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Scientific Notebooks No. 087: Measurement of Linear Attenuation Coefficient for Material Used in Coupled-Effects Experiments in the CNWRA Thermohydrology Research Project (04/14/1993 through 01/15/1997)

THERMO

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300

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CNWRA CONTROLLED COPY 087

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LB 4/14/93

(TITLE:)

MEASUREMENT OF LINEAR ATTENUATION COEFFICIENT

PURPOSE:

USE EXISTING GAMA-DINSITOMETER SYSTEM TO MEASURE THE LINEAR ATTENUATION COEFFICIENT FOR MATERIAL USED IN COUPLED-EFFECTS EXPERIMENTS IN THE CENTER'S THERMOHYDROLOGY RESEARCH PROJECT. WHEN POSSIBLE, THE MEASURED VALUES CAN BE COMPARED WITH VALUES REPORTED IN THE LITERATURE (E.G., TEXTBOOKS). ACCURATE KNOWLEDGE OF ATTENUATION COEFFICIENTS IS NECESSARY FOR JUDICIOUS DESIGN OF EXPERIMENTS AND ANALYSIS OF RESULTS.

THEORY:

THE BEAM OF GAMA-RAYS IS ATTENUATED (i.e. REDUCED) BY THE PRESENCE OF MEDIA. THIS ATTENUATION IS MODELED USING:

$$I = I_0 \exp(-\mu x)$$

WHERE

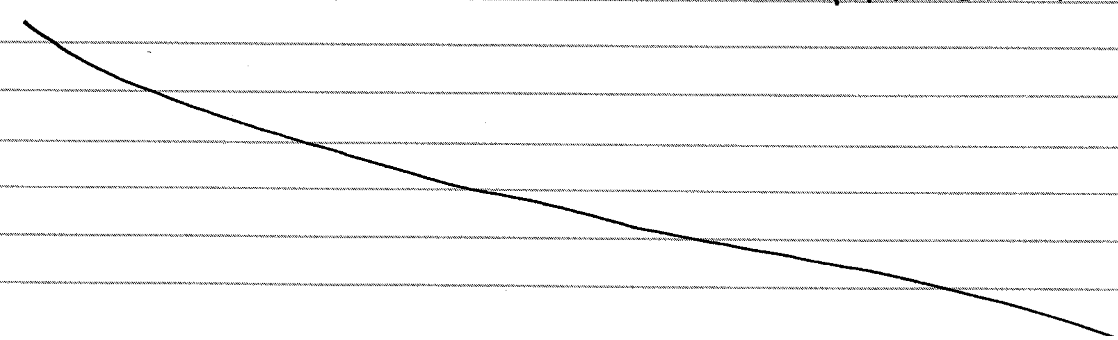
I = ATTENUATED GAMA BEAM STRENGTH

I_0 = ORIGINAL GAMA BEAM STRENGTH

μ = LINEAR ATTENUATION COEFFICIENT (1/cm)

x = THICKNESS OF MEDIA INTRODUCED TO ATTENUATE THE BEAM (cm).

THE ATTENUATED GAMA BEAM STRENGTH IS MEASURED AS THE COUNTS PER 1 MINUTE TIME.



LB 4/~~14~~ 13/93

EXPER~~E~~IMENTAL PROCEDURE:

THE ~~EXPERE~~ EXPERIMENTAL PROCEDURE IS TO MEASURE THE ORIGINAL GAMA BEAM STRENGTH AND TO SUCCESSIVELY ADD MORE MEDIA (WITH A WELL MEASURED THICKNESS) AND MEASURE THE REDUCED GAMA BEAM STRENGTH. THIS IS TYPICALLY DONE FOR ~5 EQUAL THICKNESS OF THE MEDIUM. THE DATA IS THEN USED TO DETERMINE μ BY FITTING A STRAIGHT LINE TO THE DATA POINTS OF LN(I/IO) VERSUS X:

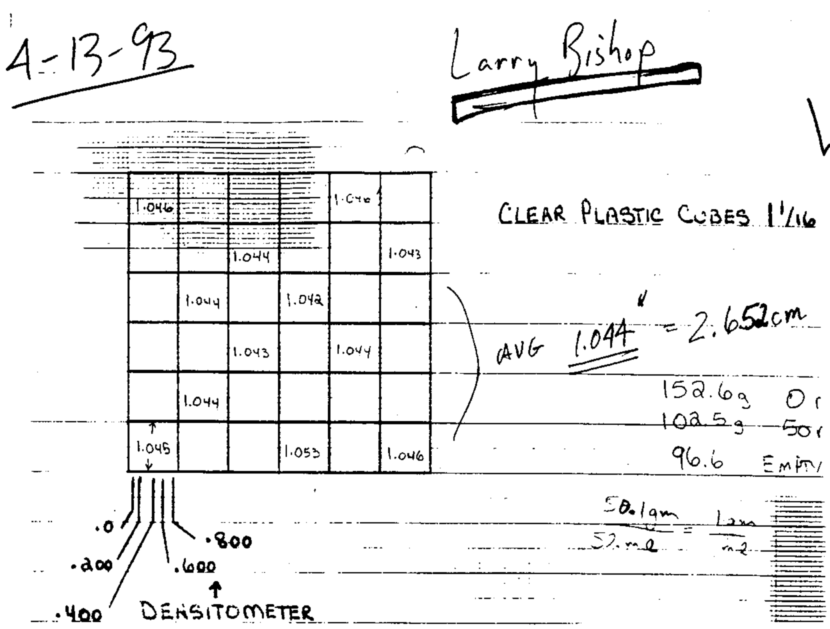
$$\ln(I/I_0) = \mu x$$

THE SLOPE OF THE STRAIGHT LINE IS EQUAL TO μ, THE LINEAR ATTENUATION COEFFICIENT.

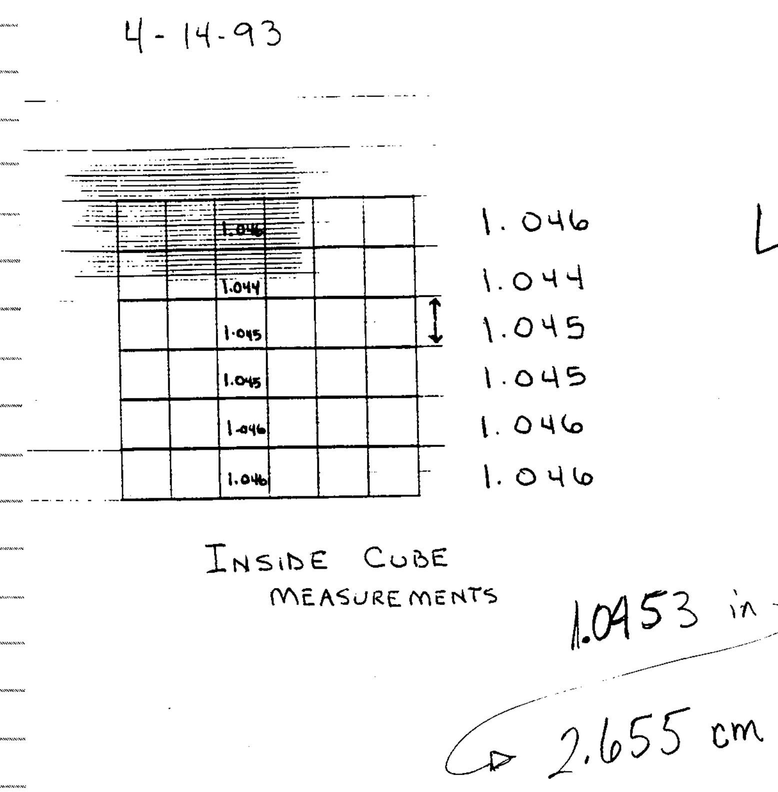
EXPERIMENTAL SETUP:

A PLASTIC TRAY WAS COMMERCIALLY PURCHASED (FROM THE CONTAINER STORE). THIS TRAY HAD 6X6 COMPARTMENTS. THE COMPARTMENTS ~~WH~~ WERE MEASURED WHERE THE CRITICAL DIMENSION IS IN THE DIRECTION THAT THE GAMA BEAM WAS TO BE PASSED.

LB 4/~~14~~ 13/93



LB 4/14/93



LB 4/14/93 IT WAS DETERMINED THAT THE BOXES HAVE VERY UNIFORM DEPTHS WITH Δx = 1.045 +- 0.001 IN (2.655 +- 0.003 cm).

NEXT, THE DENSITY OF DE-IONIZED WATER ACQUIRED FROM THE GEOCHEMISTRY LABORATORY WAS MEASURED BY SUCCESSIVELY FILLING A BEAKER AND WEIGHING THE CONTENTS.

MEASUREMENTS ON PAGE 4

LB 4/14/93

4 - 14 - 93

VOL	WT
100 ml	101.1g
200 ml	200.0g
300 ml	300.7g
400 ml	400.4g
500 ml	500.6g
600 ml	599.5g
700 ml	698.1g
800 ml	796.7g
900 ml	896.0g
1000 ml	992.9g

$\rho = 0.993$ gm/ml

VOL	WT
5 ml	4.7g
10 ml	9.7g
15 ml	14.7g
20 ml	19.7g
25 ml	24.7g

$\rho = 0.988$ gm/ml

LB

$$\frac{50.1 \text{ gm}}{50 \text{ ml}} = 1.002 \frac{\text{gm}}{\text{ml}}$$

LB 4/14/93 THE MEASURED DENSITY WAS 0.99 gm/ml +- 0.01 gm/ml, WHICH IS IN EXCELLED AGREEMENT WITH THE EXPECTED VALUE OF 1.0 gm/ml.

LB 4/21/93

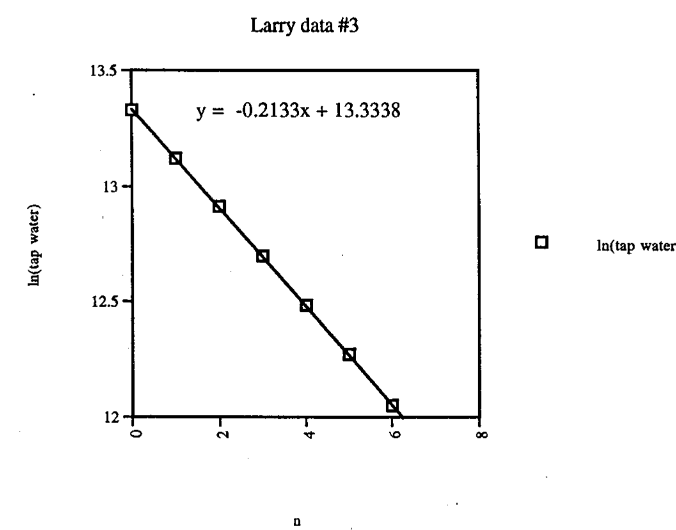
4 - 21 - 93

1 MIN READINGS

6	170832
5	212920
4	263861
3	326806
2	405250
1	498710
0 EMPTY CUBES	614457

TAP WATER

LB

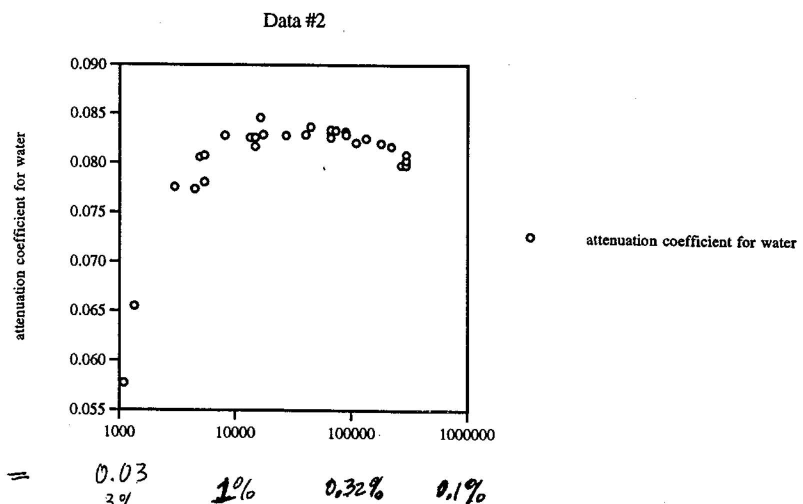


LB

296,500

$$\frac{0.2133}{2.655} = 0.0803$$

LB 4/14/93



$\left(\frac{\sigma}{\mu}\right) =$ 0.03 3%   1%   0.32%   0.1%

↑ good #.

∴ lowest count rate ~ 10,000 kpm
maximize thickness based on this.

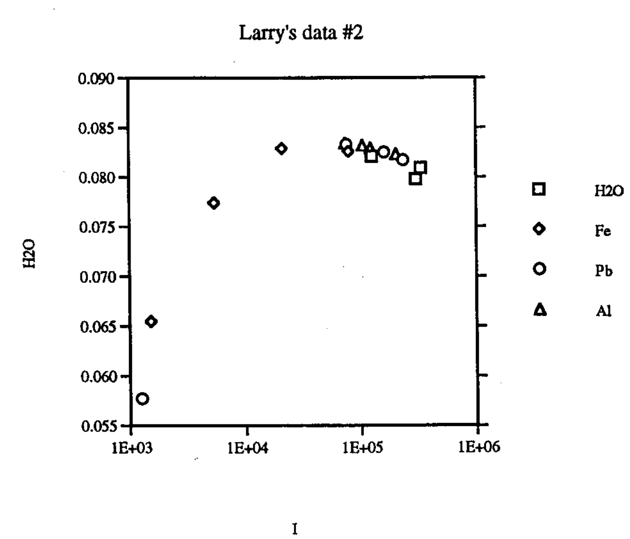
$\mu \pm \sigma$

$\sigma = \sqrt{\mu}$ Poisson Distribution

$\left(\frac{\sigma}{\mu}\right) \sim \frac{\sqrt{\mu}}{\mu} \sim \frac{1}{\sqrt{\mu}}$

LB

LB 4/14/93



LB

Pages 7 Through 11 Are Intentionally Left Blank

LB
4/13/93

LINEAR ATTENUATION COEFFICIENT FOR WATER:

THE FOLLOWING PAGES CONTAIN A "PAIRS" OF DATA AND CURVE - FITS TO DETERMINE THE ATTENUATION COEFFICIENT. THE ORIGINAL BEAM STREGTH WAS CHANGED BY ADDING THICKNESS OF LEAD, IRON, OR ALUMINUM. THIS WAS DONE TO VARY THE ORIGINAL BEAM STREGTH AND TEST ANY MEASUREMENT BIAS THE COUNTER SYSTEM MAY HAVE.

