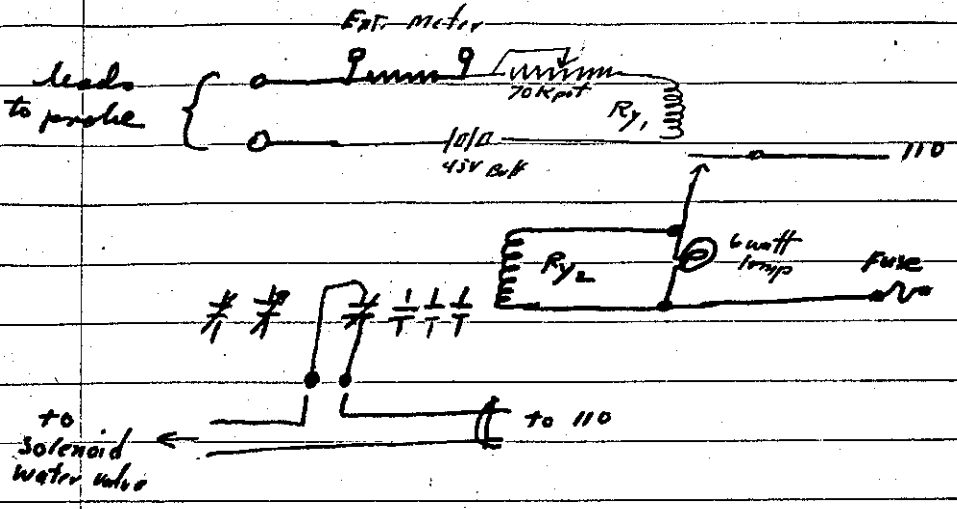
ANALYSIS REQUESTED	REPORTED ANSWERS
GRAM U /GRAM	.13 ppm
Pyro-Spec.	
Conductivity	

SIGNED: BY: Md

JAN 20 1950

DATE

Automatic Shutoff:



Shutoff set to cut valve off at 90,000 Ω

8 AM — Still running $R = 8 \times 10^5$ Ω
Filled 54 gal Drum with water
Both storage tanks almost full
and leaking (a little) at flanges-

12:30 PM — Shut off $R = 9 \times 10^4$ Ω

8/15/55 — Columns regenerated & ready for use - just plug in 110V lamp cords

8-15-55 — Water Sample Reg # 354715
.06 ppm U also spec resp = > 50 ppm total.

9-06-55 — Water Sample Reg 354717 ~~8~~ 84 ppm dried 29 ppm at 500°C
East .01 ppm U

9-20-55 — ~~total~~ waste storage tank
Reg 354718 < .05 ppm
See next page for spec

BATCH NUMBER	REQUISITION NUMBER
	354715

REPORT TO: D. F Cronin

BUILDING NO. 9213

DESCRIPTION OF MATERIAL:

Contam Water

IF NOT TO BE COMPOSITED CHECK HERE.....

ASSAY REQUESTED AT ☐ DT ☐ AT CODE NO.

ANALYSIS REQUESTED	REPORTED ANSWERS
GRAM/GRAM T	
Fluoro-	.000 000 06
spec.	

SIGNED:

BY: DATE Feb 16 1955

ANALYTICAL REPORT 04597

Report to: Chem Lab

Requisition Number 357715

Material Type 1900 Contaminated H_2O Batch Number (Cronin 9213)

.06 ppm U Spec

Answers are in: (circle) (PPM) Percent Other

Ag.	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hg	In	K	Li	Mg
	.02			.002		.0001		5	.8	<.01	<.02		<.01	2						.05	3

n	Mo	Na	Ni	P	Pb	Pd	Rb	Sb	Si	Sn	Sr	Ti	Tl	V	Zn						
01		~10	<.01	<5					4					<1							

																	C	U	Zr	Hf	RE

Remarks:

By AS Date 8-15-55

LAB-68

ANALYTICAL REPORT

Report to: _____ Requisition Number 354 717

Material Type 700 Batch Number _____

Answers are in: (circle) (PPM) of orig sample Percent Other _____

Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hg	In	K	Li	Mg
	.1			.02		<.0005		~25	2	<.05	<.1		.1	<.5						.15	4

Mn	Mo	Na	Ni	P	Pb	Pd	Rb	Sb	Si	Sn	Sr	Ti	Tl	V	Zn
<.05		~3	<.05	<2.5					2.5					<.05	

Solids 105°C	Solids Ignited	C	U	Zr	Hf	RE
84 ppm	29 ppm.					

Remarks:

LAB-68

By as aw Date 9-19-55

9-21-55 Water pumped into Sid - 197 cm tall
to be drained thru glass wool filter to
waste - Analysis per Req 354717

9-23-55 - De-ionized water from 101 storage pumped
into outside tank. 42.6 g/hr
1 25 PM started columns - ~~Dowex~~ 0.71 gal/min = 127.8 gal
4 45 PM cut back to 0.35 gal/min auto cutoff in around.
9-24-55 Shutoff 3 45 PM 490
127.8
total 617.8 gal
9-26-55
9 00 AM Started flow at 31% = 50 gal/hr

10-14-55 Suspected Contamination
3 00 PM Req 354719

4 30 PM By phone 0.91 ppm

11 00 PM Water in Sid 176 ± cm looks very murky.
Flow thru column = 0.12 × 2.7 = 0.3.24 gal/min
79.4 gal/hr.
10-15-55 system re-checked flow = 19 gal/hr looks OK
11 00 AM
6 25 PM 147.5 cm in Sid same flowrate
29 cm 16 92.28.8 litres = approx 400 gal -

10-16-57

6¹⁵ PM — Scale = 115.5

10-17 8⁰⁵ AM — " 99.5

Wipe in outside reflector tank is 3500 – 4000 dyn

10¹⁵ AM — Scrubbed outside tanks with broom + Dutch Cleanser rinsed with tap water – wipe –

16¹⁵ — 97.0 cm = 2.5 cm/2 hr 10 min 1.13 ℓ/min

176.5

1⁵⁹ PM — ~~93.5~~

83.0 cm × 59.103 4905.5 ℓtrs

1³⁰ PM Transferring cleaned water to outside reflector tank.

Samples taken:

Electrode – # P-55 — Purified water

G = 78.1774 — 50 cm

T = 26.2847

N = 51.8927 gmo

Req: 354723 — Req: 354724

Ly phone 1,166 ppm — Ly phone 0.01 ppm

.001166 gm/gm

.05 gms in samples

Recovered: G = 8.70

T .91

N = 7.790 Kg = 9.08 gmo H

Regenerated + made up approx 2000 gals more.

11-15-55 Regenerated columns and started pumping water -

11-17-55 Reactor Cyl in Sid regenerated

Sample on outside reflector tank = 354730

9 45 AM for mask floor outside — less than .01 ppm

10 20 area roped off & contamination located.

1 50 PM Another Sample after Wiping 354731

Wipe also on dump valve plumbing (Nell)

> 20,000 c/m - looks nasty - probably older than this spill. by phone - 199 ppm

4 30 PM New Sample - 354733 by phone 165 ppm

11-18-55

1 34 PM Columns regenerated + ready to use

11-27-55 West Salvage storage tanks

Req: 354735 = 0.66 ppm U approx 2.5 gm T.

11-29-55 Rinsed Actual Reflector tanks and Sid underdrain plumbing with Versene plus cutting agent 2 50 gal drums full - ① = M0105 Req 354738-7

② M0129 " 354738-8

354737 - 15 ppm

354738 - 17 ppm

12-5-55 Water started into Sid's storage tank

Sample from Nells tank Reg 354739
>.01 ppm Cl

12-14-55 Approx 2500 gal water in Reflectors Columns Regenerated
West storage tanks doesn't drain properly.