TEST #1 (1)

COUNTS PER MIN						
507750.6						H_2O
413028.0					H_2O	H_2O
335174.2				H_2O	H_2O	H_2O
271156.8			H_2O	H_2O	H_2O	H_2O
218792.2		H_2O	H_2O	H_2O	H_2O	H_2O
176338.4	H_2O	H_2O	H_2O	H_2O	H_2O	H_2O

CLEAR PLASTIC CUBES $1^1/_{16}$"

$I = I_0 e^{(\lambda \Delta x \cdot n)}$

$\ln(I/I_0) = -\lambda \Delta x\, n$

LB 4/13/93

→ .0 .200 .400 .600 .800 DENSITOMETER

5 SCANS EACH FROM LEFT TO RIGHT

TEST #2 (2)

COUNTS PER MIN						
503025.8	H_2O					
409183.1	H_2O	H_2O				
331087.2	H_2O	H_2O	H_2O			
267955.0	H_2O	H_2O	H_2O	H_2O		
215919.8	H_2O	H_2O	H_2O	H_2O	H_2O	
175273.4	H_2O	H_2O	H_2O	H_2O	H_2O	H_2O

CLEAR PLASTIC CUBES $1^1/_{16}$

LB 4/13/93

→ .0 .200 .400 .600 .800 DENSITOMETER

5 SCANS LEFT TO RIGHT

10 min readings

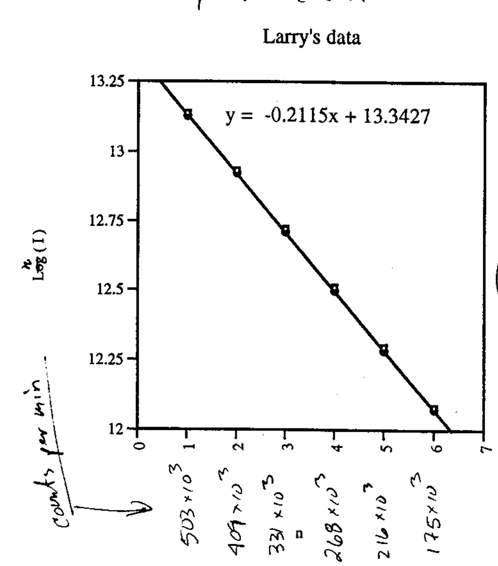
test (1+2)

LB 4/13/93

No attenuation except plastic holder + water

– 2 sets

1-min count

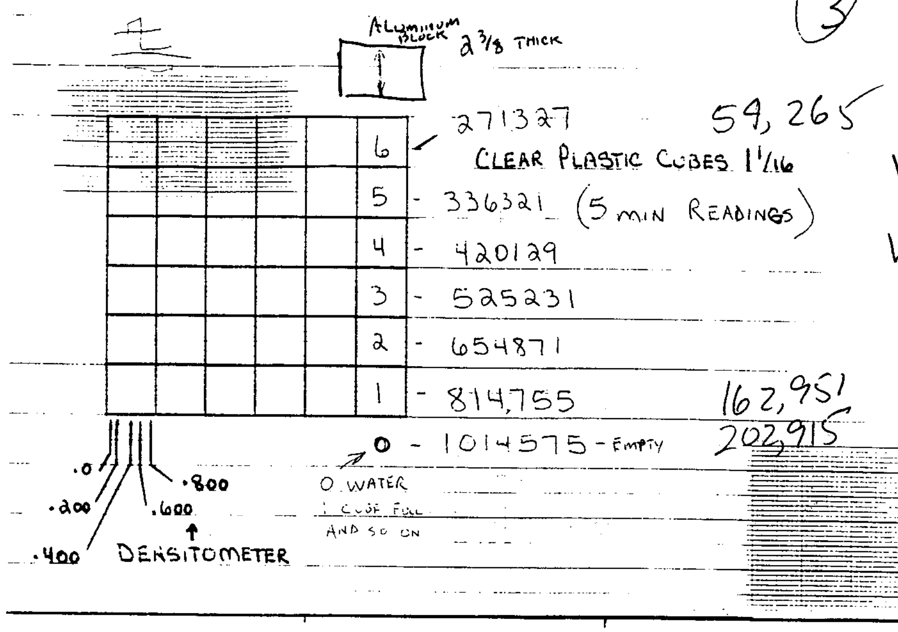


$$\lambda = \frac{0.2115}{2.652} = 0.0798 \frac{1}{cm}$$

270,000

(3)

Aluminum block 2 3/8 thick



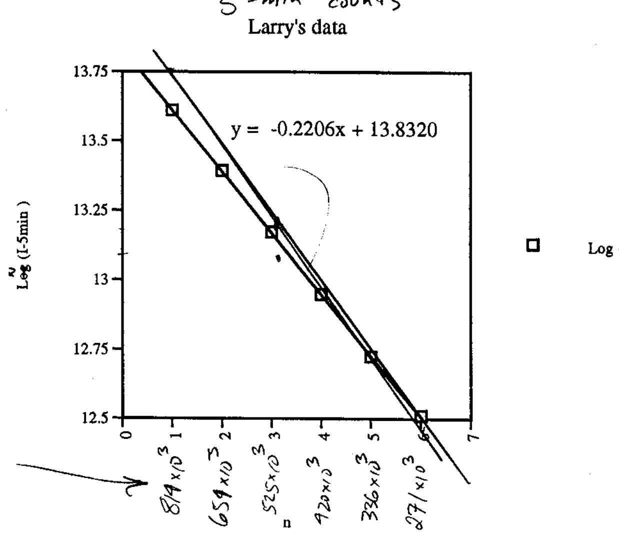
54,265

162,951

202,915

LB 4/13/93

through aluminum block 2 3/8 thick
5-min counts



LB 4/13/93

~~442,000~~/5 = 88,500

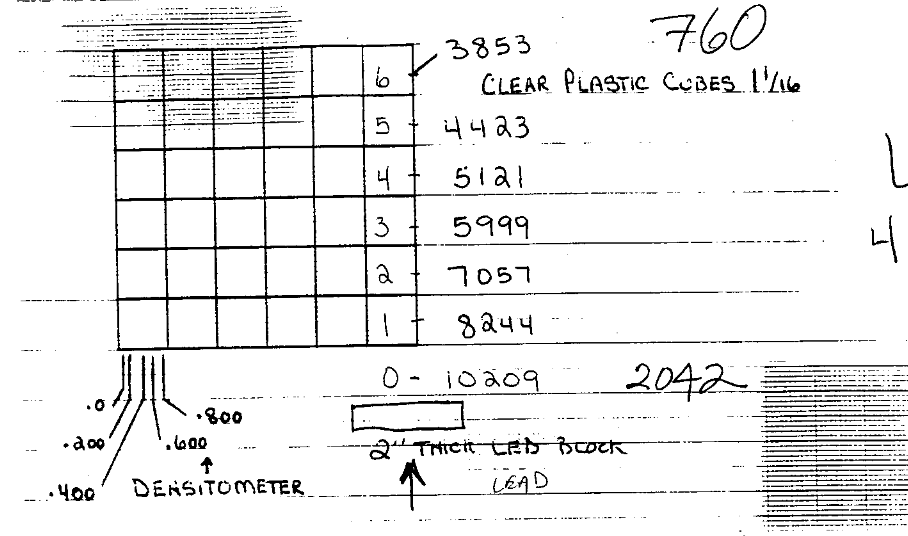
$-\lambda \Delta x = -0.2206$

$\lambda = \frac{0.2206}{2.652 \text{ cm}} = 0.0832 \frac{1}{\text{cm}}$

4-13-93

(4)

5 MIN READINGS



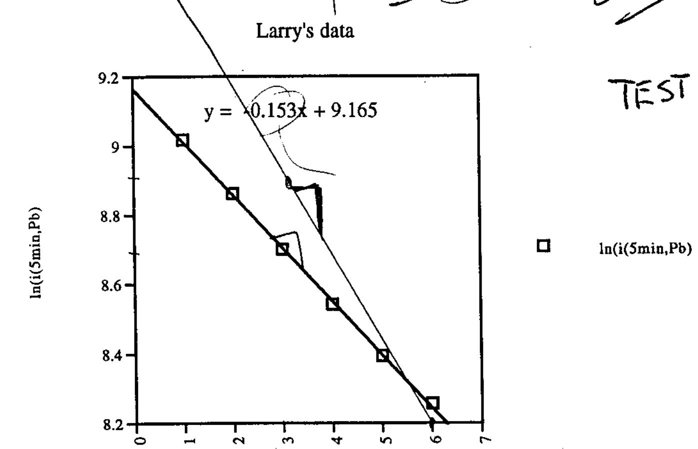
760

2042

LB 4/13/93

5-min w/ 2 in Pb

Lead



TEST 4

LB 4/13/93

.2286

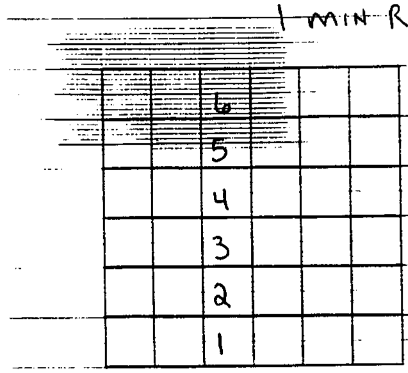
1,085

$\frac{.153}{2.652} \simeq 0.0577$

4-13-93

(5)

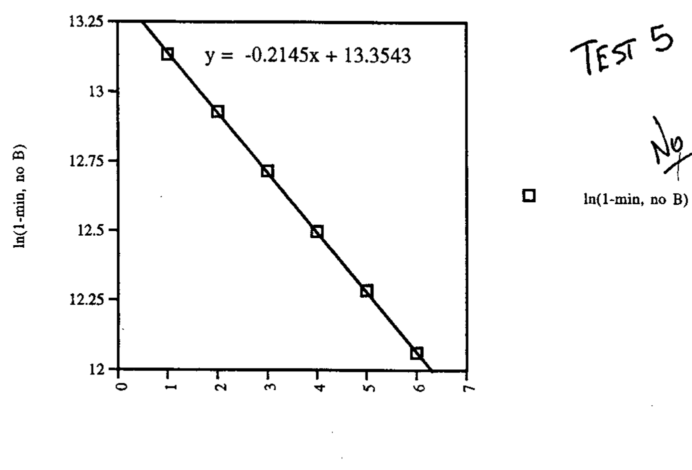
1 MIN READINGS



- 6 – 173083
- 5 – 216514
- 4 – 267706
- 3 – 333033
- 2 – 411827
- 1 – 505481
- 0 – EMPTY CUBES – 624477

LB 4/13/93

Larry's data



TEST 5
No Beaker of Water

LB 4/13/93

296,500

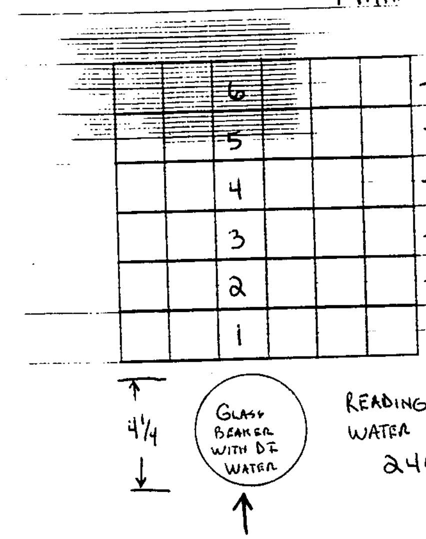
$$\lambda = \frac{0.2145}{2.652} = 0.0809$$

Same as Test 1+2

4-13-93

(6)

1 MIN READINGS

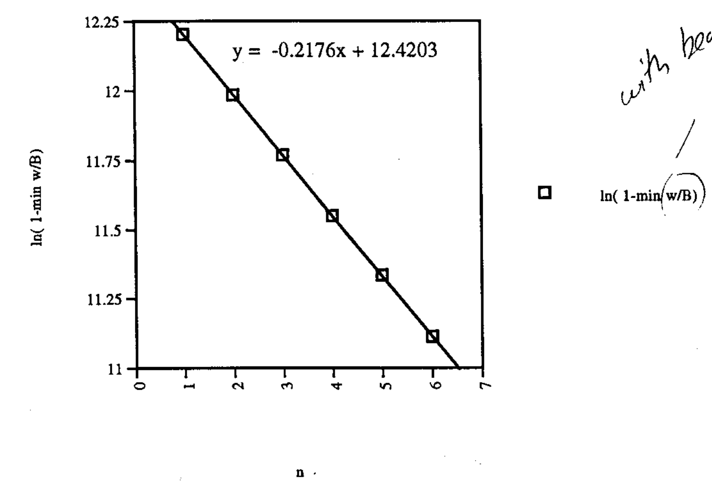


- 6 – 67056
- 5 – 83700
- 4 – 103773
- 3 – 129034
- 2 – 160080
- 1 – 199492

READING WITH NO WATER IN CUBES
240621 — 5 MIN READING
ADJUSTED MIN TO 1 MIN

LB 4/13/93

Larry's data



with beaker

LB 4/13/93

109,100

$$\lambda = \frac{.2176}{2.652} = 0.0821$$

4-13-93

Test 7

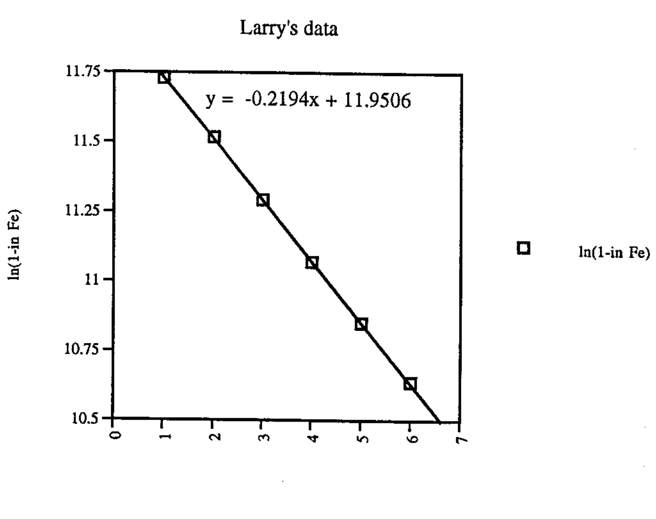
1 MIN READINGS ✓

6	41709
5	51580
4	64180
3	80138
2	100391
1	124240
0 Empty cubes	155454

1" THICK STEEL PLATE

LB 4/13/93

Larry's data



LB 4/13/93

66,170

$$\lambda = \frac{.2194}{2.652} = 0.0827$$

$$\frac{.2194}{2.655} = 0.0826$$

4-13-93

test 8

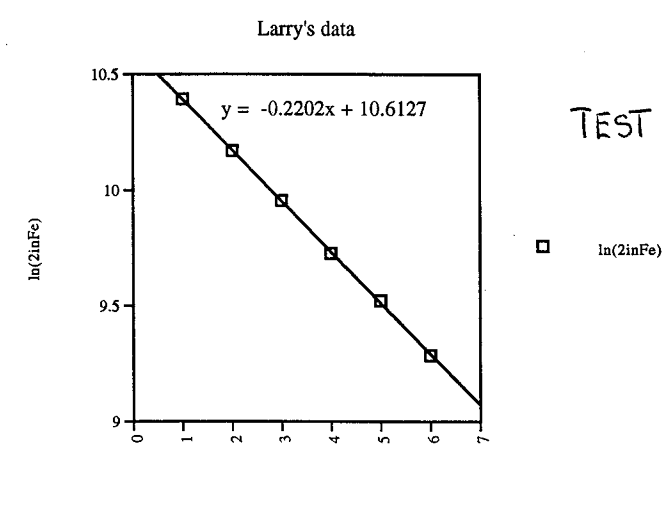
1 MIN READINGS

6	10799
5	13653
4	16734
3	21033
2	26108
1	32660
0 Empty cubes	40823

2" THICK STEEL PLATE

LB 4/13/93

Larry's data



TEST 8

LB 4/13/93

17,150

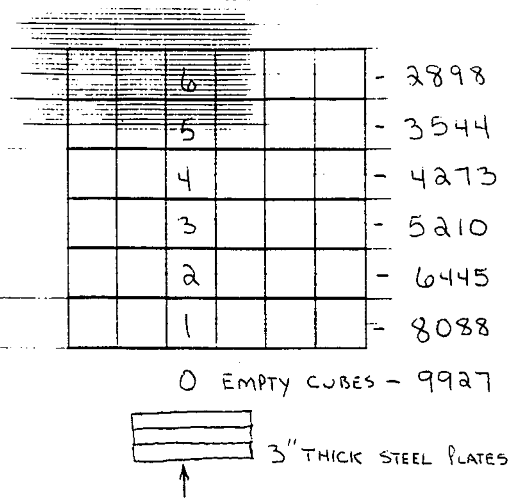
$$\lambda = \frac{0.2202}{2.652} = 0.083$$

$$\frac{0.2202}{2.655} = 0.0829$$

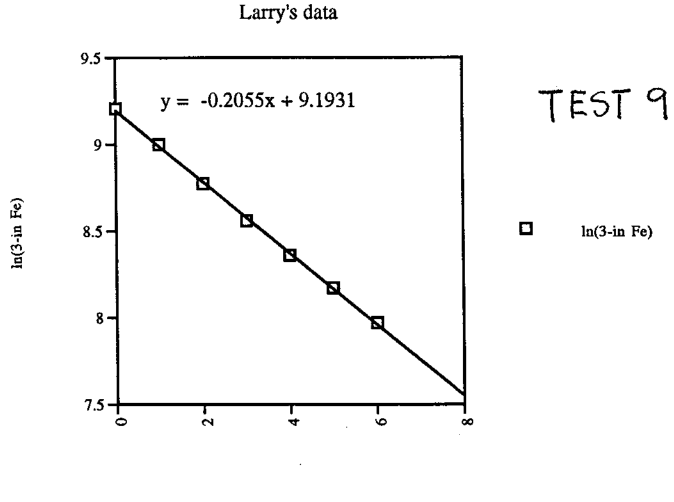
4-14-93

1 MIN READINGS

Test 9



LB 4/14/93



TEST 9

LB 4/14/93

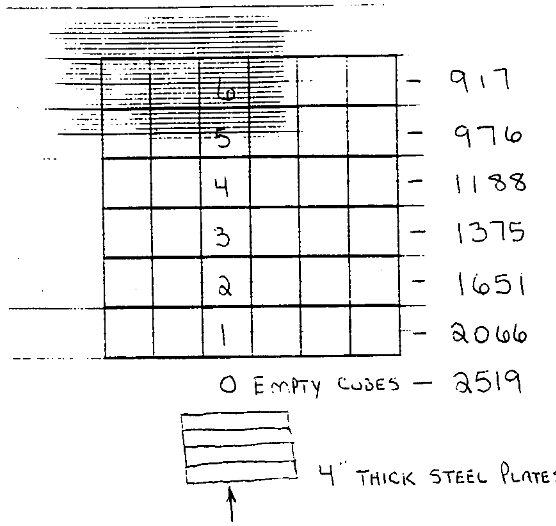
4,450

$$\lambda = \frac{0.2055}{2.652} = 0.0774$$

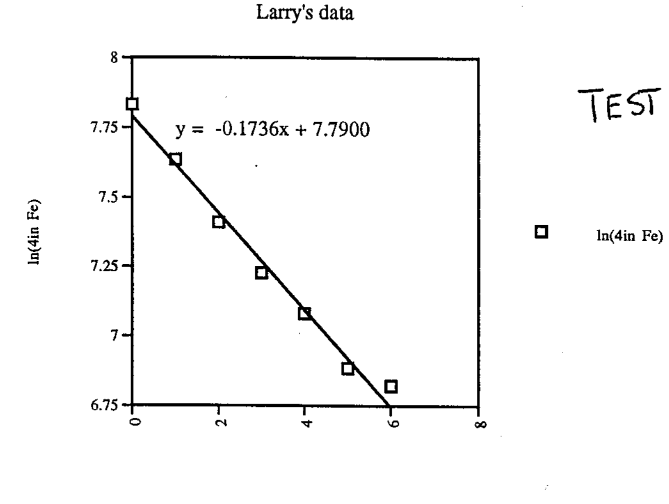
4-14-93

1 MIN READINGS

Test 10



LB 4/14/93



TEST 10

LB 4/14/93

1,340

$$\lambda = \frac{0.1739}{2.652} = ~~0.066~~ \; 0.0655$$

4-14-93

Test 11

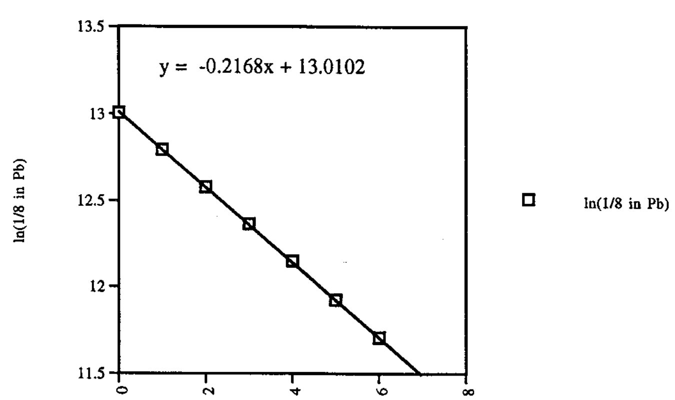
1 MIN READINGS

Cubes	Reading
6	121411
5	150473
4	188823
3	234047
2	290201
1	359840
0 Empty cubes	445099

↑ 1/8" ~~LED~~ LEAD

LB 4/14/93

Larry's data



n 0-6

219,700

$\lambda = \frac{.2168}{2.655} =$ ~~0.0822~~ 0.0817

LB 4/14/93

4-14-93

Test 12

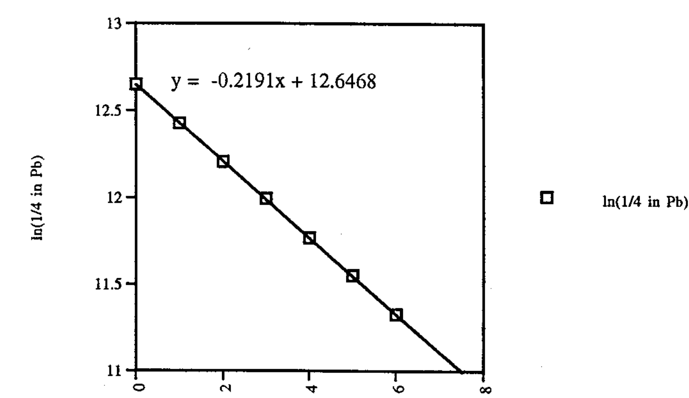
1 MIN READINGS

Cubes	Reading
6	83291
5	104118
4	129237
3	161858 LB 161858
2	199693
1	249058
0 Empty Cubes	311384

↑ 1/4" LEAD

LB 4/14/93

Larry's data



n 0-6

133,250

$\frac{.2191}{2.655} = 0.0825$

LB 4/14/93

4-14-93

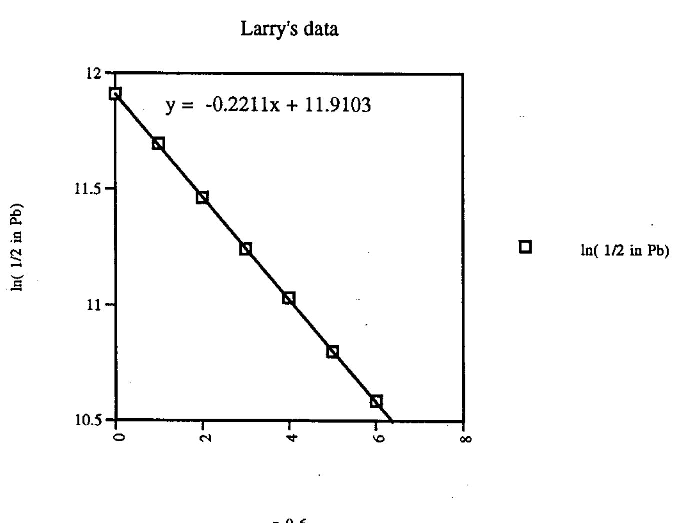
Test 13

LB 4/14/93

1 MIN READINGS

Cubes	Reading
6	39608
5	48990
4	61736
3	76427
2	95180
1	119950
0 Empty Cubes	148646

1/2" LEAD



LB 4/14/93

73,130

$$\frac{.2211}{2.655} = 0.0833$$

4-14-93

LB 4/14/93

Test ~~13~~

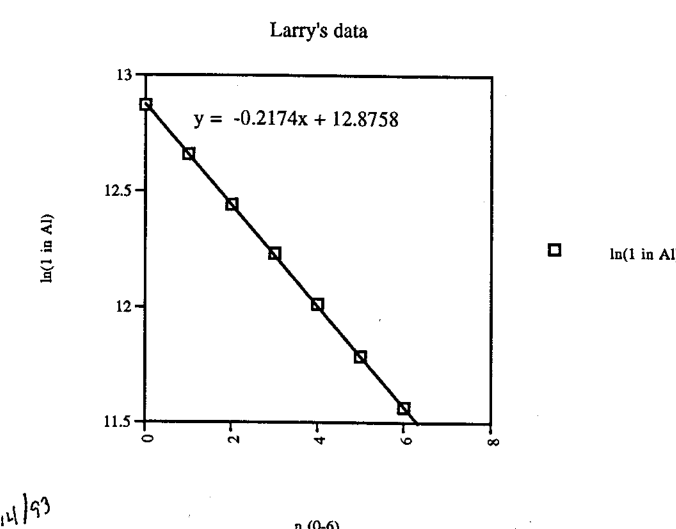
Test 13a

LB 4/14/93

1 MIN READINGS

Cubes	Reading
6	105343
5	131519
4	164952
3	204911
2	253062
1	314195
0 Empty Cubes	388747

1" ALUMINUM PLATE



LB 4/14/93

LB 4/14/93 ~~17~~ 180,000

$$\lambda = \frac{.2174}{2.652} = 0.0820$$

4-14-93

Test 14

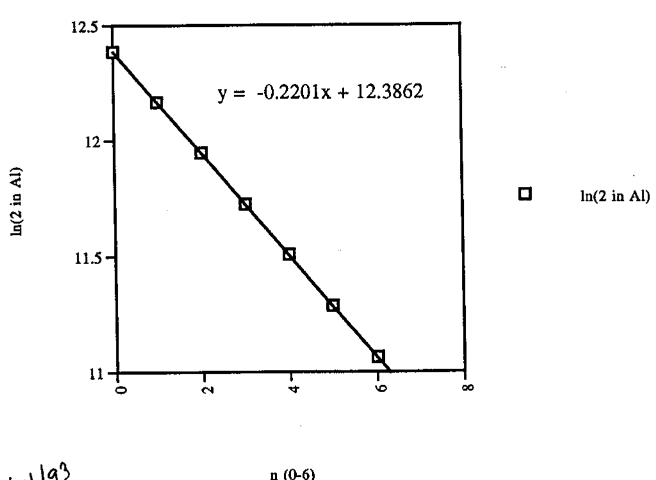
1 MIN READINGS

Cubes	Reading
6	63790
5	79738
4	99561
3	123588
2	154308
1	192099
0 EMPTY CUBES	239313

2" ALUMINUM PLATE

LB 4/14/93

Larry's data



LB 4/14/93

~~297,000~~ 89,700

LB 4/14/93

$$\frac{.2201}{2.655} = 0.0829$$

4-14-93

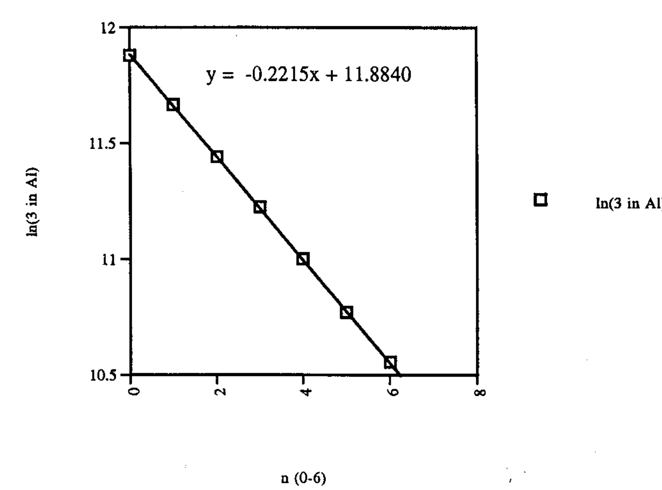
Test 15

1 MIN READINGS

Cubes	Reading
6	38428
5	47555
4	59915
3	74952
2	92956
1	116559
0 EMPTY CUBES	144279

LB 4/14/93

Larry's data



LB 4/14/93

66,170

$$\frac{0.2215}{2.655} = 0.0834$$

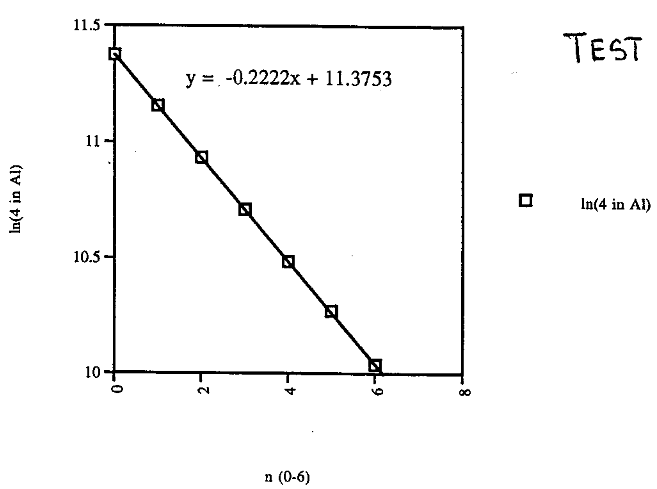
4-14-93

Test 16 LB 4/14/93

1 MIN READINGS

6	22897
5	28850
4	35730
3	44764
2	55969
1	69867
0 Empty Cubes	86941

Larry's data



TEST 16

LB 4/14/93

44,360

$$\frac{.2222}{2.655} = 0.0837$$

4-20-93

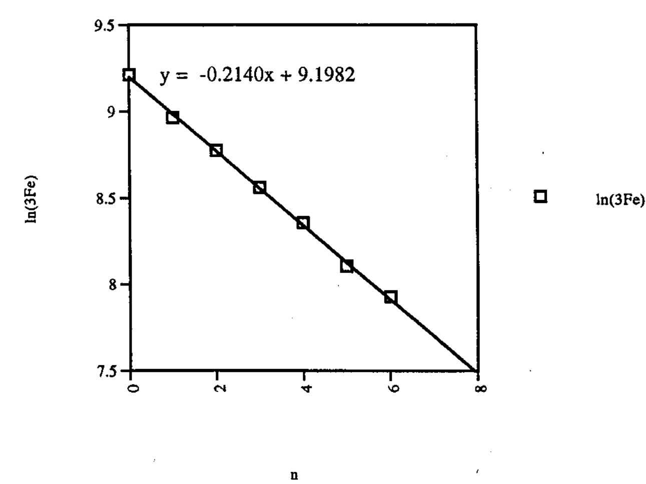
1 MIN READINGS

6	2769
5	3310
4	4245
3	5228
2	6460
1	7802
0 Empty Cubes	10016

LB 4/20/93

3" Fe

Larry data #3



LB 4/20/93

4900

$$\frac{.2140}{2.655} = 0.0806$$

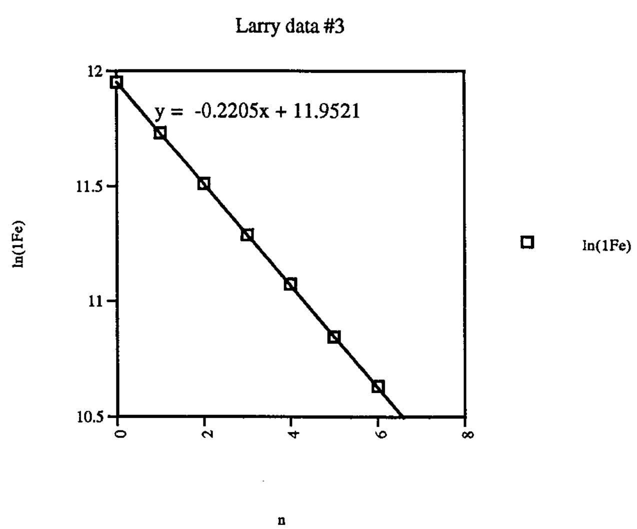
4-20-93

1 MIN READINGS

Cubes	Reading
6	41429
5	51303
4	64351
3	79912
2	99836
1	124708
0 EMPTY CUBES	154998

↑ 1" Fe

LB 4/20/93



LB 4/20/93

66,100

$$\frac{.2205}{2.655} = 0.0831$$

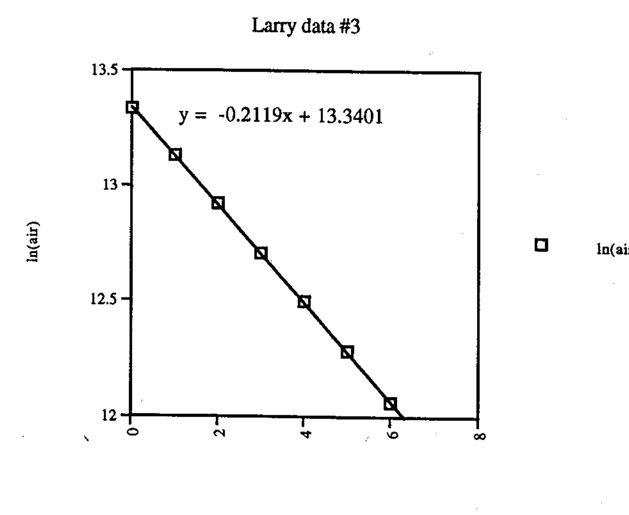
4-20-93

1 MIN READINGS

Cubes	Reading
6	173143
5	215961
4	267064
3	329577
2	408935
1	503736
0 EMPTY CUBES	617439