12-30-55 Water contaminated Vol = 10 000 ± approx
Reg 354743 0.17 ppm

Resample Reg 354744 0.77 ppm
after mixing

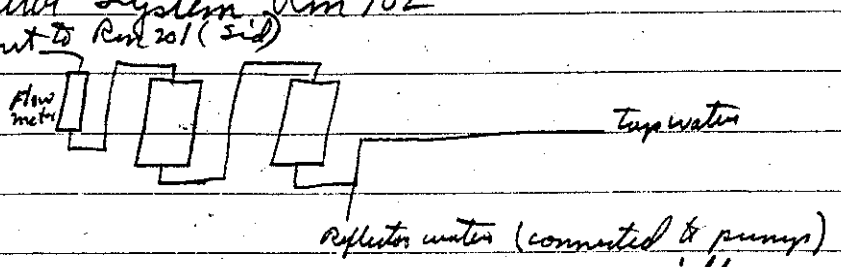
~~6 40 PM~~
6 40 PM Flow started 1 gal p min
If no interruption should finish between 10 AM
and 1 PM Sunday allowing for error in
measuring

7 00 PM Shut off leaky dump valve (wooden wedge falls in -

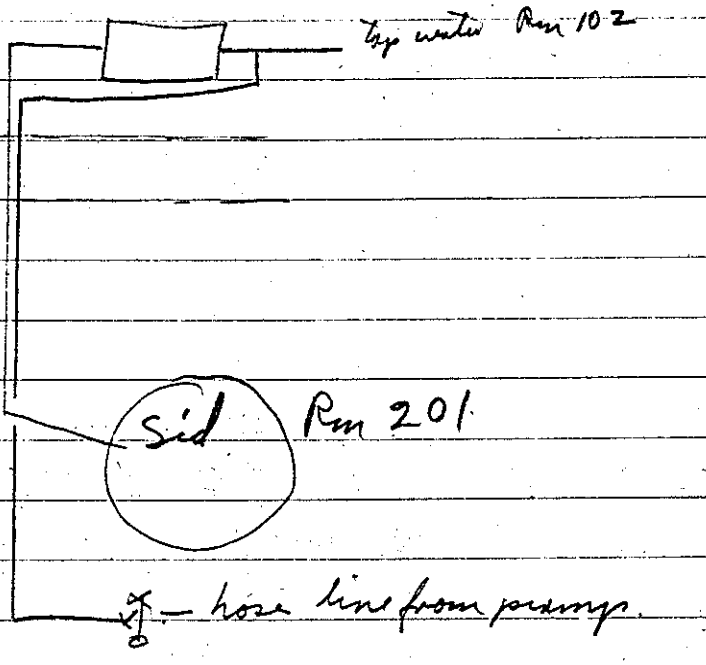
7 15 PM Flow started 6 liters/min -

(cont on page 122)

New filter System Rm 102



Capacity about 4 times that of smaller filter and direct connection with pipe to reflector water system.



Initial Sampled after overflow from slab - Reg 354743 - 0.17 ppm U
354744 - 0.77 "

Cleaning started 12-30-55 7:15 PM

Sid = 59.1 liters per cm of height.

Avg flow - approx 6 l/min.

12-31-55

1:20 AM 31 cm on Sight glass slight leak in hose connection on discharge from cation column - stopped when clamp tightened

1832.3 Liters = 3188 l/hr 1.9 gal/min (5.31 l/min)

DHC

12-31-55 Water depth in outside reflector tank is 48".

9:20 AM direct sight glass reading 20 cm J.T.

2:15 P (N-S) Sight glass 40.3 cm (40.3 - 20 = 20.3 cm

$\frac{20.3 \times 59.1}{5 \times 60}$ = 4 l/min since JTT)

Water depth in outside tank ~ 114 cm = 45"

Measured flow rate 1 l in 0.3 min = 3.3 l/min.

Dumped ~500 l through 4" line to flushpit

3:05 N-S Sight glass = 33.3 cm

~~Increased flow~~ to Unable to increase flow by adjusting valves at 201 Core bib and at pump discharge.

4:15 N-S Sight glass = 37.3 cm (3:05 to 4:15 = 3.4 l/min.)

5:15 N-S Sight glass 40.8; Side Sight glass 91.8;

Water depth in outside tank ~118 cm

Flow rate measured = 3.2 l/min

5:40 P Sample Reg 354745 less than 0.01 ppm

12/31/55

9:15 PM SG = 103 cm
- 91.8
11.2 cm ½ hr = 59.1 / 2.8 m hr,
47.28 / 11.8 = 165.9 ℓ/hr
165.9 ℓ/hr
207.66 ℓ/min

Input filter (glass wool) quite evidently stopped up -
called Irwin + spoke to Connie out Sam
tried & call Jalna - no ans. -

1/1/56

8:40A Inside.
Water height (Side scale) 128.5 cm.
(128.5 - 103) 59.1 / 11.5 × 60 = 2.2 ℓ/min.

Water height - outside tank. 102 cm = 40"
Flow rate: 1.6 ℓ/min
Told Fox not to come out today; call him tonight -

2:45 PM 38" in tank 137 cm on SG
Flow appears 3 ℓ/min after backwashing filter
4:00 PM refilled filter - flow rate @ 4 ℓ/min

5:30P 145 cm on Sight Glass - = 8538 ℓ = 2150 gal -
Flow - ~ 4 ℓ/min
Estimated outside tank water depth = 36"
" vol = 1900 gal
time required = 4 × 1900 / 4 × 60 = 30 + hrs -

dl

1/1/52

11:60 PM Sight glass reads ~~177~~ 178 cm. zero correction must be made.

Flow rate ~ 4 liters per minute.

no significant leaks.

Previous S.G. reading 145 cm.

difference

33 cm, at ~ 59 liters cm

this is 1950 liters.

time difference 5 hr. 30 min. = 330 min.

or an indicated flow rate of

5.9 liters/min.

note: error found in above

Sight glass reading 168 cm.

Water Processed = 1360 liters

$\frac{1360}{330}$ = 4.1 liter/min. RL

1/2/52

8:30A Sight glass - 201.2 cm.

Flow rate 3.2 ℓ/min

Ave " " = $\frac{(201-164)59}{9.5 \times 60}$ = 3.4 ℓ/min -

Outside tank water depth = 64 cm = 25.2" (225 cm from top of tank to H_2O).

≡ ~ 1200 gal to go -

59.1 x 201 = 11900 ℓ ≡ 3130 gal already processed.

time (at present rate) = $\frac{1200 \times 231 \times 16^4}{10^3 \times 3.2 \times 60}$ = 23 ? hrs -

1200 gal = 4500 ℓ ≡ $\frac{4500}{59}$ = 77 cm = 45 in Ld.

U content of water before processing: 1200 + 3130 = 4300 gal -

≡ 11900 + 4500 = 16400 ℓ

$16.4 \times 10^3 \times 10^3 \times 8 \times 10^{-7}$ = 12.8 gm U. ≡ 28cc Uranium

DC

10:20A Sight glass 207 cm ; flow 3 ℓ/min

11:40A Sight Glass - 211.4 cm, flow 3 ℓ/min

Sampled discharge from columns - Rg 314746 - 0.03 ppm.

DC

2:16P Stopped flow - Sight glass - 219 cm.

3 30 PM Began regeneration of columns.

using HNO_3 alone on cation & NaOH on anion

5 30 PM Flow returned 5 liters per min.

1/4/56 6P — Sight glass 22 1/2 cm
Flow 5 L/min —

10.45P — Sight glass 24.5 cm
Flow 4.8 L/min

Outside tank - Top to water 253 cm = 8.3 ft.
9.5 - 8.3 = 1.2' = 14.4"
36 x 13.5 = 485 gal & so

245 x 59.1 = 14500 L ≡ 3820 gal
4300 - 3820 = 480 gal & so. (≐ 1820 L).
at present rate - twice regular = $\frac{1820}{4.8}$ = 380 min. = 6.3 hr.

To do in 8 hrs - $\frac{1820}{8 \times 60}$ = 3.8 L/min ≡ 1L in 0.26 min -

11:20P — Sight glass 247.5 cm
Set flow at 2.8 L/min.

1/5/56 6:55A — Flow 2.5 L/min
Sight glass ~ 269 cm
Increase flow to 4 L/min
7:10A — Water depth outside tank, 19 cm ≡ 7.5' ≈ 200 gal = 750 L
9 ov AM — Stopped to clean out influent storage tanks

1-8-54 Samples

Req 354 755 Reflector water
0.15 ppm

Req 354 756 Recovery Bottle #2 (100 ml sample)
26 ppm

Req 354 757 Recovery Bottle #3 (100 ml sample)
2 ppm

1-18-56 Columns regenerated (acetate + HNO_3)

Sample of column eluteant Req #354-761
50 ml for ppm U 96.5 ppm U

Sample of Reflector Storage Req 354760
(4 liters + 50 ml) for Spec and U 0.241 ppm U

1-19-56 Resample 50 ml 354762
on Reflector water 0.23 ppm

2-7-56 Req 354763 - Sample of reflector water 0.27 ppm

2-15-56 New Columns leached + placed ready for operation.

2-17-56 Req 354764 sample of East Waste Storage tanks 14 ppm

2-20-56 " 354765 " " west " " " 0.19 ppm

2-20-56 Columns started cleaning water for Well at 4 10 gpm
flow rate 1 gal per min.