↑ NOTHING BLOCKING

LB 4/20/93



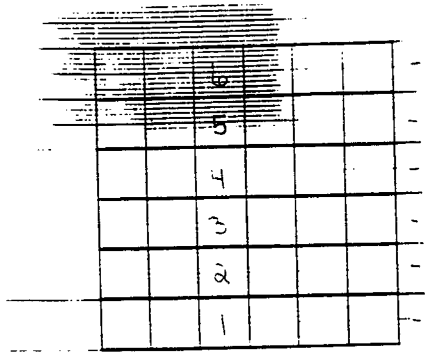
LB 4/20/93

296,000

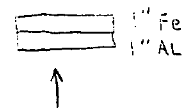
$$\frac{.2119}{2.655} = 0.0798$$

4-20-93

1 MIN READINGS

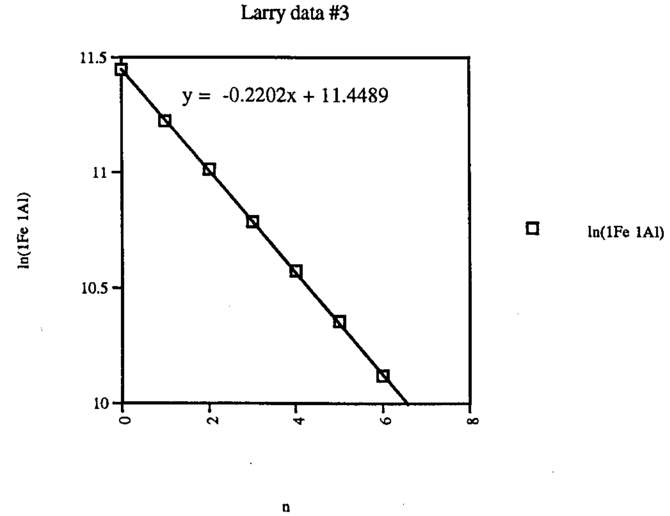


- 6 - 24816
- 5 - 31381
- 4 - 39092
- 3 - 48315
- 2 - 60654
- 1 - 74926
- 0 Empty Cubes - 93723



LB 4/20/93

Larry data #3



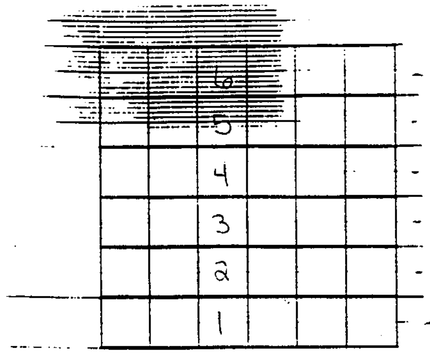
LB 4/20/93

40,000

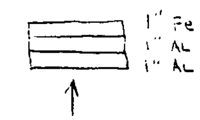
$$\frac{.2202}{2.655} = 0.0829$$

4-20-93

1 MIN READINGS

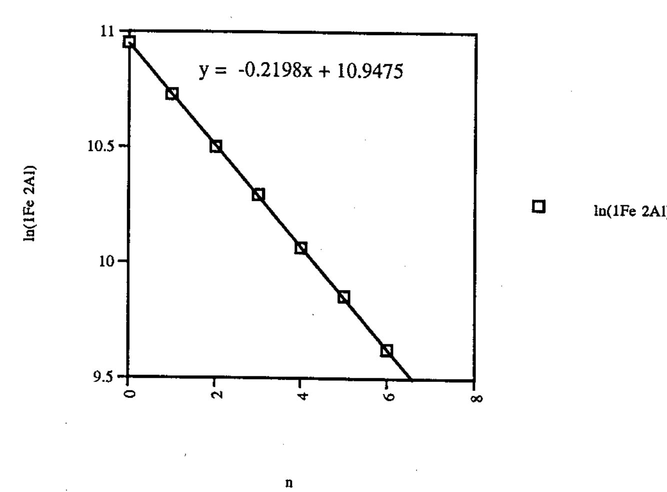


- 6 - 15163
- 5 - 19043
- 4 - 23482
- 3 - 29508
- 2 - 36355
- 1 - 45587
- 0 Empty Cubes - 56984



LB 4/20/93

Larry data #3



LB 4/20/93

27,000

$$\frac{.2198}{2.655} = 0.0828$$

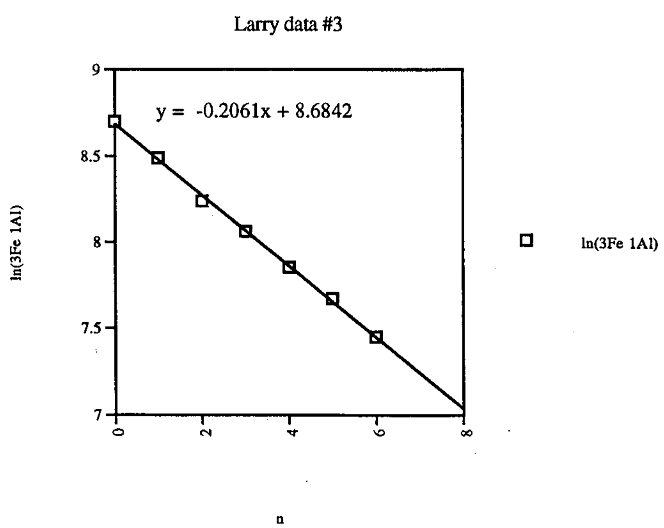
4-20-93

1 MIN READINGS

6	1718
5	2147
4	2571
3	3169
2	3784
1	4859
0 EMPTY CUBES	6000

3" Fe
1" - 1" AL

LB 4/20/93



LB 4/20/93

2,980

$\frac{.2061}{2.655} = 0.0776$

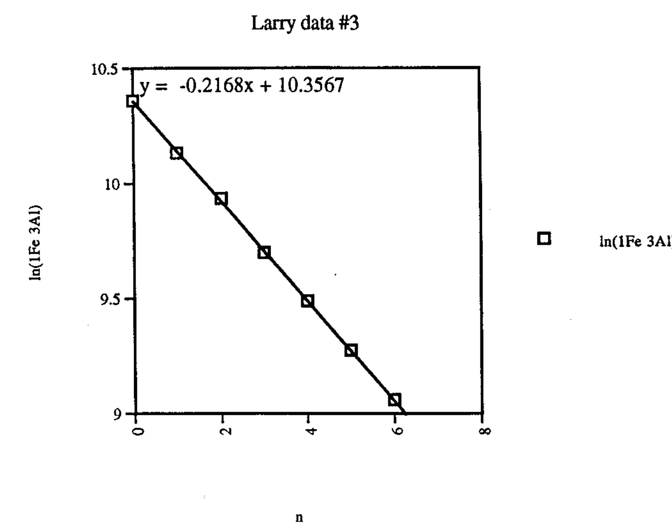
4-20-93

1 MIN READINGS

6	8584
5	10663
4	13189
3	16296
2	20624
1	25149
0 EMPTY CUBES	31563

1" Fe - 1" Fe
1" AL
1" AL } 3" AL
1" AL

LB 4/20/93



LB 4/20/93

14,700

$\frac{.2168}{2.655} = 0.0817$

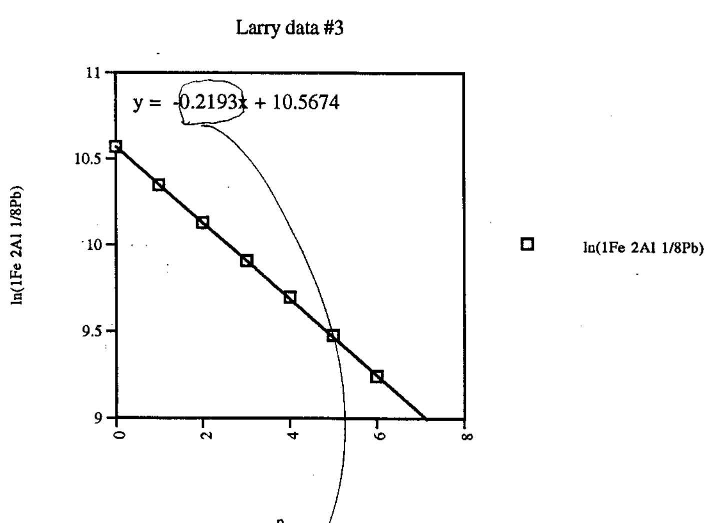
4-20-93

1 MIN READINGS

6	10328
5	13064
4	16292
3	20087
2	25043
1	31141
0 Empty Cubes	38816

1" Fe > 2" AL 1/8" Pb

LB 4/20/93



LB 4/20/93

14,750

$$\frac{.2193}{2.655} = 0.0826$$

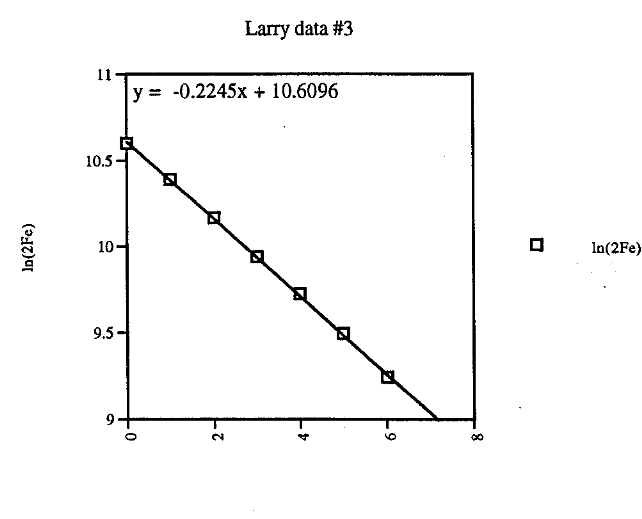
4-20-93

1 MIN READINGS

6	10358
5	13286
4	16686
3	20734
2	25934
1	32507
0 Empty Cubes	40041

1" Fe, 1" Fe > 2" Fe

LB 4/20/93



LB 4/20/93

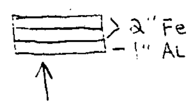
16,300

$$\frac{0.2245}{2.655} = 0.0846$$

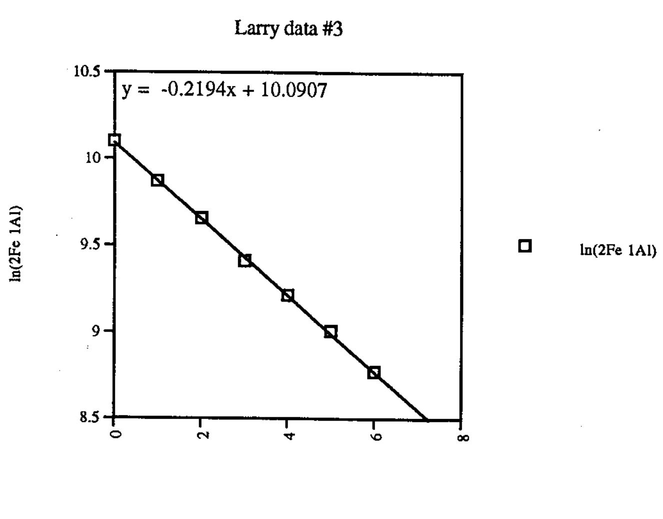
4-20-93

1 MIN READINGS

6	6462
5	8180
4	10017
3	12204
2	15580
1	19327
0 EMPTY CUBES	24358



LB 4/20/93



13,400

$$\frac{0.2194}{2.655} = 0.0826$$

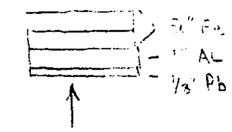
LB 4/20/93

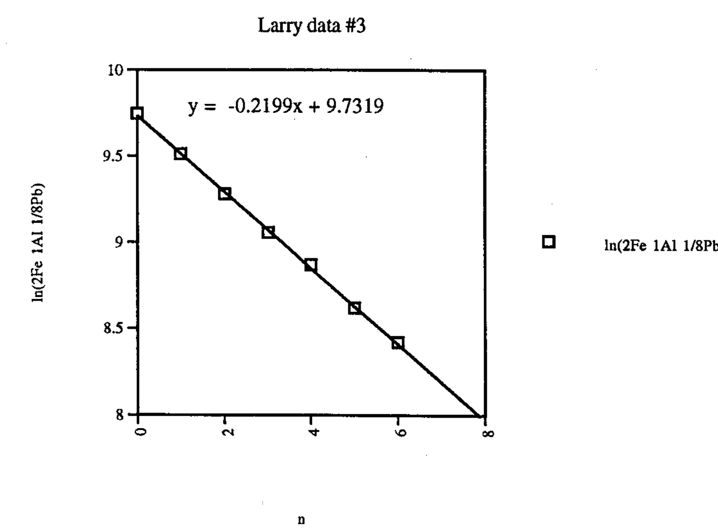
4-20-93

1 MIN READINGS

6	4541
5	5545
4	7131
3	8567
2	10735
1	13494
0 EMPTY CUBES	17063

LB 4/20/93





LB 4/20/93

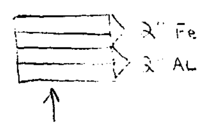
8,100

$$\frac{.2199}{2.655} = 0.0828$$

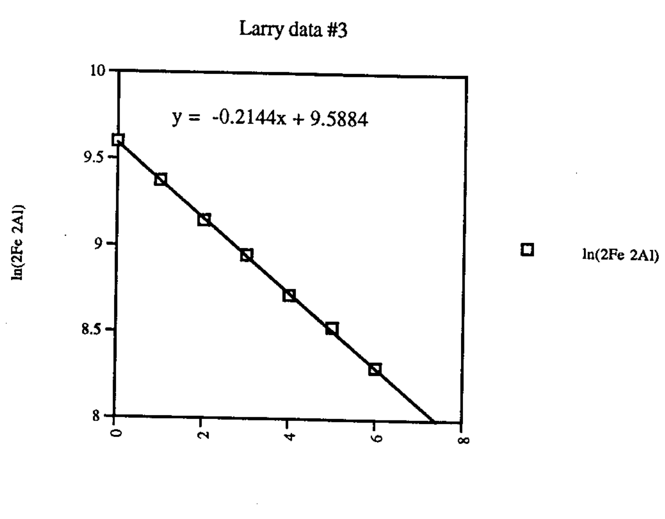
4-20-93

1 min Readings

Cubes	Reading
6	4022
5	5081
4	6109
3	7692
2	9380
1	11787
0 Empty Cubes	14717



LB 4/20/93



LB 4/20/93

5,400

$$\frac{0.2144}{2.655} = 0.0808$$

LB 4/20/93 THE MEASURED ATTENUATION COEFFICIENTS FOR WATER ARE PLOTTED AS A FUNCTION OF THE INITIAL ATTENUATION MEDIUM. THE DATA SHOWS THAT THE MEASURED VALUE IS DEPENDENT ON THE INITIAL COUNT RATE. AT VERY LOW COUNT RATES, THE COEFFICIENT IS UNDERESTIMATED. THESE RESULTS INDICATE μ_w = 0.083 +- 0.002 1/cm. BASED ON THESE VALUES, THE SYSTEM SHOULD BE OPERATED ABOVE 10,000 Kpm.

RDM 9/14/93 All of the data points from pages 12-40 are compiled into one plot on pg 6 of this notebook. The plot on pg 6 indicates μ_w = fcn of kpm.

Pages 42 Through 50 Are Intentionally
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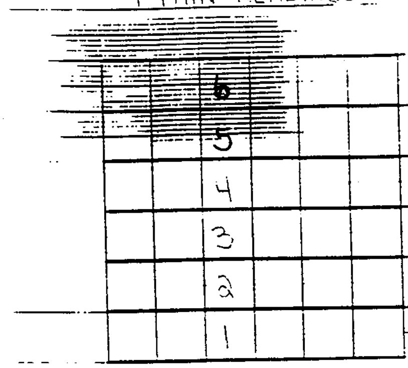
LB 4/21/93 LINEAR ATTENUATION COEFFICIENT FOR 325 MESH:

THE TRAY WAS SUCCESSIVELY FILLED WITH DRY AND SATURATED ALUMINA POWDER (325 MESH).

4-21-93

1 MIN READINGS

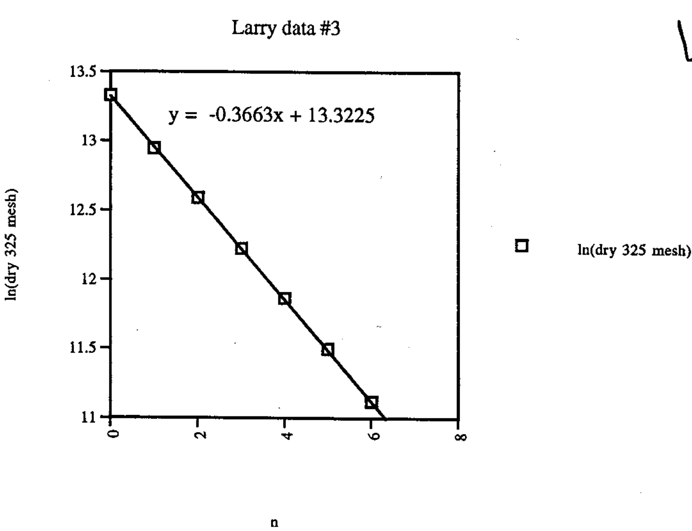


- 6 - 67215
- 5 - 98297
- 4 - 142256
- 3 - 203699
- 2 - 293993
- 1 - 418679
- 0 EMPTY CUBES - 614843

↑

DRY 325 MESH
ALUMINA POWDER
PACKED INTO EACH CUBE

LB

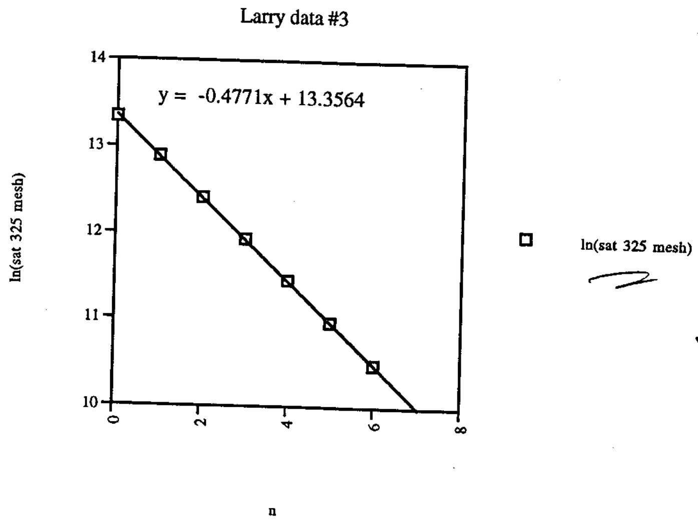


LB

LB

163,000

$$\frac{.3663}{2.655} \simeq 0.1380$$



$$\frac{.4771}{2.655} \quad 0.1797$$

LB

4-21-93

1 MIN READINGS

Cubes	Reading
6	35743
5	57837
4	94323
3	152712
2	245706
1	395392
0 Empty Cubes	619288

SATURATED MIXTURE OF 325 MESH "ALUMINA POWDER" PACKED INTO EACH CUBE

LB

~~TE~~ LB

LB 4/21/93 THE RESULTS INDICATE μ 325-DRY = 0.138 1/cm AND μ 325-SAT = 0.1797 1/cm WHICH INDICATES THAT THE ALUMINA POWDER HAS ABOUT TWICE THE ATTENUATION THAT THE WATER HAS.

Pages 54 Through 62 Are Intentionally
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LB 9/1/93 LINEAR ATTENUATION COEFFICIENT FOR PLEXIGLASS:

DIFFERENT THICKNESSES OF PLEXIGLASS WERE USED TO ATTENUATE THE BEAM. IN ADDITION, DIFFERENT THICKNESS OF AL, Fe AND Pb WERE USED TO CHANGE THE STRENGTH OF THE INITIAL BEAM.

LARRY BISHOP 9-1-93

PAGE 1

PLEXIGLASS 1 MIN COUNT

1" PLEX	447648
2" PLEX	354187
3" PLEX	283733
4" PLEX	224556
5" PLEX	177539
6" PLEX	141225

LB 9/1/93

PLEXIGLASS AND ALUMINUM 1 MIN COUNT

1" PLEX	1" AL	272870
2" PLEX	1" AL	214334
3" PLEX	1" AL	171661
4" PLEX	1" AL	135636
5" PLEX	1" AL	107164
6" PLEX	1" AL	85643

(1" AL 341977)

1" PLEX	2" AL	164235
2" PLEX	2" AL	131514
3" PLEX	2" AL	103175
4" PLEX	2" AL	81264
5" PLEX	2" AL	65071
6" PLEX	2" AL	50871

(2" AL 208734)

LARRY BISHOP 9-1-93 PAGE 2

PLEXIGLASS 1 MIN COUNT

LB

PLEXIGLASS AND STEEL 1 MIN COUNT

1" PLEX	1" Fe	106875
2" PLEX	1" Fe	84422
3" PLEX	1" Fe	67079
4" PLEX	1" Fe	53424
5" PLEX	1" Fe	42104
6" PLEX	1" Fe	33650

(1" Fe 134456)

1" PLEX	2" Fe	27679
2" PLEX	2" Fe	22239
3" PLEX	2" Fe	17437
4" PLEX	2" Fe	13768
5" PLEX	2" Fe	11025
6" PLEX	2" Fe	8774

(2" Fe 35259)

PLEXIGLASS AND LEAD 1 MIN COUNT

1" PLEX	1/8 Pb	311800
2" PLEX	1/8 Pb	247232
3" PLEX	1/8 Pb	195517
4" PLEX	1/8 Pb	154809
5" PLEX	1/8 Pb	122578
6" PLEX	1/8 Pb	97625

(1/8 Pb 392850)

1" PLEX	1/4 Pb	218139
2" PLEX	1/4 Pb	170447
3" PLEX	1/4 Pb	134701
4" PLEX	1/4 Pb	103442
5" PLEX	1/4 Pb	85713
6" PLEX	1/4 Pb	67931

(1/4 Pb 274139)

LARRY BISHOP 9-1-93 PAGE 3

LB

PLEXIGLASS STEEL AND LEAD 1 MIN COUNT

1" PLEX	1" Fe	1/4 Pb	57299
2" PLEX	1" Fe	1/4 Pb	44750
3" PLEX	1" Fe	1/4 Pb	35912
4" PLEX	1" Fe	1/4 Pb	28170
5" PLEX	1" Fe	1/4 Pb	22192
6" PLEX	1" Fe	1/4 Pb	17743

(1" Fe 1/4 Pb 71886)

1" PLEX	2" Fe	1/4 Pb	13403
2" PLEX	2" Fe	1/4 Pb	10569
3" PLEX	2" Fe	1/4 Pb	8643
4" PLEX	2" Fe	1/4 Pb	6727
5" PLEX	2" Fe	1/4 Pb	5452
6" PLEX	2" Fe	1/4 Pb	4352

(2" Fe 1/4 Pb 16838)

9/1/93

$I = I_0 e^{(-\mu x)}$

μ = linear attenuation coefficient

LB 9/1/93

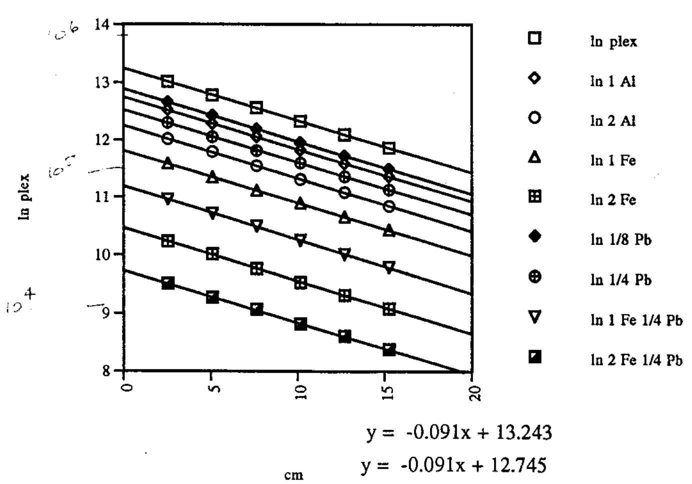
$\ln(I) = -\mu x + \ln(I_0)$

$\therefore$ slope = $-\mu$

LB

Attenuation Coefficient of Plexiglass

Larry's data



y = -0.091x + 13.243
y = -0.091x + 12.745
y = -0.092x + 12.249
y = -0.091x + 11.808
y = -0.091x + 10.462
y = -0.092x + 12.882
y = -0.091x + 12.516
y = -0.092x + 11.186
y = -0.088x + 9.724

$\mu \doteq 0.091 \frac{1}{cm}$ Plexiglass

Now, $\mu_{plexiglass} \approx \mu_{H_2O}$

$0.091 \frac{1}{cm} \gtrsim 0.083$ ✓

LB 9/1/93 THE RESULTS INDICATE THAT μ_{PLEX} = 0.091 +- 0.001 1/cm. THIS INDICATES THAT THE ATTENUATION OF PLEXIGLASS IS ~~COMPA~~ LB COMPERABLE TO ~~THE~~ LB AND SLIGHTLY HIGHER THAN THAT OF WATER.

Pages 67 and 68 Are Intentionally Left Blank

B 10/27/93

SCOPING OF CYL 1

TIME	TC 3 HEATER TEMP	TC 4 WALL TEMP	INSIDE PRESSURE	OUTER PRESSURE
12:00	90.3 °C	20.7 °C	.2	.4
12:07	91.0 °C	20.9 °C	.5	.5
12:20	90.3 °C	21.1 °C	.8	.8
12:28	90.0 °C	21.6 °C	.3	.2
12:35	HEATER OFF			

TURNED HEATER BACK ON AT 3:50 HOOKED UP WATER MANOMETER ONE SIDE WAS HOOKED TO INSIDE PRESSURE AND THE OTHER TO THE OUTSIDE. VOID TEST AT 4:00

				OUTER PRESSURE INCHES OF WATER
11:30	21.1 °C	20.4 °C	0	10/27/93 LB ~~1"~~ 0
11:45	90.4 °C	20.5 °C	0	5"
11:58	90.3 °C	20.7 °C	0	6"
12:07	91.0 °C	20.9 °C	0	8"
12:14	90.2 °C	21.1 °C	0	10"
12:20	90.3 °C	21.1 °C	0	11"
12:28	90.0 °C	21.6 °C	0	OFF SCALE

LB 10/28/93

SCOPING OF CYL 1

TIME:	TC 3 HEATER TEMP	TC 4 WALL TEMP	INSIDE PRESSURE (MANOMETER READINGS)	OUTSIDE PRESSURE (MANOMETER READINGS)
9:34	106.9°C	21.5°C	-.2 TENTHS	.8 TENTHS
9:44	108.0°C	21.6°C	-.2	1"
10:00	109.2°C	21.1°C	-.1	1.4"
11:00	TURNED HEATER OFF			
12:20	TURNED CYLINDER OVER AND TURNED HEATER ON			
12:45	108.9°C	20.9°C	-.2 TENTHS	.2 TENTHS
12:50	109.2°C	21.2°C	.2	.4
12:55	109.5°C	21.3°C	.2	.6
1:00	REMOVED INSIDE PRESSURE LINE AND FORCED AIR IN TO REMOVE WATER FROM LINE. HOOKED LINE BACK UP.			
1:15	110.6°C	19.5°C	.1	1"
1:20	TURNED HEATER OFF			

1/27/94 RJJ

Prepared three test containers for coupled-effects experiments. Two are cylinders to be used in the ~~X-Y~~ RJJ 1/27/94 X-Y densitometer. Both are about 12-13 inches in diameter. One is with aluminum side wall (4") and plexiglass ends. The other has a plexiglass side wall (7") with plexiglass end. The third container is a repeat of Test 6/7.

All three were filled with a concrete mixture: 1 part portland cement and 2 parts silica sand.

Two samples were collected in small cylinders to allow testing of hydraulic properties.

Silicon gel was smeared on the top of the aluminum cylinder and both the top and bottom of the plexiglass cylinder.

These cells will cure for 3 weeks before any scoping tests be attempted

Porosity Test (Pycnometric) C1*2 Sample

KM 2/8/94
For pycnometric method see LAB Book # 078

Volume of chamber w/o sample:

$(15.36psi - ~~4.91psi~~\ 4.25psi)\ 249.64 / 4.25 = 652.59 cm^3$

Volume of chamber w/ sample:

$(15.36 - 4.91)\ 249.64 / 4.91 = 531.31 cm^3$

Volume of solids in sample:

$652.59 - 531.31 = 121.28 cm^3$

Volume of sample (measured w/ ruler):

$\pi \left(\frac{6.75}{2}\right)^2 5 = 178.92\ cm^3$

Porosity of sample:

$\frac{178.92 - 121.28}{178.92} = .322 = 32.2\%$

Initial moisture Content on Sample C1*1

2/10/94

Initial Weight (g)	Final (Dry) Weight (g)
231.8	228.9

2/14/94
C1*1
Change in weight (Dry vs Wet): 2.9 g
=> 2.9 cc in water lost.

Volume of Retaining ring = $19.16 cm^3$

KM 2/22/94 Diameter of sample C1*1 = 6.9 cm
Height of sample = 2.6 cm

volume = $\pi (6.9/2)^2 (2.6) = 97.2\ cm^3$

at 32.2% porosity
moisture content of air dried sample =
$2.9 / (.322 \times 97.2) = 0.093 = 9.3\%$

Km 2/16/94

Cored out sub-samples from Large C1 Cylinder used in scoping (coupled-effects) test.

3 sizes of cores were taken
- a size = 1.9 cm diameter
- B size = 5.01 cm diameter
- C size = 7.64 cm diameter

Cores split up into layers upon coring. These layers appear to be packing layers.

Km 2/22/94

Cut B and A size samples (From C1) for moisture retention curve.

Volume of samples

C1A1 =	$2.55 cm^3$	C1B1 =	$46.13 cm^3$
C1A2 =	$2.44 cm^3$	C1B2 =	$19.71 cm^3$
C1A3 =	$2.58 cm^3$	C1B3 =	$47.31 cm^3$
C1A4 =	$2.61 cm^3$	C1B4 =	$38.44 cm^3$
C1A5 =	$2.30 cm^3$		
C1A6 =	$2.67 cm^3$		
C1A7 =	$2.64 cm^3$		
C1A8 =	$2.38 cm^3$		
C1A9 =	$2.67 cm^3$		
C1A10 =	$2.58 cm^3$		
C1A11 =	$2.52 cm^3$		
C1A12 =	$2.52 cm^3$		
C1A13 =	$2.41 cm^3$		
C1A14 =	$2.69 cm^3$		
C1A15 =	$2.87 cm^3$		
C1A16 =	$2.58 cm^3$		

placed samples in oven to dry.

2/23/94

C1A Dry weights

Sample	Dry weight (g)
C1A 13	4.116
C1A 12	4.730
C1A 1	4.292
C1A 5	4.157
C1A 11	4.656
C1A 7	4.411
C1A 14	4.764
C1A 10	4.624
C1A 3	4.386
C1A 2	4.181
C1A 8	4.484
C1A 6	4.434
C1A 15	4.351
C1A 9	4.556
C1A 16	4.810
C1A 4	4.442

C1B4 Dry Weight 70.739g

3/11/94 C1B4 SAT weight 82.2g

Saturated all samples 2/23/94

3/3/94

C2*1 Initial Weight ~~328.~~ 3/3/94 328.1 g

C2*2 Initial Weight 183.1g

Put in Oven to Dry overnight

3/4/94

C2*1 Dry weight 321.7g

C2*2 Dry weight

3/11/94 C2*1 Satud.(g) = 400.5

Km 12/26/94 Vol C2*2 = $67.69 cm^3$ ~~C2*2~~ C2*1 = $183.33 cm^3$

TEST = Ksat

Sample ID: CICI   Date: 3/7/94

Investigators: KM

Notes: h = 4.5 cm   D = 7.64 cm   V = 206.30 cm³

wt_{SAT} = 432.2 g

DP: 3 psi (psig)	Date: 3/7/94	Start time: 0.0 sec	Stop Time: 60 sec	
Pressures		Fluid Levels(ml)		
Pressure	Set Pressure(psig)	Level	Inital	Final
Confining	9.7	Confining	0.8	0.8
Inflow	8.0	Inflow	6.7	20.6
Outflow	5.0	Outflow	21.4	7.3
Change in Fluid level(ml)				
Confining:		Inflow: −13.9	Outflow: +14.1	

DP: 3 psi (psig)	Date: 3/7/94	Start time: 0.0	Stop Time: 60 sec	
Pressures		Fluid Levels(ml)		
Pressure	Set Pressure(psig)	Level	Inital	Final
Confining	9.7	Confining	0.8	0.8
Inflow	8.0	Inflow	~~3? [illegible]~~ 5.3	21.4
Outflow	5.0	Outflow (KM 3/7/94)	~~22.0~~ 23.1	6.9
Change in Fluid level(ml)				
Confining:		Inflow: −16.1	Outflow: +16.2	

DP: 3 psi (psig)	Date: 3/7/94	Start time: 0.0	Stop Time: 60 sec	
Pressures		Fluid Levels(ml)		
Pressure	Set Pressure(psig)	Level	Inital	Final
Confining	9.7	Confining	0.8	0.8
Inflow	8.0	Inflow	4.0	21.5
Outflow	5.0	Outflow	23.9	6.2
Change in Fluid level(ml)				
Confining:		Inflow: −17.5	Outflow: +17.7	