~~354766~~

See Hepts Page
for anal. / Req # 5

354765 Liquid 0.19 ppm } 2 liter
Sample net wgt 2044 gms Solids total 540 μ gms
Liquid = 588 μ gm 728 μ gm / 2044

354766 Liquid 0.20 ppm } 4 liter
sample net wgt 4,215 Solids 1900 μ gms
Liquid = 843 μ gm

354765 $\frac{728 \times 10^{-6}\ \text{gm}}{2044\ \text{gm}}$ = 0.357 ppm

354766 = $\frac{2143 \times 10^{-6}}{4215}$ = 0.65 ppm

2/21/56 Both tanks dumped.

2/28/56 Req 354769 East tanks full 4 liter sample .103 ppm.

3-6-56 Req 354770 West tanks full 4 liter sample 5 ppm

3-7-56 3 PM Started Outside Reflector tanks thru columns —
3-10-56 7:30 PM Shut off — cleaned water = 230.2 cm high on dial
8:30 PM Rinsed outside water tanks with hose (after draining — Shut off heaters to tanks —

3-14-56 East tank full Reg 354793 = 0.26ppm
Resampled west tank Reg 354792 0.08ppm
Pumped West tank

3-20-56 West tank full Reg 354794 0.05ppm

4-2-56 Regenerated columns - 1st 10 liters required to flush out water - regeneration seemed complete after 30 more liters - Required 62 liters to wash out regenerant with de-mineralized water.
Cation sample Reg 354802 97.2ppm
Time: Cation = 4½ hrs } with two pumps.
Anion = 6 hrs } may be done simultaneously.

4-4-56 East tank full Reg 354803 - 0.35 ppm
4-4-56 West tank drained by 3PM.
4-5-56 West tank full 8AM Reg 354804
0.11 ppm
4-7-56 East tank full Reg 354805
~~0.1~~ 1.4ppm

4-16-56 West tank full Reg 354806
7.01 ppm
4-17-56 East tank full Reg 354808
0.2 ppm (by phone)

5-24-56 West Waste tank full 2 liter Reg 354809
0.15 ppm U

6-1-56 East Waste tank full 4 liter Sample
Reg # 354811
0.17 ppm

6-19-56 West Waste tank 4 Liter Sample Reg 354815
4×10^{c} .26 ppm.
$\frac{.26 \times 10^{-6}}{1.04}$ ²

6-29-56 West Waste tank Drained — Cross

6-29-56 East Waste tank full 4 liter Sample
East tank Drained 7-11-56 Reg 354825 0.10 ppm

7-10-56 West Waste tank full Reg 354826
West tank Drained 7-11-54 0.23

8-6-56 East Waste tank Full 4 liter Sample
Reg # 354828

~~8/10/56 East Tank Full 4 liter sample~~
~~Reg # 354828~~
East tank Drained 8-10-56 0.81 ppm

Duplicate

8-28-56 West Waste tank full 4 liter sample
.06ppm Reg # 354816
West tank Drained 9-13-56

9-13-56 East waste tank Full 2 liter Sample
sml = 0.30ppm U Reg # 354818
East tank Drained 9-24-56

10-8-56 West waste tank full 4 liter sample
Reg # 354829
.06ppm U
West tank Drained 10-19-56

10-24-56 East Waste tank full 4 liter Sample
Reg # 354820
0.21ppm
East tank Drained 11-7-56

11-23-56 Reflector water outside tank Reg 354822 0.20ppm (phone)

11-26-56 Reflector water dumped - (10,000 liters approx) rinsed with tap water (rinsing grits milky (Al_2O_3?)]
Column started 9AM at 1.56 gal/min
some water leaks in column seals - tightened.
if rate continues = 2,250 gal by 9AM 11-27-56 -
conductivity cell checks OK - limit output water stirrer (magnetic?)

11.28.56 Column Stopped 4 $\frac{30}{PM}$ = 55½ hrs = 5000 gal.

11-27-56 West Waste tank full 4 liter SAMPLE
1.3 ppm U Req # 35H823
approx 5.2 gm U dumped—

~~12-2-56~~ ~~12-3-56~~ west tank Drained 12-6-56
Column Regenerated
12-3-56 UO_2F_2 soln HF H300 thru column
— at approx 20 liters effluent is pale yellow —
continued until same color as input.

12-4-56 Column eluted 4M HF
approx 4 L of > 1.32 Sp Gr. remainder to storage for analysis. Elution stopped when effluent was colorless - approx 25 L.
UO_2F_2 soln started in without washing column - all effluent pale yellow—

12-5-56 - Column eluted — approx 3.5 L of material from 1.18 & 1.28 Sp Gr — returned to makeup —

Column regenerated 4M HF (total 50 liters)
washed H_2O until acid free
Column saturated with HF 300 approx 25 liters

Waste sampled—

Effluent < 0.1 M HF by phos

~ #1	Reg 354824	.133 N	.05018 gm U/gm	d = 1.03
~ #2	354830	.131 N	.02345 gm U/gm	
#3	354831	.341 N HF	.004916 gm U/gm	
#4	354832	.536	.002725 gm U/gm	
#5	354833	.191	.001769 gm U/gm	

Regenerant > 2 M HF conc. 3.6 f

~ #6	354834	3.9 N HF	.01402 gm U/gm	
7	354835	.017	.000019 gm U/gm	
8	354836	2.07	.000047 gm U/gm	
9	354837	4.03	.000895 gm U/gm	

3rd elution =

vol in	Sp Gr	Vol	Sp Gr.
500	1.120	7000	1.26
1000	1.120	7500	1.14
1500	1.120	8000	1.06
2000	1.120		
2500	1.120		
3000	1.120		
3500	1.180		
4000	1.240		
4500	1.280		
5000	1.326		
5500	1.34		
6000	1.34		
6500	1.33		

retained

2 ℓ

6-56
12-~~56~~ Column regenerated & washed

Reg 354839 .57N free HF
.2173 gH/gm 1.338 gm/cc

354840	.11 ppm	column washings — discarded after analysis.
41	.12	
42	.85	
43	.26	
44	.07	
45	.10	
46	void	
47	.02	
48	.01	
49	.02	

HF sol passed thru anion col — eluted with 0.2 N HNO_3 — dil to .05 N & adsorbed on cation col yyy — 354850 2.3 ppm (to hold tank.)

Reg 354850 .000 0023
354851 .000133

1-21-57 East Waste tank full 1 liter sample
Reg # 35-4852

2-6-57 East Waste tank Drained cc .20ppm

2-7-57 Reg 354853 #2 drum (wash out) 126 ppm
Est. 25.75 gms X

Reg 354854 #5 drum 717 ppm
Est 146.55 gms X

1 drum open sewage > 100 gm est.

3-26-57 1 qt Sample of Reflector H2O taken from Reflector H2O storage tank (outside) Reg # 35-4858
108 ppm

4-2-57

Cation columns loaded with ~600 gms 25 water washed – eluted with HF – followed by 6N HNO_3 wash & then water wash until acid free.

9 50 PM Sample A (1st yellow liquid Sp Gr. 1.12 – 1.15) Sp Gr = 1.1214

1 – Req. 354863 – 25 ml sample .089427 gm/gm HF = .02266.

1 = Req 354864 – 100 ml sample very dilute U-HF sol .002209

2 " 354865 – " " " " " .000710

3 " 35486 6 " " " " HNO_3 sol .000047

4 " 354867 " " " " " " .000038

5 " 354868 " " " " water wash .000004

6 – no sample taken

Sample A to be analyzed for: U – HF – + Spectro imp.

4 00 PM stopped approx 6½ hrs to clean & regenerate columns Anion columns left as HNO_3 form – to be converted to OH^- form just before using.

Irradiation # 354863

Batch A

Sp. G. 1.1214 @ 24.0°C

% U .089827

HF blue out

Req. No. 354863

N.C.		PYRO		AVG.
Be		Be	.4	
Ni		Ni	2	
Sn		--	--	
Si		Si	<10	
Li		Li	1	
P		P	150	
Na		Na	125	
Mo		--	--	
Mn		Mn	<1	
Mg		Mg	60	
K		--	--	
Fe		Fe	1000	
Cu		Cu	2	
Cr		Cr	10	
Ca		Ca	50	
Ba		--	--	
B		B	8	
Al		Al	50	
Ag		--	--	
		Cd	.3	
		Co	<1	
		V	<1	
		Hg		
		In		
		C		
		F		

P.S. 32417
1900
UO_2F_2
Comp.
Spec
pyro

Spectrographic Report
All results in ppm.

Req. No. 354879

N.C.		PYRO		AVG.
Be	<.3	Be		
Ni	<25	Ni		
Sn	80	--	--	
Si	<10	Si		
Li	15	Li		
P	200	P		
Na	275	Na		
Mo		--	--	
Mn	<5	Mn		
Mg	15	Mg		
K	<50	--	--	
Fe	725	Fe		
Cu	3	Cu		
Cr	<6	Cr		
Ca	<50	Ca		
Ba	<10	--	--	
B	<1	B		
Al	13	Al		
Ag	<1	--	--	
		Cd		
		Co		
		V		
		Hg		
		In		
		C		
		F		

1937
Water sol'n
UO_2F_2
45
0.5 5.7 16

MAY 27 1957

Spectrographic Report
All results in ppm.