DP: 3 psi (psig)	Date: 3/7/94	Start time: 0.0	Stop Time: 60 sec	
Pressures		Fluid Levels(ml)		
Pressure	Set Pressure(psig)	Level	Inital	Final
Confining	9.7	Confining	0.8	0.8
Inflow	8.0	Inflow	3.3	21.8
Outflow	5.0	Outflow	22.6	3.9
Change in Fluid level(ml)				
Confining:		Inflow: −18.5	Outflow: +18.7	

Continued on page: ___________

Sample ID: 3/7   TEST = Ksat   Continued on pg:

DP: 3 psi	Date:		Start time:	Stop Time: 60 sec
Pressures			Fluid Levels	
	Inital	Final	Inital	Final
Confining	9.9	9.9	Confining: KM 3/7/94 ~~3.1~~ 0.8	~~23.~~ 0.8
Inflow	8.0	8.0	Inflow: 3.1	KM 3/7/94 ~~23.3~~ 19.9
Outflow	5.0	5.0	Outflow: 23.3	6.3
Change in Fluid level ~~−16.8~~ KM 3/7/94				
Confining: 3/7/94		Inflow: −16.8		Outflow: +17.0

DP: 3 psi	Date: 3/7/94		Start time:	Stop Time: 60 sec
Pressures			Fluid Levels	
	Inital	Final	Inital	Final
Confining	10.0	10.0	Confining: 0.8	0.8
Inflow	8.0	8.0	Inflow: 2.6	20.0
Outflow	5.0	5.0	Outflow: 23.1	6.1
Change in Fluid level				
Confining:		Inflow: −17.4		Outflow: +17.0

DP: 3 psi	Date: 3/7/94		Start time: 0.0	Stop Time: 60 sec
Pressures			Fluid Levels	
	Inital	Final	Inital	Final
Confining	10.4	10.4	Confining: 0.6	
Inflow	8.0	8.0	Inflow: 3.5	20.4
Outflow	5.0	5.0	Outflow: 23.6	6.6
Change in Fluid level				
Confining:		Inflow: −16.9		Outflow: +17.0

DP: 4 psi	Date: 3/7/94		Start time:	Stop Time: 60 sec
Pressures			Fluid Levels (KM 3/7/94 ~~60 sec~~)	
	Inital	Final	Inital	Final
Confining	10.4	10.4	Confining: 1.5	1.5
Inflow	8.0	8.0	Inflow: 1.9	24.3
Outflow	5.0	5.0	Outflow: 24.1	1.6
Change in Fluid level				
Confining:		Inflow: −22.4		Outflow: +22.5

DP: 4 psi	Date: 3/7/94		Start time: 0.0	Stop Time: 60 sec
Pressures			Fluid Levels	
	Inital	Final	Inital	Final
Confining	10.4	10.4	Confining: 1.5	1.5
Inflow	8.0	8.0	Inflow: 1.7	23.6
Outflow	5.0	5.0	Outflow: 23.1	1.0
Change in Fluid level				
Confining:		Inflow: −21.9		Outflow: +22.1

Sample ID: C1C1 TEST = Ksat Continued on pg:

DP: 4psi | Date: 3/7/94 | Start time: 0.0 | Stop Time: 60 sec

	Pressures			Fluid Levels	
	Inital	Final		Inital	Final
Confining	10.3		Confining	0.6	0.6
Inflow	8.0		Inflow	2.5	22.6
Outflow	4.0		Outflow	24.7	4.4

Change in Fluid level

Confining: Inflow: -20.1 Outflow: +20.3

DP: 4psi | Date: 3/7/94 | Start time: 0.0 | Stop Time: ~~60sec~~ 55sec KM 3/7/94

	Pressures			Fluid Levels	
	Inital	Final		Inital	Final
Confining	10.3		Confining	1.5	1.5
Inflow	8.0		Inflow	2.9	23.4
Outflow	4.0		Outflow	23.6	3.1

Change in Fluid level

Confining: Inflow: -20.5 Outflow: +20.7

DP: 4psi | Date: 3/7/94 | Start time: | Stop Time: 55sec

	Pressures			Fluid Levels	
	Inital	Final		Inital	Final
Confining			Confining	1.5	1.5
Inflow			Inflow	2.2	22.7
Outflow			Outflow	24.4	3.7

Change in Fluid level

Confining: Inflow: -20.5 Outflow: +20.7

DP: 4psi | Date: 3/7/94 | Start time: | Stop Time: 60sec (KM 3/7/94 ~~60sec~~)

	Pressures			Fluid Levels	
	Inital	Final		Inital	Final
Confining	10.3		Confining	1.5	1.5
Inflow	8.0		Inflow	1.5	23.8
Outflow	4.0		Outflow	23.9	1.4

Change in Fluid level

Confining: Inflow: -22.3 Outflow: +22.5

DP: 5psi | Date: 3/7/94 | Start time: | Stop Time: 55sec

	Pressures			Fluid Levels	
	Inital	Final		Inital	Final
Confining	10.4		Confining	1.5	1.5
Inflow	8.0		Inflow	1.3	24.6
Outflow	3.0		Outflow	23.7	0.3

Change in Fluid level

Confining: Inflow: -23.3 Outflow: +23.4

Sample ID: C1bC1 TEST = Ksat Continued on pg:

DP: 2psi | Date: 3/7/94 | Start time: 0.0 | Stop Time: 90sec

	Pressures			Fluid Levels	
	Inital	Final		Inital	Final
Confining	10.4		Confining	1.5	1.5
Inflow	8.0		Inflow	1.1	20.7
Outflow	6.0		Outflow	24.0	4.2

Change in Fluid level

Confining: Inflow: -19.6 Outflow: +19.8

DP: 2psi | Date: 3/7/94 | Start time: 0.0 | Stop Time: 100sec

	Pressures			Fluid Levels	
	Inital	Final		Inital	Final
Confining	10.4		Confining	1.5	1.5
Inflow	8.0		Inflow	1.5	22.5
Outflow	6.0		Outflow	20.7	1.5

Change in Fluid level

Confining: Inflow: -21.0 Outflow: 19.2

DP: 2psi | Date: 3/7/94 | Start time: 0.0 | Stop Time: 100sec

	Pressures			Fluid Levels	
	Inital	Final		Inital	Final
Confining	10.4		Confining	1.0	1.0
Inflow	8.0		Inflow	3.9	23.5
Outflow	6.0		Outflow	23	2.1

Change in Fluid level

Confining: Inflow: -19.6 Outflow: +20.9

DP: 2psi | Date: 3/7/94 | Start time: 0.0 | Stop Time: 100sec

	Pressures			Fluid Levels	
	Inital	Final		Inital	Final
Confining	10.4		Confining	1.0	1.0
Inflow	8.0		Inflow	3.1	23.7
Outflow	6.0		Outflow	23.8	3.1

Change in Fluid level

Confining: Inflow: -20.6 Outflow: +20.7

DP: 1psi | Date: 3/7/94 | Start time: 0.0 | Stop Time: 100sec

	Pressures			Fluid Levels	
	Inital	Final		Inital	Final
Confining	10.4		Confining	1.0	1.0
Inflow	8.0		Inflow	0.7	13.0
Outflow	7.0		Outflow	23.1	10.6

Change in Fluid level

Confining: Inflow: -12.3 Outflow: +12.5

Sample ID: C1×C1		TEST = Ksat			Continued on pg:
DP: 1psi	Date: 3/7/94	Start time:		Stop Time: 100 sec	
KM	Pressures (psi)		Fluid Levels (ml)		
	Inital	Final		Inital	Final
Confining	10.4	10.4	Confining	1.0	1.0
Inflow	8.0	8.0	Inflow	13.0	21.0
Outflow	7.0	7.0	Outflow	10.6	2.5
Change in Fluid level					
Confining:		Inflow: -8.0		Outflow: +8.1	

DP: 1psi	Date: 3/7/94	Start time:		Stop Time: 100sec	
KM	Pressures		Fluid Levels		
	Inital	Final		Inital	Final
Confining	10.4	10.4	Confining	1.0	1.0
Inflow	8.0	8.0	Inflow	2.0	13.9
Outflow	7.0	7.0	Outflow	23.5	11.5
Change in Fluid level					
Confining:		Inflow: -11.9		Outflow: +12	

DP: 1psi	Date: 3/7/94	Start time:		Stop Time: 100 sec	
KM	Pressures		Fluid Levels		
	Inital	Final		Inital	Final
Confining	10.4	10.4	Confining	1.0	1.0
Inflow	8.0	8.0	Inflow	13.9	21.7
Outflow	7.0	7.0	Outflow	11.5	3.6
Change in Fluid level					
Confining:		Inflow: -7.8		Outflow: +7.9	

DP: 1psi	Date: 3/7/94	Start time: 0.0		Stop Time: 200 sec	
KM	Pressures		Fluid Levels		
	Inital	Final		Inital	Final
Confining	10.4	~~10.4~~ KM 3/7/94 10.4	Confining	1.0	1.0
Inflow	8.0	8.0	Inflow	2.9	22.4
Outflow	7.0	7.0	Outflow	24.5	4.7
Change in Fluid level					
Confining:		Inflow: -19.5		Outflow: +19.8	

DP:	Date:	Start time:		Stop Time:	
	Pressures		Fluid Levels		
	Inital	Final (KM)		Inital	Final
Confining			Confining		
Inflow			Inflow		
Outflow			Outflow		
Change in Fluid level					
Confining:		Inflow:		Outflow:	

Sample ID: C1×C1		TEST = Ksat			Continued on pg:
DP: 5psi	Date: 3/7/94	Start time:		Stop Time: 55sec	
KM	Pressures		Fluid Levels		
	Inital	Final		Inital	Final
Confining	10.4	10.4	Confining	KM 3/7/94 ~~0.7~~ 10.4	10.4
Inflow	8.0 psi	8.0	Inflow	0.7	23.9
Outflow	3.0 psi	3.0	Outflow	24.2	0.9
Change in Fluid level					
Confining:		Inflow: -23.2		Outflow: +23.3	

DP: 5psi	Date: 3/7/94	Start time: ~~23.2~~ KM 3/7/94		Stop Time: ~~+23.3~~ 55 sec	
KM	Pressures		Fluid Levels		
	Inital	Final		Inital	Final
Confining	10.4	10.4	Confining	1.4	1.4
Inflow	8.0 psi	8.0	Inflow	0.9	24.0
Outflow	3.0 psi	3.0	Outflow	24.6	1.3
Change in Fluid level					
Confining:		Inflow: -23.1		Outflow: +23.3	

DP: 5psi	Date: 3/7/94	Start time:		Stop Time: 55 sec	
KM	Pressures		Fluid Levels		
	Inital	Final		Inital	Final
Confining	10.4	10.4	Confining	1.5	1.5
Inflow	8.0	8.0	Inflow	1.2	24.2
Outflow	3.0	3.0	Outflow	24.2	1.0
Change in Fluid level					
Confining:		Inflow: -23.0		Outflow: +23.2	

DP: 5psi	Date: 3/7/94	Start time:		Stop Time: 55sec	
KM	Pressures		Fluid Levels		
	Inital	Final		Inital	Final
Confining	10.4	10.4	Confining	1.5	1.5
Inflow	8.0	8.0	Inflow	0.6	23.6
Outflow	3.0	3.0	Outflow	24.3	1.0
Change in Fluid level					
Confining:		Inflow: -23.0		Outflow: +23.3	

DP: 2psi	Date: 3/7/94	Start time:		Stop Time: 90sec	
KM	Pressures		Fluid Levels		
	Inital	Final		Inital	Final
Confining	10.4	10.4	Confining	1.5	1.5
Inflow	8.0	8.0	Inflow	0.5	20.4
Outflow	6.0	6.0	Outflow	24.4	4.2
Change in Fluid level					
Confining:		Inflow: -19.9		Outflow: +20.2	

KM

c1xc1

Cement 1 ksat

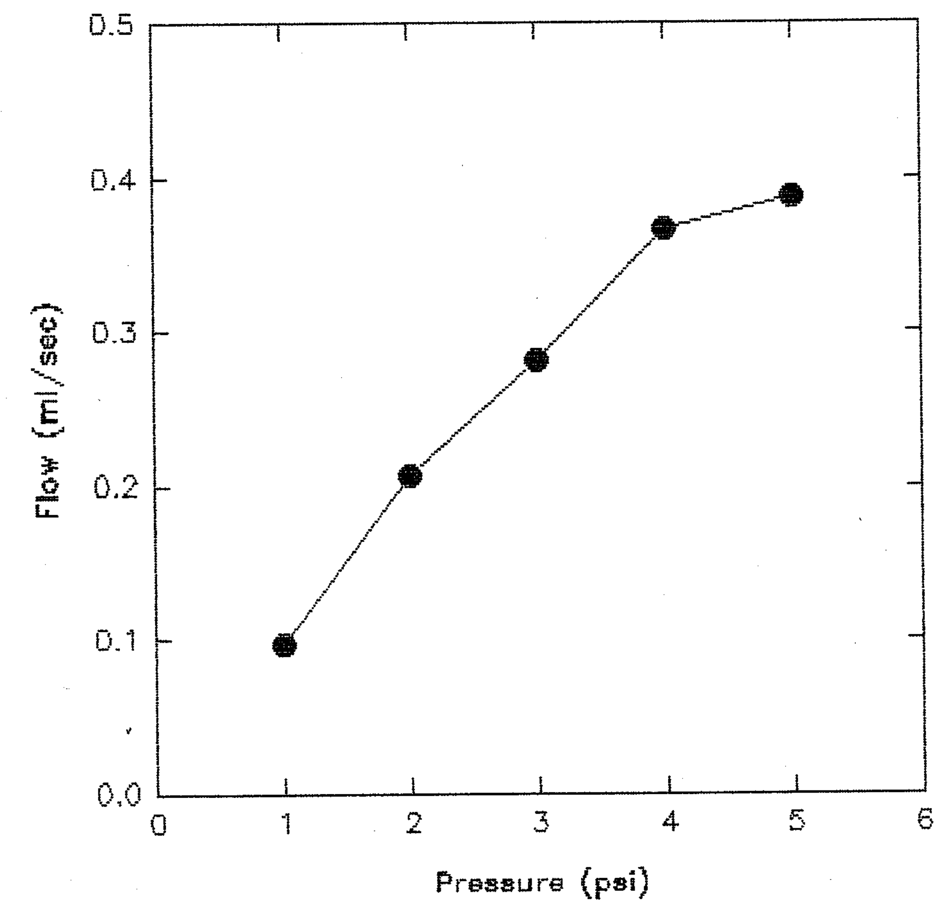
Flow (ml/sec)	Press (psi)
0.0975	1
0.206	2
0.282	3
0.367	4
0.388	5

KM 3/7/94

KM

KM 3/7/94 C1xC1

Cement #1



Cl*Cl cont. (m 3/7/94

$K = \frac{QL}{A(t)h}$

t = time need not be added in because time is already included in Q; all subsequent calculations are correct. M.H. 3/27/96

at 1psi $K = (9.75 \cdot 4.5)/(45.84 \cdot (100) \cdot 70.31)$
$= 1.36e^{-4}$ cm/s

at 2psi $K = \frac{QL}{Ah} = (.206 \cdot 4.5)/(45.84 \cdot 140.62) =$
$1.44e^{-4}$ cm/s

at 3psi $K = (.282 \cdot 4.5)/(45.84 \cdot 210.93) =$
$1.312e^{-4}$ cm/s

at 4psi $K = (.367 \cdot 4.5)/(45.84 \cdot 281.24)$
$= 1.708e^{-4}$ cm/s

TEST = AquaLab Yr: 1994

Notes: Concrete sample Cl saturated

Investigators: [signature]

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
ClA * 11	2/25	5.274	5.264	.993	26.9
ClA * 1	2/25	4.926	4.921	.995	26.6
ClA * 16	2/25	5.479	5.473	.995	26.6
ClA * 8	2/25	5.176	5.165	.993	26.7
ClA * 4	2/25	5.150	5.144	.992	27.3
ClA * 2	2/25	4.804	4.799	.994	27.3
ClA * 10	2/25	5.259	5.253	.995	26.7
ClA * 7	2/25	5.163	5.158	.999	27.4
ClA * 3	2/25	5.043	5.038	.991	27.0
ClA * 14	2/25	5.420	5.416	.995	26.6
ClA * 15	2/25	4.989	4.985	.995	27.1
ClA * 5	2/25	4.778	4.770	.996	27.1
ClA * 12	2/25	5.320	5.313	.992	26.9
ClA * 6	2/25	5.073 2/25/94	5.069	.995	27.1
ClA * 13	2/25	~~4.784~~ 4.660	4.658	.993	26.6
ClA * 9	2/25	5.290	5.287	.996	27.1