5-21-57 Sample

A = 354878 20 gm .00131 3 gm/gm

13 = 354879 22 gm .089349 gm/gm

5-27-57 West Waste tank full 1st sample

Reg # 354880

2.4 ppm U

5-30-57 Est average

1 = ~~33.1~~ 33.1 gm (15 L)

2 = 15.62 (22 L)

3 = 0.94 20 L

4 = 0.95 25 L

5 = 0.10 25 L

6 = 20 L

7 4.75 25

A 10.50 9.90 Kg Gross

1.9

8.00 net Kg

13 596.85 8.58 Kg Gross

1.9

6.68 Kg Net

625.77 gm

shipped

5/30-5-7

10-17-57

Rq 35Y 895

Sample of Reflector water from Sid for ppm U + Spec

0.22 ppm U

Spec

Be	.004	Co	<.1
Ni	<.1	V	<.1
Si	<1		
Li	<.02		
P	<10		
Na	4		
Mn	<.1		
Mg	6		
Fe	1.2		
Cu	<.2		
Cr	.4		
Ca	20		
B	.01		
Al	1.5		
Cd	.02		

12- -57 Rq 354801 U sample from Well = 0.43 ppm
floor & side of tank contaminated from
refl. water.

Spec. (pyro)

Be	.01
Ni	<.05
Si	<.5
Li	<.01
P	<5
Na	0.15
Mn	<.05
Mg	.3
Fe	<.5
Cu	.15
Cr	<.1
Ca	.75
B	<.005
Al	0.1
Cd	.02
Co	<.05
V	<.05

12-27-57

Reg # 354910 Sample of Reflector Water from Sid .04 ppm U

1-2-58 Reflector from Sid System (using ORR element in wood stand)

conductivity (to Lynn 9733-4

10.97×10^{-5} mhos at 25°C

pH = 7.90

compare to tap water	pH	cond
12/3/57	7.55	23×10^{-5}
1/2/58	7.6	24×10^{-5}

Ca + Mg run later on same sample –

sample	tap water
Ca = 6.67 ppm	28 ppm
Mg = 7.22 ppm	27 ppm

REPORT OF ANALYSIS LAB. NO. G 4128

Cronin DATE REC'D

ASSIGNED TO:

IDENTIFICATION						
			12 mm			
storage H2O	PH				7.90	
	Cond	~~[illegible]~~			10.97 X 10^{-5}	mhos at 25°C
	Ca		7 6.6			
	mg		~~7~~ 7.2 ppm			
	Sent Sample to Lyon					

STANDARD ERROR AT 95 PER CENT CONFIDENCE LEVEL

REPORTED BY CCL DATE 1/ 58

Req. No. 562869

N.C.		PYRO		AVG.
Be		Be	<.001	
Ni		Ni	<.1	
Sn		--	--	
Si		Si	1	
Li		Li	<.02	
P		P		
Na		Na	4	
Mo		--	--	
Mn		Mn	<.1	
Mg		Mg	8	
K		--	--	
Fe		Fe	<1	
Cu		Cu	<.1	
Cr		Cr	<.2	
Ca		Ca	8.5	
Ba		--	--	
B		B	.02	
Al		Al	1.5	
Ag		--	--	
		Cd	.1	
		Co	<.1	
		V	<.1	
		Hg		
		In		
		C		
		F		

NON-C

Deionized Water

5234

Z-69

graphic Report

lts in ppm.

1-8-58 Water from Sid

11.4×10^{-5} mhos

pH 7.8

Ca 6.8 ppm Mg 6.4 ppm

Al+Fe < .2 ppm

1-13-58 Sample from Columni for storage in Nell.

4.25×10^{-6} 2.35×10^{7} Ω

1-15-58 Samples from Sid after circulating water for 1 hr —

#1 unfiltered #2 filtered thru Minstan oil filter

562819	562820
0.16 ppm U	0.13 ppm U

1-17-58 Req 354911 (dumped Sid — n 3000 gal.

0.10 ppm

1-22-58 East Waste Tank Full 2 liter sample
Reg # 354912
1.8 ppm U 4 x 10^6 ml = 7.2 gms U

dumped 5/16/58

2-3-58 Fuel Element for Holland
When filled with UO_2F_2 soln (139.9 gms U^{25})
gas evolution expensive (identified as H_2)
and corrosion of Al with subsequent ppt'n of UO_2 —
~~Steel~~ Element anode-coated —
volume measured — 2079 ml — (to top of
short outlet tube —

2-4-58 Volume 1958 ml after coating inside with GE 7700
and baking for 12 hrs —
volume of paint = 121 ml

4-8-58 Reg 354914 Salvage Mtl in Lbl Room 102
.000005 gm U/gm

5-20-58 Water Sample to Lynn #733-4 from Faucet Run 204

5-22-58 Evaporator started 2:00 PM
~ 7 liters dil washings -
Circulation rate 300-600 ml/min
using water bubbler for exit gas to check on carryover.
Temp in - ~ 150°C out 30°C
3^00 PM column overloaded (+ spilled out into bubbler - column should have no more than 1 ft of liquid in it.]

4^30 PM Air pressure set at 2# (jet) + 7# (heated air)

5-23-58
8^00 AM from sight glass - 2" in 4" cyl evaporated during night (no heat)
8^10 AM cyl refilled to 12" deep + heat turned on -

10^30 Evap ~ 2"
11^30 Refilled to 12" deep -

9-15-58 Req 635334 Water from Well for ppm Cl
50 ml for florimetric 2 ℓ for Spec -
.04 ppm (by phone)

10-30-58 Req 635337 1 gal water from Well
.04 ppm (by phone)

REPORT OF ANALYSIS LAB. NO. G-6121

Cronin DATE REC'D

Tap Water Rm 204 ASSIGNED TO:

IDENTIFICATION					ppm	Std Error %
		pH		7.20		
Tap Water						
~~923~~		Cl			3	5
Bedy 9213		Fe			0.17	5
Faucet		Ca			29	2
Room 204		mg			25	2
		Ag			<0.1	

STANDARD ERROR AT 99.5 PERCENT CONFIDENCE LEVEL

REPORTED BY [signature] DATE 5/26/58

Req. No. 635337

N.C.		PY O		A
Be	<.30	Be		
Ni	55	Ni		
Sn	<10	--	--	
Si	250	Si		
Li	<2	Li		
P	<100	P		
Na	<10	Na		
Mo		--	--	
Mn	15	Mn		
Mg	60	Mg		
K	<50	--	--	
Fe	210	Fe		
Cu	2	Cu		
Cr	10	Cr		
Ca	95	Ca		
Ba	<10	--	--	
B	<1	B		
Al	80	Al		
Ag	<1	--	--	
		Cd		
		Co		
		V		
		Hg		
		In		
		C		
		F		

1500 SOL'N

Push

8P 51064

Spectrographic Report
All results in ppm.

Y-1495(2-57)

SPECIAL SAMPLES LABORATORY

ANALYTICAL REPORT

REPORTED IN: (circle one)

% ppm micrograms/ml other on basis of sample as received

Req. No.: 635-33

Sample Type: De-ionized water for a analysis #2

Report To: Portsmouth Crowell

Date: 9-17-58 9213

Ag	<.05	Al	.3	Au	<.2	B	<.2	Ba	<.02	Be	<.01	Bi	<.1
Ca	6	Cd	<.4	Co	<.05	Cr	<.1	Cs	<6	Cu	<.05	Fe	<.4
Hf	<.2	Hg		In	<.1	K	4	Li	.4	Mg	20	Mn	.05
Mo	<.02	Na	15	Nb	<.2	Ni	<.1	P	<10	Pb	<.2	Pd	<.02
Pt	<.2	Rb	<1.5	Sb	<.4	Si	2	Sn	<.05	Sr		Ta	<1.5
Ti	<.1	V	<.05	W	<.4	Zn	<.8	Zr	<.01				
As		Ga		Ge		Ir		Os		Re		Rh	
Ru		Sc		Th		Tl		U			pH 7.1		
Ce		Dy		Er		Eu		Gd		Ho		La	
Lu		Nd		Pm		Pr		Sm		Tb		Tm	
Y		Yb						Br		C		CO_3	
Cl		F		I		N		NO_3		O		OH	
PO_4		Pu		S		SO_4		% Ash		% Moisture			