(m 2/26/94

Continued on page: ____________

[signature] 2/26/94

TEST = AquaLab Yr: 1994

Notes: Run #1 Air Dry time = 15 min
Run #2 Air Dry time = 160 min

Investigators: [signature]

	Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
Run 1	CIA * 1	2/28	4.878	4.863	.993	23.5
	CIA * 2	2/28	4.7~~3~~56 (2/28/94)	4.748	.995	23.5
	CIA * 3	2/28	4.991	4.987	.992	23.7
	CIA * 4	2/28	5.087	5.086	.994	23.6
	CIA * 5	2/28	4.718	4.717	.996	23.3
	CIA * 6	2/28	5.027	5.024	.995	23.9
	CIA * 7	2/28	5.109	5.108	.995	24.0
	CIA * 8	2/28	5.126	5.121	.994	24.1
	CIA * 9	2/28	5.248	5.247	.994	23.8
	CIA * 10	2/28	5.211	5.209	.995	23.9
	CIA * 11	2/28	5.222	5.220	.995	24.2
	CIA * 12	2/28	5.270	5.267	.993	24.0
	CIA * 13	2/28	4.622	4.621	.994	23.8
	CIA * 14	2/28	5.375	5.373	.992	23.7
	CIA * 15	2/28	4.945	4.942	.994	23.5
	CIA * 16	2/28	5.439	5.434	.996	23.5
Run 2	CIA * 1	3/3	4.532	4.530	.811	23.6
	CIA * 2	3/3	4.408	4.406	.832	24.5
	CIA * 3	3/3	4.658	4.652	.858	25.1
	CIA * 4	3/3	4.725	4.723	.866	25.7
	CIA * 5	3/3	4.389	4.387	.814	26.1
	CIA * 6	3/3	4.697	4.695	.840	26.4
	CIA * 7	3/3	4.664	4.662	.816	26.7
	CIA * 8	3/3	4.767	4.764	.842	26.9
	CIA * 9	3/3	4.817	4.815	.863	26.1
	CIA * 10	3/3	4.913	4.910	.831	27.1
	CIA * 11	3/3	4.950	4.948	.824	27.2
	CIA * 12	3/3	4.999	4.997	.855	27.3
	CIA * 13	3/3	4.330	4.328	.808	27.4
	CIA * 14	3/3	5.053	5.051	.849	27.4
	CIA * 15	3/3	4.618	4.615	.866	27.5
	CIA * 16	3/3	5.089	5.085	.845	27.5

Continued on page: 87

TEST = AquaLab Yr. 1994

Notes: Run #1 Air Dry time = 10 min
Run #2 Air Dry time =
① Aqualab recalibrated after this measurement

Investigators: [signature]

	Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
Run 1	CIA * 1	3/4	4.524	4.522	.774	24.5
	CIA * 2	3/4	4.384	4.384	.723	25.4
	CIA * 3	3/4	4.628	4.626	.771	26.8
	CIA * 4	3/4	4.703	4.702	.802	27.0
	CIA * 5	3/4	4.369	4.366	.755	27.0
	CIA * 6	3/4	4.672	4.670	.681	27.3
	CIA * 7	3/4	4.635	4.635	.681	27.5
	CIA * 8	3/4	4.744	4.742	.783	27.6
	CIA * 9 (3/4/94)	3/4	4.790	4.790	.754	27.5
	CIA * 10	3/4	4.891	4.890	.763	27.6
	CIA * 11	3/4	4.929	4.927	.769	27.7
	CIA * 12	3/4	4.977	4.976	.759	27.8
	CIA * 13	3/4	4.305	4.303	.713	27.2
	CIA * 14	3/4	5.027	5.027	.745	27.7
	CIA * 15	3/4	4.592	4.587	.745	27.8
	CIA * 16	3/4	5.064	5.064	.730	27.7
Run 2	CIA * 1	3/10	4.503	4.502	.704 ~~.458~~	26.6
~~Run 2~~	CIA * 1 ①	3/7	4.503	4.508	.954	26.8
	CIA * 2	3/10	4.361	4.360	.528	27.4
	CIA * 3	3/10	4.608	4.608	.626	27.5
	CIA * 4	3/10	4.683	4.681	.640	27.7
	CIA * 5	3/10	4.350	4.350	.561	27.9
	CIA * 6	3/10	4.653	4.651	.564	28.0
	CIA * 7	3/10	4.623	4.622	.588	28.2
	CIA * 8	3/10	4.722	4.720	.598	28.4
	CIA * 9	3/10	4.768	4.765	.568	28.4
	CIA * 10	3/10	4.875	4.871	.609	28.5
	CIA * 11	3/10	4.911	4.911	.625	28.6
	CIA * 12	3/10	4.958	4.957	.595	28.5
	CIA * 13	3/11	4.283	4.282	.593	24.7
	CIA * 14	3/11	4.957	4.956	.646	25.2
	CIA * 15	3/11	4.572	4.572	.654	26.1
	CIA * 16	3/11	5.041	5.040	.616	27.0

Continued on page:

3/11/94 Ceramic samples (SA*) Cut and measured for Area.

SA*1	height (cm) = .67	width (cm) = 1.90
SA*2	height (cm) = .61	width (cm) = 1.90
SA*3	height (cm) = .69	width (cm) = 1.90
SA*4	height (cm) = .70	width (cm) = 1.90
SA*5	height (cm) = .79	width (cm) = 1.90

AREA (cm^2)	Volume (cm^3)
SA*1 = 2.84	SA*1 = 1.90
SA*2 = 2.84	SA*2 = 1.73
SA*3 = 2.84	SA*3 = 1.96
SA*4 = 2.84	SA*4 = 1.99
SA*5 = 2.84	SA*5 = 2.24

Ceramic sample SB*1 height = 3.52 cm w = 5.01 cm
Volume = 69.38 cm^3

3/14/94
Dry weights: SA*1 = 3.145 (g) SA*4 = 3.389
SA*2 = 2.998 (g) SA*5 = 3.720 (g)
SA*3 = 3.211 (g)

Dry weigth SB*1 = 128.05 g

Saturated samples: SA*1, 2, 3, 4, 5 and SB*1

KM 3/14/94 Porosity of C1B4

(SAT wt − Dry wt) / Vol =

(82.2 − 70.739) / 38.44 = 0.298

TEST = VPPE 1 * SB * 2

KM 3/31/94 Set up VPPE cell according to instructions FOUND in MEDIA LAB BOOK # 097 on page 31. Sample to be tested is SB * 2 (ceramic).

Sample ID: SB * 2 TEST = VPPE 1 * SB * 2

Notes: Did not use Vapor Saturator
4/4/94 Gas turned off at valve left at 0.2" Hg. 2.75 ml loss due to evaporation?

Investigators: KM

	Date	Gas Pressure ("Hg)	New Pressure ("Hg)	Δ ϑ (ml)
KM	4/1/94	0.2"	—	—
KM	4/4/94	0.2"	~~0.8~~ ~~0.6~~ KM 4/4/94 4/19/94	-2.75 ml
KM	4/5/94	0.2"	0.4"	+1.98 ml
KM	4/6/94	0.6"	1.0"	0.0 ml
SS	4/7/94	1.0	2.0	.33
KM	4/11/94	2.0	3.0	+0.11 ml
KM	4/12/94	3.0	4.0	+0.03 ml
KM	4/13/94	4.0	6.0	-0.10 ml
KM	4/14/94	6.0	8.0"	+0.135
KM	4/15/94	8.0	9.0"	+1.05 ml
KM	4/19/94	9.0"	10"	+6.83 ml

KM

cont pg. 94

Sample ID: VIT * 2 TEST = VPPE * 2

Notes: 3/21 set up test. Packed saturated VIT * 2 clay into brass ring 5.0 cm diameter + 5.0 cm high.

Investigators: KM

	Date	Gas Pressure ("Hg)	New Pressure ("Hg)	Δ ϑ (ml)
KM	3/22/94	0.2	—	~~+10.6 ml~~
KM	3/23/94	~~0.4~~ 0.2 (KM 3/23/94)	0.4	+10.6 ml
KM	3/25	0.4	0.6	+7.12 ml
KM	3/28/94	0.6	0.8	+0.21 ml
KM	3/30/94	0.8	1.0	+0.1 ml
KM	3/31/94	1.0	1.6	-0.18 ml
KM	4/1/94	1.6	2.0	+0.24
KM	4/4/94	2.0	4	0.00
KM	4/5/94	4.0	5"	+1.68 ml
KM	4/6/94	5.0"	6"	+0.8 ml
SS	4/7/94	6"	7"	~~+.33~~ ?

Continued on page: 92

KM

Sample ID: V1T*2 TEST = VPPE*2

Notes:

Investigators:

Date	Gas Pressure("Hg)	New Pressure("Hg)	Δ Q (ml)
4/11/94	7"	8"	+5.41
KM 4/12/94	8"	9"	+1.0 ml
KM 4/13/94	9"	10"	~~+2.~~ KM 4/13/94 +1.15 ml
KM 4/14/94	10"	11"	+0.74 ml
~~KM 4/15/94~~	~~11"~~ KM 4/15/94	~~12"~~	~~+1.05 ml~~
KM 4/15/94	11	12"	0.96 ml
KM 4/19/94	12"	13"	+2.72 ml
KM 4/21/94	13"	14"	+0.60 ml
KM 4/22/94	14"	16"	+0.20 ml
KM 4/27/94	16"	18"	+0.40 ml
KM 4/28/94	18"	19"	+1.3 ml

Continued on page: 106

KM 4/28/94

4/18/94 C3B*1 Cement sample cored: Core cut to A size. Diameter of "A" cores: ~~1.9~~ cm (4/18/94)

C3A samples are subsample of C3B*1 core

Volumes of C3A*1 = .72 cm^3
C3A*2 = .38 cm^3
C3A*3 = .65 cm^3
C3A*4 = .80 cm^3
C3A*5 = .78 cm^3
C3A*6 = .70 cm^3
C3A*7 = .65 cm^3
C3A*8 = .66 cm^3
C3A*9 = .51 cm^3
C3A*10 = .63 cm^3

Volumes incorrect KM 1/3/95

Placed C3A samples in Oven to dry

4/20/94 Dry weights (g)

C3A*1 = 2.857	C3A*6 : 2.950
C3A*2 = 2.118	C3A*7 = 2.735
C3A*3 = 2.688	C3A*8 = 2.863
C3A*4 = 3.069	C3A*9 = 2.476
C3A*5 = 3.092	C3A*10 : 2.746

Saturated C3A samples

From pg 90

Sample ID: SB*2 TEST = VPPE 1*SB*2

Notes:
* 4/27/94 ΔQ = ≥+8.10. Unknown amount lost out end of pipet. Should be able to back out amount at the end of the run. Km
8/5/94 Km This test did not use Vapor saturator

Investigators: Km

Date	Gas Pressure("Hg)	New Pressure("Hg)	Δ ∂ (ml)
Km 4/21/94	10"	11"	+1.25 ml
Km 4/22/94	11"	12"	+2.22 ml
Km 4/27/94	12"	13"	≥+8.10 ml *
Km 4/28/94	13" Hg	14"	+4.75 ml
Km 5/4/94	14"	15"	+6.98 ml
Km 5/9/94	15"	16"	+6.58 ml
Km 5/11/94	16"	16"	+2.28 ml
Km 5/12/94	16"	16"	+0.72 ml
Km 5/13/94	16"	16"	+0.75 ml
Km 5/16/94	16"	16"	+1.42
Km 5/17/94	16"	16"	+0.35 ml

Continued on page: 107

Sample ID: SAN COR-005 TEST = VPPE 4*SANCOR5

Notes: 4/19/94 Set up test According to directions in LAB Book #047 page #31. Saturation achieved by resting core in WATER on TOP OF PLATE. WATER WAS Aprox. 0.4 cm deep. After saturation core had swelled creating A Dome at the top of the Ring. took photos of core. 4/21

Investigators: Km

4/21 set gas = 0.4" Hg

Date	Gas Pressure("Hg)	New Pressure("Hg)	Δ ∂ (ml)
Km 4/22/94	0.4	0.6	+0.97 ml
Km 4/27/94	0.6	0.8	−0.12 ml
Km 4/28/94	0.8	1.0	−0.06 ml
Km 5/9/94	1.0	1.6	−0.25 ml
Km 5/11/94	1.6	2.0	+0.03 ml
Km 5/12/94	2.0	3.0	+0.13 ml
Km 5/13/94	3.0	4.0	+0.51 ml
Km 5/16/94	3.0	4.0	0.00
Km 5/17/94	4.0	5.0	+0.58 ml
Km 5/18/94	5.0	6.0	+0.58 ml
Km 5/23/94	6.0	7.0	+0.86 ml

Continued on page: 111

Sample ID: SANCOR *004 TEST = VPPE

Notes: see notes for SANCOR *005 (pg 95).
4/21 set P_g = 0.4" Hg

Investigators: KM

	Date	Gas Pressure("Hg)	New Pressure("Hg)	Δ Q (ml)
KM	4/22/94	0.4"	0.6	+2.05 ml
KM	4/27/94	0.6"	0.8"	−0.38 ml
KM	4/28/94	0.8"	1.0"	+0.3 ml
KM	5/9/94	1.0"	1.6"	+0.1 ml
KM	5/11/94	1.6"	2.0	+0.45 ml
KM	5/12/94	2.0	3.0	+0.70 ml
KM	5/13/94	3.0	4.0	+1.87 ml
KM	5/16/94	3.0	4.0	+0.23 ml
KM	~~5/16/94~~ KM 5/17/94	4.0	5.0	+2.05 ml
KM	5/18/94	5.0	6.0	+1.90 ml
KM	5/23/94	6.0	7.0	+2.55 ml

Continued on page: 100

TEST = AquaLab

Notes: Initial saturated weights and activity

Investigators: [signature], KM Yr: 1994

	Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
[initials]	SA*1	3/22	3.931	3.928	.990	27.2
	SA*2	3/22	3.752	3.749	.988	27.5
	SA*3	3/22	4.019	4.015	.991	27.4
	SA*4	3/22	4.250	4.245	.989	27.6
	SA*5	3/22	4.672	4.667	.991	27.2
[initials]	SA*1	3/23	3.~~805~~ 766 g	3.763	.990	27.8
	SA*2	3/23	3.675	3.669	.995	27.8
	SA*3	3/23	3.950	3.946	.996	27.6
	SA*4	3/23	4.185	4.183	.996	27.4
	SA*5	3/23	4.598	4.595	.996	27.7
KM	SA*1	3/25/94	3.695	3.689 / 3.688	0.996/.996	28.4/28.4
	DI H_2O	3/25/94	–	–	.996	27.5
	DI H_2O	3/25	–	–	1.000	28.1
	DI H_2O	3/28	–	–	.998	26.0
	Na Cl	3/28	–	–	.756	26.0
[initials]	SA*1	3/28	3.664	3.661	.993	27.0
	SA*2	3/28	3.607	3.606	.997	27.0
	SA*3	3/28	3.891	3.888	.99~~8~~6	27.0
	SA*4	3/28	4.112	4.109	.992	26.9
	SA*5	3/28	4.539	4.537	.996	26.7
					~~.998~~	~~29~~
KM	DI H_2O	3/30			.998	29.1
	NaCl	3/30			.751	28.6
	SA*1	3/30	3.531	3.529	.994	29.3
	SA*2	3/30	3.437	3.429	.994	29.4
	SA*3	3/30	3.763	3.756	.996	29.3
	SA*4	3/30	3.973	3.968	.996	28.7
	SA*5	3/30	4.415	4.411	.997	28.3

Continued on page: 98

TEST = AquaLab

Notes:

Investigators: Yr: 1994

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
DI H_2O	3/31			.999	24.3
NaCl	3/31			.757	24.9
SA*1	3/31	3.475	3.47~~8~~2 (4/4/94)	.997	25.2
SA*2	3/31	3.357	3.353	.997	25.6
SA*3	3/31	3.687	3.683	.994	25.7
SA*4	3/31	3.929	3.925	.994	25.8
SA*5	3/31	4.357	4.350	.997	26.1
DI H_2O	4/1			.999	26.5
NaCl	4/1			.756	26.3
SA*1	4/1	3.268	3.265	.991	27.4
SA*2	4/1	3.130	3.127	.993	27.4
SA*3	4/1	3.500	3.496	.994	27.4
SA*4	4/1	3.716	3.710	.99~~8~~1 (4/9/94)	27.5
SA*5	4/1	4.131	4.122	.997	27.8
DI H_2O	4/4			.999	26.6
NaCl	4/4			.757	26.3
SA*1	4/4	3.158	3.156	.975 (4/9/94)	27.2
SA*2	4/4	3.020	3.018	.986 ~~.969~~ (4/9/94)	27.4 ~~27.3~~
SA*3	4/4	3.369	3.367	.995	27.3
SA*4	4/4	3.567	3.564	.993	27.3
SA*5	4/4	3.996	3.995	.996	27.4
DI H_2O	4/6			1.000	27.1
NaCl	4/6			.757	27.6
SA*1	4/6	3.143	3.140	.313	29.1
SA*2	4/6	2.997	2.997	.281	29.2
SA*3	4/6	3.207	3.207	.291	29.9
SA*4	4/6	3.394	3.391	.959	30.0
SA*5	4/6	3.767	3.764	.988	29.8