Req. No. 5 64 002

N.C.		PYRO		AVG.
Be		Be	<.001	
Ni	<2.5	Ni		
Sn	<1.0	--	--	
Si	<1.0	Si		
Li		Li	<.02	
P	<10	P		
Na	5.5	Na		
Mo		--	--	
Mn	<.5	Mn		
Mg	9.0	Mg		
K	<5.0	--	--	
Fe	<1.0	Fe		
Cu	<.2	Cu		
Cr	<.6	Cr		
Ca	22.5	Ca		
Ba	<1.0	--	--	
B		B	.025	
Al	1.3	Al		
Ag	<.1	--	--	
		Cd	<.01	
		Co	<.1	
		V	<.1	
		Hg		
		In		
		C		
		F		

ON BASIS OF ORIGINAL SAMPLE

Reflector water NON-U 5473 2811

pH of water = 8.3

Spectrographic Report
All results in ppm

Tap water 11/13/50

3/10/59 Square tanks cleaned & started de-ionizing water — 2 30 PM @ 1.5 gal/min
9 1/2 PM @ 0.75 g/m (at tank) water at 70 cm

3/11/59 8 00 AM at 50% 107 cm in tank

3/11/59 3 60 PM 161 cm in Well (shut off & dumped)
1425 gal (5380 liter) de-ionized water —

3/12/59 8 05 AM flow started 60% by
1 30 PM 67 cm more in Well
#1 tank = 143.5 cm in Well (from full tanks (4.7'))
from both tanks at equil pumped / dry = 113.2 cm
30.3 cm more needed to fill well — 269 gal
1 full tank = 1265 gal - 2 = 2530

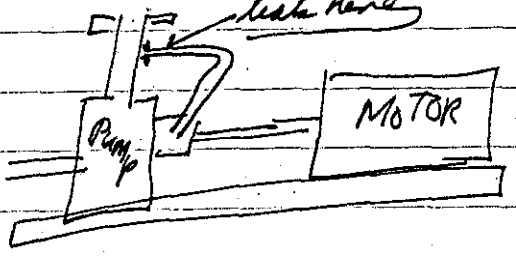
3/13/59 12 30 PM dumped 23 cm into storage tanks — 34.1 cu ft = 259 gal

3/20/59 Req. 354989 - for spec on water
Req 354990 for spec on top waters used in TSR II Exp.

	354989	354990
Be	< .001 ppm	< .001
Ni	0.2	.15
Si	5	2
Na	2	3
Mn	< .1	< .1
Mg	0.6	4
Fe	< 1	< 1
Cu	0.12	.115
Cr	< .2	< .2
Ca	15	60
B	.015	.2
Al	.2	.8

6-22-59

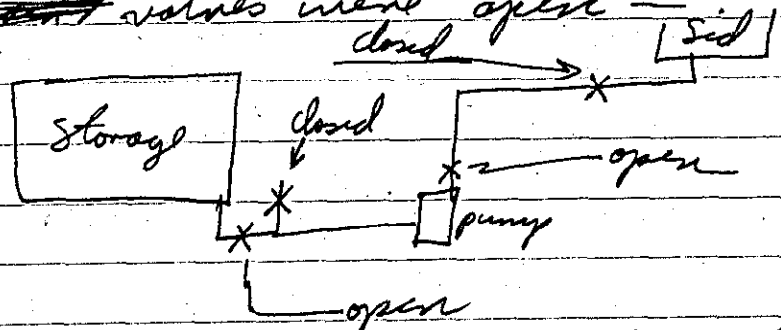
Leak in pump cooling line (Big Sid storage) found to be copper line – brass flare fittings



line had evidently leaked for ~~2 some hours~~ – was not leaking on 6/18/59 when pump was inspected – floor of pump house contaminated –

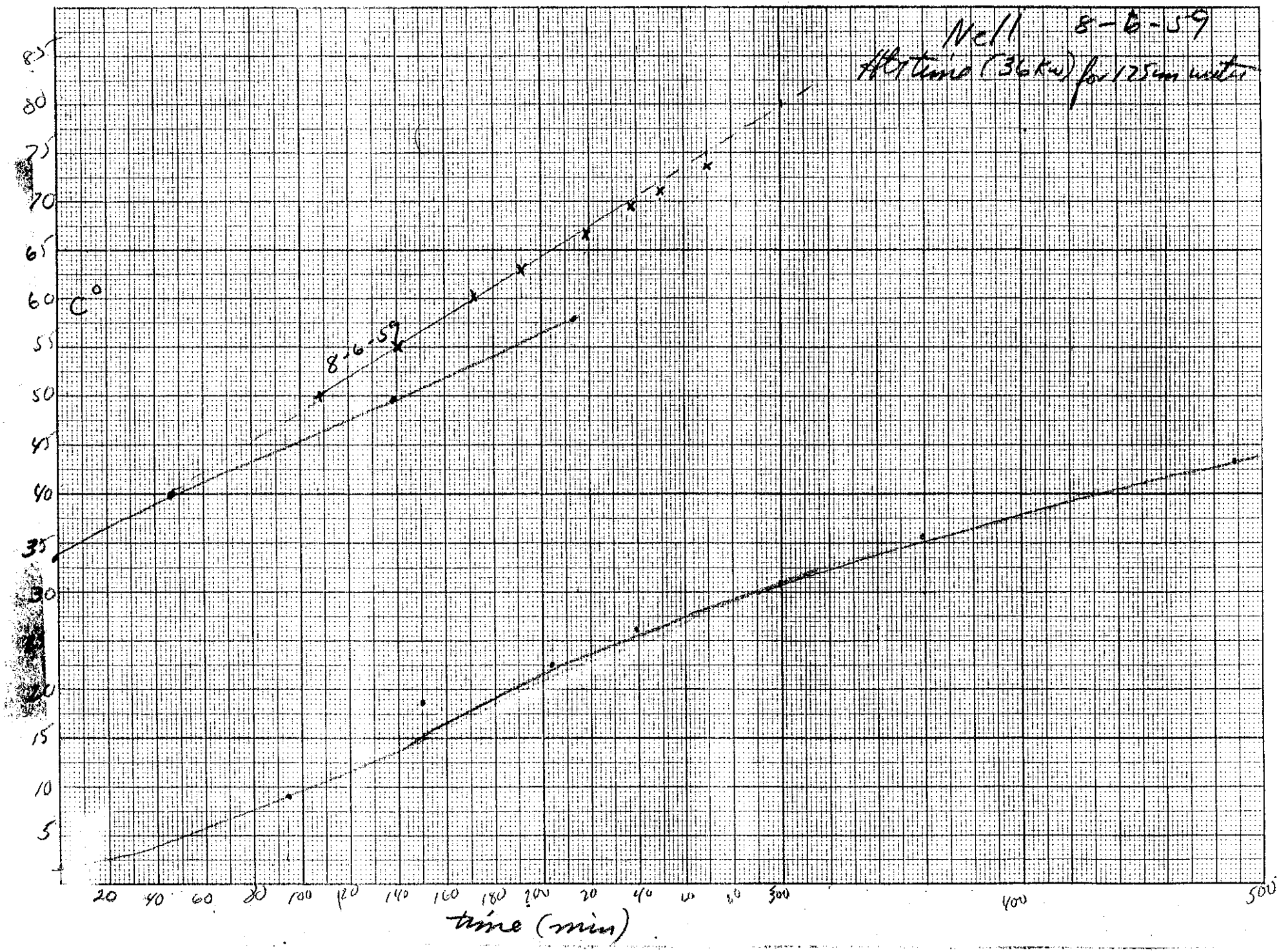
Major portion cleaned up – line replaced with stainless – and soln from ~~Sid~~ storage pumped back up into Sid –

Note: when leak was discovered ~~valves~~ valves were open –



No spit could be found for floor drain in pump house – probably blanked off (heresay) when outside drains were re-routed about 1954-55 Probably about 5 liters lost in 50-100 gms –

18



8-27-59 Started cooling & filtering waters in Well
1040 AM – storage temp = 45°C – 47°C for started thru
heat exchanger –

1435 cooled 120 cm in Well 6 29-30°C

9-18-59 – on checking outside tanks to take sample
for U^{23} salvage Crew found bottle discharge
valves open – last record of dumping
is in Jan 1958 — U^{23} salvage had been
sampled before dumping –
all wastes > .01 ppm U on W and were
sent to salvage so judging from
past history no more than 20 – 30 gms lost –

1954	dumped	4 X	= 4.11 gms U
1955	"	4 X	= 2.5 gms
1956	"	18 X	= 10.23 gms (groundwater seepage, and all <.01 gm U reported as .04 gms
1957	"	4 X	= 16.65 gms (includes 1 in 1958 of 6.8 gms)

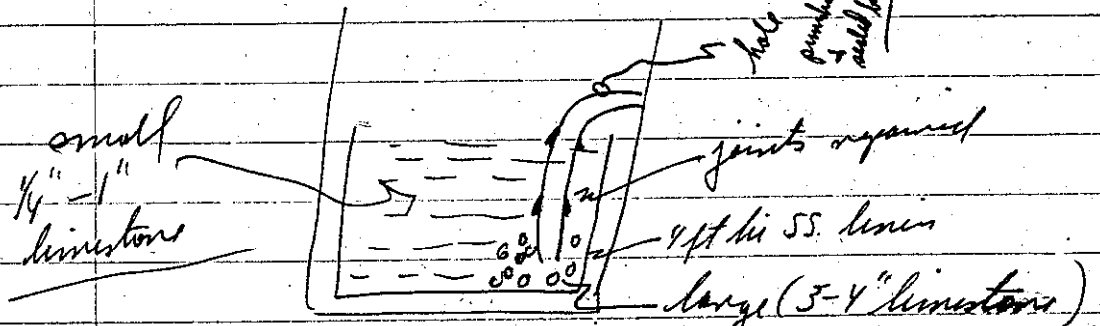
10-4-59 East tank full - indicator light not working
Sampled after air sparging for 2 hrs —
in 4 liter sample Rx 593056 — 3 ppm
by phone 2.3 ppm

10-5-59 593057 sample of solids from
acid neut. pit — .00008 gm/gm

10-9-59 593058 sample of 1st rinse in East tank
0.9 ppm U 4000 x 10⁶ cc = 3.6 gm U

10-12-59 593059 west tank full - 0.72 ppm U

Acid pit filled with screened + washed
limestone after repairing inlet pipe



East tank rinsed + dumped 3 times.

10-13-59 East tank put back into operation.

11-11-59

limestone gravel from
acid neutralizing pit
total of 7,243 lbs analysis
gave 87 ppm U equivalent
to 285.7 gms U — Reg 59305

~~Resample = 31.8 ppm~~
~~for assay — 593070~~

West lab waste storage
tanks — Reg 59305 = 0.72 ppm U
3785 liters ≡ 2.7 gms U
also Rinsing of West tanks
3785 liters at 0.2 ppm Rg 593060
≡ 0.757 gm U

~~Resample 31.8 ppm~~

10-22-59 West tank 1st rinsing Reg 593060

0.2 ppm
3785 liters
0.7570 gms U

11-11-59 Gravel from pit - Reg 59305-7 (87 ppm)

13 barrels

390	662	705
320	567	670
682	620	4.7
507	705	1422
698	670	3224
2597	3224	2597
		7243 lbs

7243
× 87 × 10⁻⁶
50501
57944
.629941 = 0.63 lbs = 285.7 gms

11-11-59 Resample of gravel in 5# Reg 593061 = 318 ppm

11-24-59 Sample of ~~this~~ East tank Reg 593063 1 liter
.03 ppm

12-3-59 West tank full Reg 593064 1 liter
0.58 ppm U

12-21-59 East tank full - sampled - 1 liter
Reg 593068 (.04 ppm)

12-23-59 Ground for assay 593070
12-22-59 Carried back to chemical ground 7-13
Reg 593070,

Assay	
U 233	.90
234	.44
235	36.63
236	.07
238	61.94

2/2/60 West reflector - sample - 2 liters .01 Reg 635344 } Neil
2/2/60 East " - " - 1 1/2 .01 Reg 635345 }

4-6-60 West salvage tank Reg 635349 ~ 1 liter
float valve leaks — .06 ppm at 3785 liters = 0.23 gm U

7-5-60 West tank sample Reg 709654
0.40 ppm - ≡ 1.54 gm U dumped 7-6-60

East tank Reg 709655
0.07 ppm = 0.26 gm U dumped 7-6-60

7-6-60
Water windows in West End Rm 202 cleaned out + refilled with filtered deionized water having "algaecide #2" from Va Chem Co - prob- pentachlorophenol + chlorophenols - in 10-15 ppm

8-9-60 Reg 593107 2 liter sample from East Tank
dumped 0.18 ppm = $\frac{3.785 \times 10^{6}}{.18 \times 10^{-6}}$ ^{5}
29280
3785
0.6713 0

8-22-60 Reg 593108 1 liter sample from West tank overflowed during week-end (rainy) probably some in-leakage - by phone 0.31 ppm

9/19/60 Reg 593109 East Tank -
0.31 ppm U - represents 1.17 gm U

10-19-60 Req 709658 West storage (waste) tank
" 2 ℓ. sample -
0.24 ppm U 3.785 x 10^6
0.24 x 10^{-6}
0.908 gm

11-7-60 Req 593112 East waste tank
" 4 ℓ sample
0.5 ppm U ≡ 1.892 gm U

12-19-60 Req 593113 West tank
.36 ppm dumped

1/3/61 Req 593114 East tank 0.13 ppm dumped 1/13/60

1/5/61 Req 593115 Sample from Sid Reflector
for Spec.

1/18/61 Req 593116 West tank full
0.17 ppm 378.5
.17
0.643 gm U

NCR Paper

ANALYTICAL REPORT

Req. No.: 5-93113-

Sample Type: De-ionized Water from Storage

Report To: Cromer 213

Date: 1-18-61

REPORTED IN: (circle one)

% ppm micrograms/ml basis other

P.S. 12526

Ag	<.05	Al	<.1	Au	<.2	B	<.1	Ba	.12	Be	<.01	Bi	<.1
Ca	60	Cd	<.4	Co	<.05	Cr	<.02	Cs	<6.0	Cu	<.05	Fe	<.2
Hf	<.2	Hg		In		K	.6	Li	<.02	Mg	5-0	Mn	<.05
Mo	<.02	Na	.8	Nb	<.2	Ni	<.1	P	<10	Pb	.1	Pd	<.02
Pt	<.2	Rb	<1.5	Sb	<.4	Si	1.0	Sn	<.05	Sr		Ta	1.5
Ti	<.05	V	<.02	W	<.8	Zn	<.8	Zr	<.02				
As		Ga		Ge		Ir		Os		Re		Rh	
Ru		Sc		Th		T1		U					
Ce		Dy		Er		Eu		Gd		Ho		La	
Lu		Nd		Pm		Pr		Sm		Tb		Tm	
Y		Yb						Br		C		CO_3	
Cl		F		I		N		NO_3		O		OH	
PO_4		Pu		S		SO_4		% Ash		% Moisture			

Y-1495 (9-58) NRC

2/20/61 East tank Reg 593117 by phone 0.21 ppm

2/23/61 West tank full 8 cm Reg 593118 by phone 0.03 ppm

2/27/61 East tank full 8 cm Reg 593119 0.05 ppm

3-8-61 West tank Reg 593121 .07 ppm
3.785 × 10⁶

3-9-61 East tank Reg 593122 .07 ppm × 10⁶ / 26495

3-10-61 West tank Reg 593123 .02 ppm
3,785 × 10⁶ S

4-2-61 East tank Reg 593124 0.10 ppm / 0.3 gm V

4-6-61 West tank Reg 593150 0.03 PPM

4-11-61 " " Dumped

4-11-61 East Water tanks (sample taken) Reg 593152 0.12 ppm = 0.454 gm V

4-14-61 East " " " Reg 593153 = 0.189 gm / .05 ppm

4/18/61 ~~East~~ West tank Reg 593151 = .05 ppm = 0.189 gm V.
dumped 5/21/61 - Reedy

5/2/61 East Water tank Reg 593156 = .20 ppm = 0.757 gm V. dumped 5/2/61

5/16/61 West storage tanks Reg # 593158. = .08 ppm
3.785 X .08 = 0.303 g V. dumped 5/22/61

6/16/61 East storage tanks Reg # 593159 = .47 ppm
3.785 X .47 = 1.78 gm V. dumped 6/23/61.

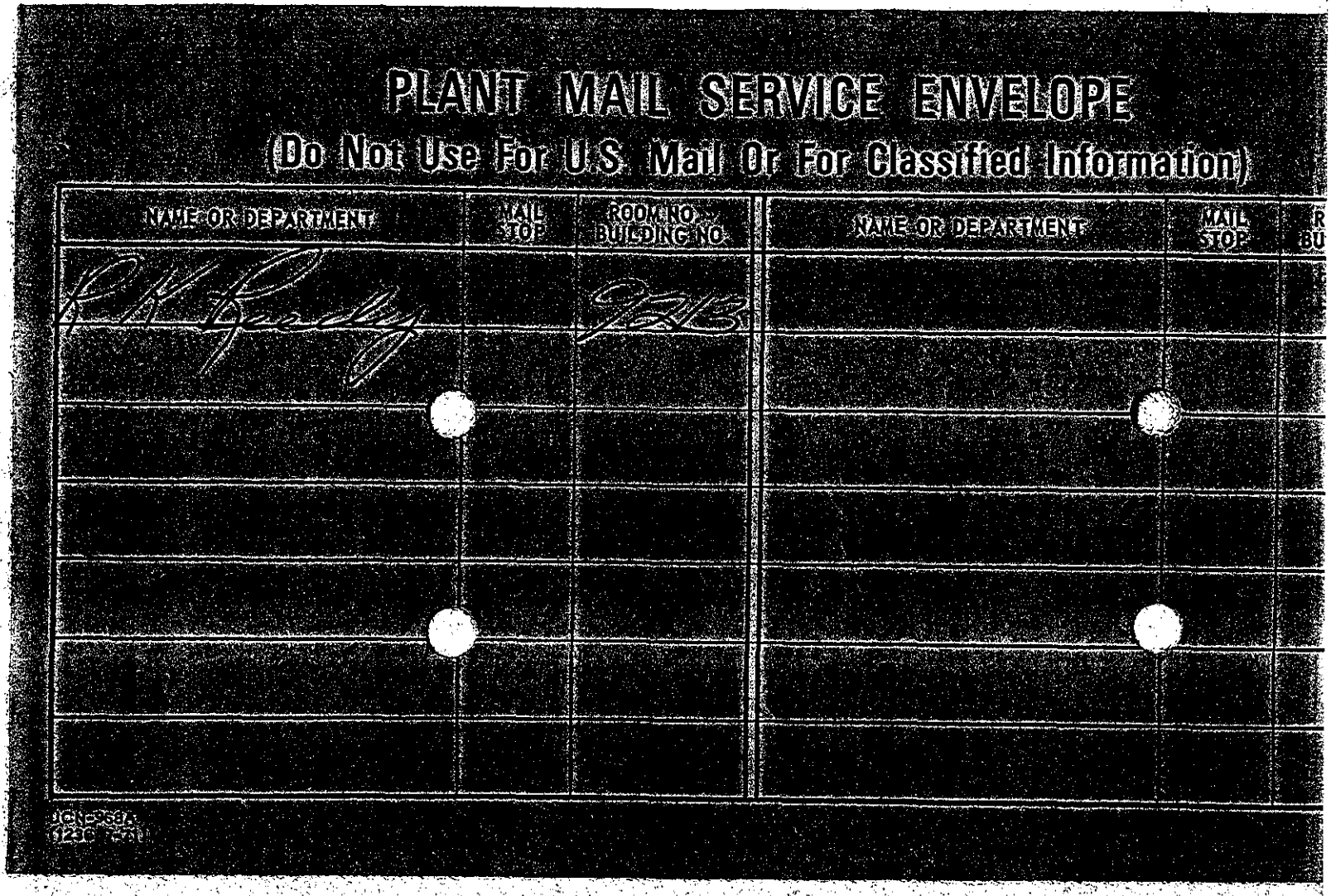
7-26/61 West storage tanks Reg # 593160. = .09 ppm
3.785 X .09 = 0.341 g V - dumped. 7/31/61.

11/13/61 East storage tanks Reg # 593165. = .000 000 13 ppm
11/17/61 3.785 X .13 = 0.49205 gm V dumped 11/17/61

11/17/61 West storage tanks Reg # 593166
3.785 X .09 = 0.341 gm V dumped 11/28/61
11/24/61 East Tanks Reg # 593167
3.785 X .56 = 2.12 g/v dumped 12/7/61

1-29-62 East Tanks Reg # 593168 = .19 ppm
3.785 X .19 = .71 g/v dumped 2-18/61

4-2-62 West Tanks Reg # 593169
3.785 X .06 = .23 g/v dumped 4-11-62

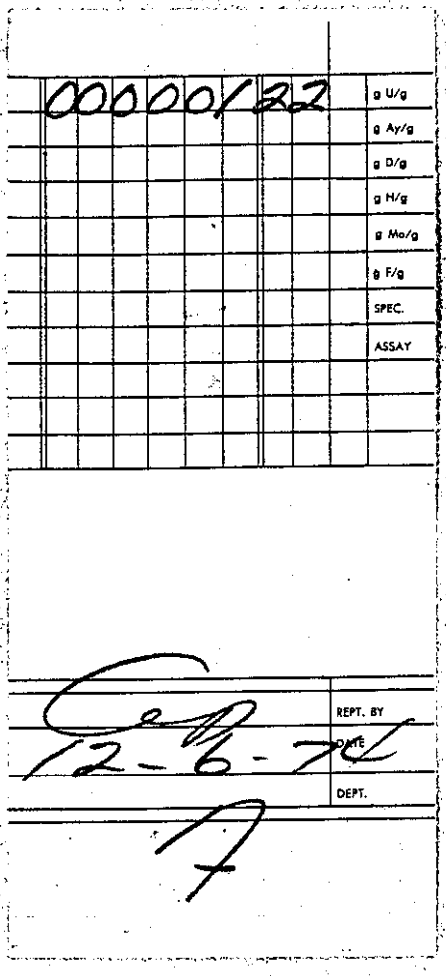

PLANT MAIL SERVICE ENVELOPE
(Do Not Use For U.S. Mail Or For Classified Information)
NAME OR DEPARTMENT
MAIL STOP
ROOM NO.
BUILDING NO.
NAME OR DEPARTMENT
MAIL STOP

REQUISITION 684650

REPORT TO R. K. Rudolph

BUILDING NO. 9213

PHONE NO. 3-5237


00000122
g U/g
g Ay/g
g D/g
g H/g
g Mo/g
g F/g
SPEC.
ASSAY
REPT. BY
12-6-74
DEPT.
7

6-21-62 West Tank Reg # 5-93171 = .01
3.785 X .01 = .04 #/v dumped 6-28-62

6-21-62 East Tank Reg # 593172 = .06
3.785 X .06 = .23 #/v dumped 6-28-62

8-30-62 West Tanks Reg # 5-93183
3.785 X .12 = .45 #/v dumped 9/12/62

10-3-62 East Tank Reg # 593188
3.785 X .36 = 1.36 #/v dumped 10-16-62

11-14-62 West Tank Reg # 5-93192
3.785 X .3 = 1.1 #/v dumped 11-19-62

2-20-63 East Tanks - Reg # 593198
3.785 X .07 = .26 #/v dumped 3-10-63

3-12-63 West Tanks - Reg # 593195
3.785 X .01 = .04 #/v dumped 4-1-63

9-25-63 East Tanks - Reg # 593201 = .01 PPM
3.785 X .01 = .04 #/v dumped 10-4-63

1-7-64 East Tanks - Reg # 593214
3.785 X .04 = .12 #/v dumped 12-15-63

2-24-64 West Tank:- Reg# 593215
3.785 X .10 = .38 g/v: dumped 3-4-64

4-20-64 West Tank: Reg# 593243
3.785 X 1.72 = 6.5 g/v - dumped 5-11-64

4-20-64 East Tank: Reg# 593244
3.785 X 2.18 = 8.3 g/v dumped 5-11-64

10-16-64 East Tank; Reg# 684428
3.785 X 1.56 = 5.9 g/v

10-26-64 West Tank; Reg# 684429
3.785 X 1.0 = 3.78 g/v

1-15-65 West Tank; Reg# 684437
3.785 X .24 = 0.9 g/v

2-2-65 55gal Drum: Waste water from spent fuel element working. Reg# 684462

5-20-65 Reg# 684478: 6.2 Kg of limestone from acid pit. Ord for. g/g. Material type 1999.

5-25-65 Reg 684480: Waste Water. West Tanks.
Received 6-15-65: expend. 00209582/3.

6-17-65 Reg 684482: Waste Water. West Tanks.
Archeb of Reg # 684480.
3.755 x .56 = 3.782.

12-13-65 Reg 684492: Waste Water. East Tanks.
Received 12-16-65: = .00000005 Z/3
3.785 x .05 = 1.89 2/3 or 2.09 4
Dumped 12-16-65

3-16-67 Reg # 684503. Refelutor water. (Big Lid.)
Dumped - 3-30-67

3-28-67 Reg # 684504 Refelutor water (Well)
Dumped 3-31-67

4-6-67 Big Lid & Little Well filled with
Clean H2O.

5-10-67 West fold tanks
Reg # 684505

5-10-67 Effluent Water (Well)
Reg # 684506

9-26-67 Well tanks.
Reg # 684521.

12-1-67 Well and small effluent tanks on claim
water from Y-12

Well
Reg #
684533

Effluent tanks
Reg #
684534

4-1-68 East Tank = .000001
Reg # 684540 = 4.0g U

dumped 5-16-69

4-1-68 West tank = .000001
Reg # 684541 = 4.0g U

6-16-69 West tank
Reg # 684553 calc for g U/g

10-23-69 West tank
Reg # 684581 calc for g U/g
g U/g = .000000012 X 3.785 X 1000 = 1.0g U
dumped 10-23-69

10-7-70 East Tank
Reg # 684611 calc for g U/g = .00000003
= 1.0g U
dumped 10-15-70

1-27-70 East Tank
Reg # 684643 calc for g U/g = .000000057
= 2.1g U
Dumped 2-5-71

1-6-72 West Tank; Reg # 694423
g/g = .00000020 x 3.785.0 x 1000 = .75 g/u
Dumped 1-25-72

3-7-72 West Tank; Reg # 694429
g/g. = .00000560 x 3785.0 x 1000 = 21.0 g/u
Dumped 3-16-72

10-10-72 West Tank; Reg # 684637
g/g = .00000112 x 3785.0 x 1000 = 4.2 g/u
Dumped 10-13-72

11-28-73 East Tank; Reg # 684649
g/g. = .00000012 x 3.785.0 x 1000 = .00045 g/u

SPECIAL SAMPLES LABORATORY
ANALYTICAL REPORT

7/28

Req. No.: 354822
Sample Type: Replacer H_2O
Report To: Cronin
Date: 11-28-56

REPORTED IN: (circle one) % ppm micrograms other — on basis liquid water 341 Van Mouchout

Ag	<.05	Al	5	Au	<.2	B	<.1	Ba	<.05	Be	<.01	Bi	<.05
Ca	.5	Cd	<.2	Co	<.05	Cr	<.2	Cs	<3	Cu	<.01	Fe	<.4
Hf	<.2	Hg		In	<.05	K	<.2	Li	<.01	Mg	<.01	Mn	<.05
Mo	<.02	Na	1.5	Nb	<.2	Ni	<.1	P	<10	Pb	.1	Pd	<.02
Pt	<.2	Rb	<.8	Sb	<.2	Si	1.5	Sn	<.05	~~Sr~~	Solids 30 ppm	Ta	<.8
Ti	<.1	V	<.05	W	<.8	Zn	<.8	Zr	<.01				
As		Ga		Ge		Ir		Os		Re		Rh	
Au		Sc		Th		Tl		U					
Ce		Dy		Er		Eu		Gd		Ho		La	
Lu		Nd		Pm		Pr		Sm		Tb		Tm	
		Yb						Br		C		CO_3	
Cl		F		I		N		NO_3		O		OH	
ClO_4		Pu		S		SO_4		% Ash		% Moisture			

REQUEST for ANALYSIS

REPORT OF ANALYSIS LAB. NO. G-1943

MATERIAL: H_2O

REPORT TO

CC:

DATE REC'D

ASSIGNED TO:

SUBMITTED BY: J. K. Fox

SOURCE:

ACCOUNT NO.: 4410-28

REPORT TO:

BUILDING NO.

DATE

TESTS DESIRED

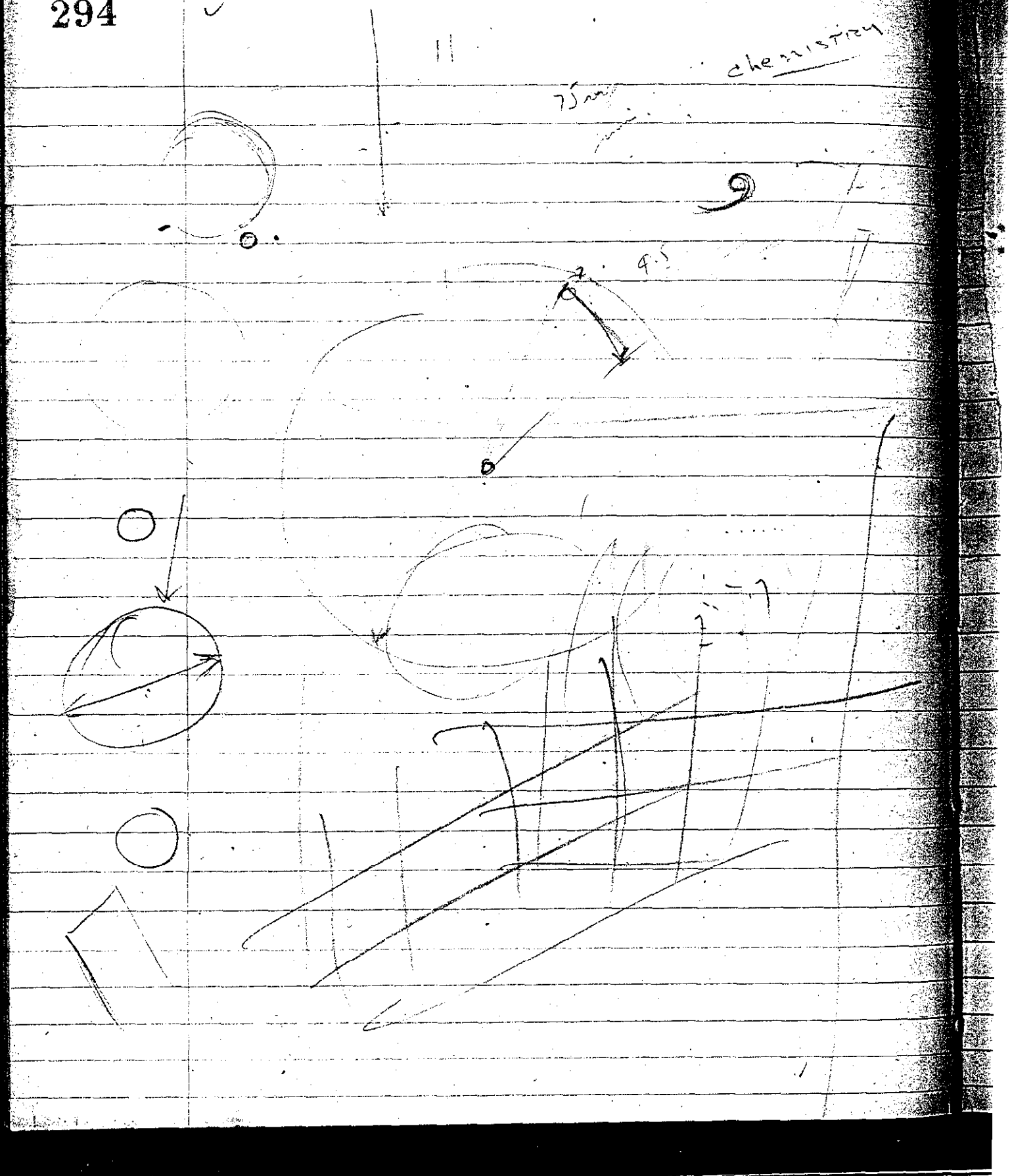
· P.H. Total solids, Vol. solids, ignited solids)

REMARKS:

LAB. NO.	IDENTIFICATION	
G-1943		159 ppm Total solids
		63 ppm Volatile matter
		96 ppm Ignited solids
		8.5 pH

STANDARD ERROR AT 95 PER CENT CONFIDENCE LEVEL

TESTED BY CHECKED BY REPORTED BY L J Brady DATE 6-14-61



ANALYTICAL DATA REPORT

TO: E B Johnson

FROM: GENERAL ANALYSIS LAB.

LABORATORY NUMBER	SAMPLE CODE	PH	Spec. Res.	PPM Solids	PPM NVM	Acid No.	PPM CO_3	PPM HCO_3
2595	water 4/10/67	6.52	4.64×10^5	3	1.4	<0.0005	0	0
	put in Sl & Mail							
	from you							
		PPM Hg	PPM N_2	PPM Cu	PPM Si	PPM Cr	PPM Ni	PPM Fe
		<0.06	0.06	<0.05	<0.05	<0.02	<0.03	0.15

CONCENTRATION

☑ SAMPLES returned to sender ☐ sent to waste ☐ retained

REMARKS

UCN-2134
(3 9-60)

ANALYZED FOR: 9213

CONTROL NO. D 76664

SERIES NO.

DATE: 4-12-67

ppm HCO_3	ppm as $CaCO_3$ Hardness	ppm as Ca_2CO_3 Ca Hardness	ppm Mg	ppm U	ppm Ca		
0	0.94	0.95	<0.1	0.005	0.38		
ppm Fe	ppm Al	ppm F	ppm SO_4	ppm PO_4	ppm NO_3	ppm Cl	ppm Diss CO_2
0.15	0.04	<0.05	0.19	0.12	0.27	5	143

LABORATORY SUPERVISOR

W R Laing