Continued on page: 99

TEST = AquaLab

Notes: Initial Saturated weights and activities for 2nd run on ceramic samples

Investigators: Yr: 1994

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
DI H_2O	4/11			1.000	25.6
NaCl	4/11			.757	26.0
SA*1	4/11	3.928	3.924	.989	26.5
SA*2	4/11	3.747	3.744	.992	26.5
SA*3	4/11	4.016	4.012	.993	26.9
SA*4	4/11	4.245	4.241	.992	27.4
SA*5	4/11	4.664	4.660	.994	27.6
DI H_2O	4/13	~~1.000~~ 4/13/94		1.000	26.7
NaCl	4/13			.756	26.9
SA*1	4/13	3.347	3.344	.992	27.3
SA*2	4/13	3.702	3.697	.992	27.4
SA*3	4/13	3.969	3.967	.992	27.7
SA*4	4/13	4.196	4.193	.993	27.9
SA*5	4/13	4.619	4.611	.991	28.0
DI H_2O	4/14			1.000	25.6
NaCl	4/14			.757	25.8
SA*1	4/14	3.305	3.304	.991	25.8
SA*2	4/14	3.660	3.655	.996	25.8
SA*3	4/14	3.930	3.927	.993	25.9
SA*4	4/14	4.159	4.157	.993	25.7
SA*5	4/14	4.576	4.574	.994	26.0
DI H_2O	4/18			1.000	24.2
NaCl	4/8			.757	24.5
SA*1	4/18	3.265	3.261	.995	25.0
SA*2	4/18	3.609	3.607	.995	25.0
SA*3	4/18	3.874	3.870	.993	25.4
SA*4	4/18	4.102	4.099	.994	25.3
SA*5	4/18	4.512	4.510	.995	25.7

Continued on page: ~~100~~ 4/18/94 100

TEST = AquaLab

Notes: 4/8/94 Resaturated SA*1-5 for new data run. [initials]

Investigators: [initials] Yr: 1994

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
DI H_2O	4/7	~~3.140~~ [initials] 4/7/94		.999	26.4
NaCl	4/7			.756	26.2
SA*1	4/7	3.140	3.140	.255	27.0
SA*2	4/7	2.997	2.997	.257	27.1
SA*3	4/7	3.207	3.207	.267	27.3
SA*4	4/7	3.385	3.385	.264	27.4
SA*5	4/7	3.725	3.722	.448	27.6
DI H_2O	4/8			1.000	25.2
NaCl	4/8			.756	25.6
SA*4	4/8	3.384	3.383	.501	26.1
SA*5	4/8	3.717	3.716	.465	26.4
~~DI H_2O~~					
~~NaCl~~ [initials] 4/18/94		End of Run	4/8/94 [initials]		
~~SA*1~~					
~~SA*2~~					

[initials] 4/22/94

Continued on page: ____________

[initials] 4/22/94

[initials]

TEST = AquaLab

Notes: ① Initial saturated weight and activity
② Data Run terminated Samples resaturated. 3/18/94

Investigators: ____________ Yr: 1994

	Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
①	SA*1	3/16	3.931	3.926	.998	26.8
	SA*2	3/16	3.749	3.747	.994	27.1
	SA*3	3/16	4.019	4.015	.998	26.8
	SA*4	3/16	4.252	4.250	.994	27.4
	SA*5	3/16	4.672	4.670	.996	27.6
②	SA*1	3/18	3.231	3.228	.489	27.1
	SA*2	3/18	3.094	3.090	.491	27.2
	SA*3	3/18	3.292	3.289	.492	27.4
	SA*4	3/18	3.497	3.495	.492	27.3
	SA*5	3/18	3.796	3.794	.489	27.4

[initials] 4/22/94

Continued on page: ____________

[initials] 4/22/94

TEST = AquaLab

Notes:

Investigators: [signature], KM   Yr: 1994

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
CIA * 10	2/25	5.259	5.253	.995	26.7
CIA * 12	2/25	5.420	5.416	.995	26.6
CIA * 10	2/28	5.211	5.209	.995	23.9
CIA * 12	2/28	5.375	5.373	.992	23.7
CIA * 10	3/3	4.913	4.910	.831	27.1
CIA * 12	3/3	5.053	5.051	.849	27.4
CIA * 10	3/4	4.891	4.890	.763	27.6
CIA * 12	3/4	5.027	5.027	.745	27.7
CIA * 10	3/10	4.875	4.871	.609	28.5
CIA * 12	3/10	4.957	4.956	.646	25.2
CIA * 10	3/11	4.863	4.862	.538	28.4
CIA * 12	3/11	4.950	4.949	.522	28.1
CIA * 10	3/14	4.859	4.858	.655	26.5
CIA * 12	3/14	4.945	4.944	.649	26.5
CIA * 10	3/30	4.844	4.844	0.599	28.4
CIA * 12	3/30	4.926	4.927	0.521	28.3
CIA * 10	4/6	4.823	4.823	.411	27.9
CIA * 12	4/6	4.913	4.913	.398	27.9
CIA * 10	4/7	4.820	4.819	.347	27.7
CIA * 12	4/7	4.908	4.908	.358	27.5

KM 4/21/94

KM 4/21

Continued on page: ____________

KM 5/19/94

TEST = AquaLab

Notes:

Investigators: [signature]   Yr: 1994

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
DI H_2O	4/20	~~3.232~~ [initials] 4/20/94	NA	1.000	23.8
NaCl	4/20	NA	NA	.757	24.1
SA * 1	4/20	3.232	3.231	.994	24.3
SA * 2	4/20	3.566	3.564	.996	24.6
SA * 3	4/20	3.832	3.832	.997	24.7
SA * 4	4/20	4.063	4.061	.997	25.1
SA * 5	4/20	4.462	4.461	.998	25.1
DI H_2O	4/21	NA	NA	1.000	23.8
NaCl	4/21	NA	NA	.756	24.2
SA * 1	4/21	3.194	3.191	.985	25.0
SA * 2	4/21	3.499	3.497	.996	25.1
SA * 3	4/21	3.773	3.773	.995	25.0
SA * 4	4/21	3.998	3.998	.997	25.1
SA * 5	4/21	4.399	4.398	.993	25.6
DI H_2O	4/22	NA	NA	.999	24.8
NaCl	4/22	NA	NA	.756	24.3
SA * 1	4/22	3.165	3.161	.982	25.2
SA * 2	4/22	3.452	3.451	.993	25.4
SA * 3	4/22	3.728	3.727	.993	25.4
SA * 4	4/22	3.951	3.951	.997	25.4
SA * 5	4/22	4.357	4.356	.991	25.8
DI H_2O	4/25	NA	NA	1.000	23.9
NaCl	4/25	NA	NA	.757	24.2
SA * 1	4/25	3.140	3.140	.574	24.8
SA * 2	4/25	3.061	3.058	.991	25.1
SA * 3	4/25	3.365	3.365	.994	25.2
SA * 4	4/25	3.590	3.586	.993	25.5
SA * 5	4/25	3.926	3.924	.994	25.6

[initials] 4/27/94

Continued on page: ____________

TEST = AquaLab

Notes:

Investigators: [signature]

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
DI H_2O	4/27	NA	NA	.999	25.8
NaCl	4/27	NA	NA	.740	25.6
SA*1	4/27	3.141	3.141	.592	26.0
SA*2	4/27	3.014	3.009	.475	26.2
SA*3	4/27	3.296	3.295	.992	26.1
SA*4	4/27	3.505	3.505	.993	26.1
SA*5	4/27	3.832	3.828	.993	26.1
DI H_2O	4/28	NA	NA	1.000	23.5
NaCl	4/28	NA	NA	.757	23.5
SA*1	4/28	3.140	3.140	.563	24.1
SA*2	4/28	2.997	2.997	.537	24.4
SA*3	4/28	3.256	3.253	.485	24.6
SA*4	4/28	3.461	3.459	.488	24.8
SA*5	4/28	3.787	3.786	.490	24.9
DI H_2O	4/29	NA	NA	.999	24.1
NaCl	4/29	NA	NA	.756	24.5
~~SA*1~~ [initials] 4/29/93	4/29		[initials] 4/29/93		
~~SA*2~~ [initials] 4/29/93	4/29				
SA*3	4/29	3.207	3.207	.589	25.1
SA*4	4/29	3.383	3.383	.605	25.2
SA*5	4/29	3.715	3.715	.590	25.3
DI H_2O	5/2	NA	NA	1.000	23.1
NaCl	5/2	NA	NA	.758	23.4
SA*3	5/2	3.207	3.207	.592	23.8
SA*4	5/2	3.382	3.382	.556	24.2
SA*5	5/2	3.715	3.714	.548	24.4

Continued on page: ____________

KM 5/19/94

5/19/94 Wts + lengths of dry C4 samples

* Samples were in oven at 105°C for 48 hrs.

~~C4*C1~~ Km 5/19/94

Sample ID	Wt dry (g)	L cm
C4*C1	189.21	2.51
C4*A1	3.160	0.69
C4*A2	3.373	0.73
C4*A3	3.297	0.71
C4*A4	4.278	0.97
C4*A5	2.746	0.63
C4*A6	3.174	0.70
C4*A7	2.557	0.60
C4*A8	3.011	0.71
C4*A9	2.984	0.65
C4*A10	3.456	0.73
C4*A11	2.894	0.64
C4*A12	2.593	0.59
C4*A13	3.003	0.68
C4*A14	3.776	0.87
C4*A15	2.661	0.63
C4*A16	2.301	0.53
C4*A17	2.576	0.56
C4*A18	3.445	0.76

5/19/94 KM

Above dry samples were place in SATURATOR

Vacuume pulled = ~~H~~ Km 5/19

= -10.84 psi

From 92

Sample ID: VIT*2 TEST = VPPE *2 cont

Notes: From page 92

Investigators:

Date	Gas Pressure("Hg)	New Pressure("Hg)	Δ ? (ml)
5/4/94	19"	20"	+2.5ml
5/9/94	20"	22"	+1.55ml
5/11/94	22"	22"	+0.45ml
5/12/94	22"	28"	+0.20
~~5/13~~ 5/13/94	28"		
5/16/94	28"	~~32"~~ 30.8" (Km 5/16/94)	+0.81ml
5/17/94	30.8"	30.8	+0.15ml
5/19/94	32.6	32.6	+0.00
5/19/94	32.6	30.8	—
5/23/94	30.8	30.0	+0.50
5/26/94	30.0	29.0	+0.02

Continued on page: 118

Km 5/19/94

Sample ID: SB*2 TEST = VPPE 1*SB*2

Notes: From Pg 94

Investigators: Km

Date	Gas Pressure("Hg)	New Pressure("Hg)	Δ ? (ml)
~~5/18/94~~ Km 5/18/94			
5/19/94	16"	16"	+0.78
5/22/94	16"	16"	+0.50
Km 5/26/94	16"	17"	0.00
5/30/94	17"	18"	-0.05
Km 5/31/94	18"	20	0.00
Km 6/2/94	20"	22"	-0.04
Km 6/6/94	22"	20	-1.28ml
6/10/94	20"	18	-0.58ml
Km 6/15/94	~~19"~~ 18" (Km 6/15/94)	16	-0.56ml
Km 6/21/94	16	14	+1.1ml

Continued on page: 123

5/23/94 fm

SAT Wts of C4 Samples

Sample ID	Wt SAT (g)
C4*A1	3.802
C4*A2	4.023
C4*A3	3.925
C4*A4	5.218
C4*A5	3.333
C4*A6	3.844
C4*A7	3.017
C4*A8	3.686
C4*A9	~~C4*A9~~ 3.590 fm 5/23/94
C4*A10	4.117
C4*A11	3.470
C4*A12	3.131
C4*A13	3.598
C4*A14	4.601
C4*A15	3.252
C4*A16	2.823
C4*A17	3.133
C4*A18	4.087
C4*C1	223.86

fm 6/1/94 C4*B1 SAT. weight = 118.76g

fm 5/23

Sample	Mass (dry)(g)	Height (cm)	Vol. (cm^3)	Mass (sat)(g)	Bulk Density	Porosity (grav.)	Porosity (pycn.)	k water m^2
C4*A1	3.16	0.69	1.956	3.802	1.62	0.33	N/A	N/A
C4*A2	3.373	0.73	2.070	4.023	1.63	0.31	N/A	N/A
C4*A3	3.297	0.71	2.013	3.925	1.64	0.31	N/A	N/A
C4*A4	4.278	0.97	2.750	5.218	1.56	0.34	N/A	N/A
C4*A5	2.746	0.63	1.786	3.333	1.54	0.33	N/A	N/A
C4*A6	3.174	0.7	1.985	3.844	1.60	0.34	N/A	N/A
C4*A7	2.557	0.6	1.701	3.017	1.50	0.27	N/A	N/A
C4*A8	3.011	0.71	2.013	3.686	1.50	0.34	N/A	N/A
C4*A9	2.984	0.65	1.843	3.59	1.62	0.33	N/A	N/A
C4*A10	3.456	0.73	2.070	4.117	1.67	0.32	N/A	N/A
C4*A11	2.894	0.64	1.815	3.47	1.59	0.32	N/A	N/A
C4*A12	2.593	0.59	1.673	3.131	1.55	0.32	N/A	N/A
C4*A13	3.003	0.68	1.928	3.598	1.56	0.31	N/A	N/A
C4*A14	3.776	0.87	2.467	4.601	1.53	0.33	N/A	N/A
C4*A15	2.661	0.63	1.786	3.252	1.49	0.33	N/A	N/A
C4*A16	2.301	0.53	1.503	2.823	1.53	0.35	N/A	N/A
C4*A17	2.576	0.56	1.588	3.133	1.62	0.35	N/A	N/A
C4*A18	3.445	0.76	2.155	4.087	1.60	0.30	N/A	N/A
C4*C1	189.21	2.51	115.067	223.86	1.64	0.30		

Sample ID: SAN COR 004 TEST = VPPE 3

Notes:
From pg 96

Investigators: Km

Date	Gas Pressure("Hg)	New Pressure("Hg)	Δ ∂ (ml)
Km 5/26/94	7.0	8.0	+1.95
Km 5/30/94	8.0	9.0	+3.00 ml
Km 5/31/94	9.0	9.0	+1.65 ml
Km 6/2/94	9.0	10.0	~~+0.20~~ +0.30 Km 6/2
Km 6/6/94	10.0	11.0	+0.72 ml
Km 6/10/94	11.0	12	+0.14
Km 6/15/94	12	14	+0.55 ml
Km 6/21/94	14	16	+3.85 ml
Km 6/23/94	16	18	+ 2.05 ml
Km 6/24/94	18	20	+ 0.78 ml
Km 6/28/94	20	24	+ 1.20 ml

Continued on page: 135

Sample ID: SAN COR 005 TEST = VPPE 4

Notes:
From Pg 95

Investigators: Km

Date	Gas Pressure("Hg)	New Pressure("Hg)	Δ ∂ (ml)
Km 5/26/94	7.0	8.0	+0.69
Km 5/30/94	8.0	9.0	+0.87
Km 5/31/94	9.0	9.0	+0.56
Km 6/2/94	9.0	10.0	+0.20
Km 6/6/94	10.0	11.0	+0.25
Km 6/10/94	11.0	12	~~+0.14~~ +0.39 Km 6/10/94
Km 6/15/94	12	14	+0.31 ml
Km 6/21/94	14	16	+ 0.54 ml
Km 6/23/94	16	18	+0.45 ml
Km 6/24/94	18	20	+ 0.33 ml
Km 6/28/94	20	24	+ 0.20 ml

Continued on page: 136

Sample ID: C4*C1 TEST = VPPE 5

Notes: Sample saturated 5/24 Km 5/23

initial wt = 223.86

END WT 225.57

Investigators: Km

Date	Gas Pressure("Hg)	New Pressure("Hg)	Δ ϑ (ml)
Km 5/26/94	0.2	0.2	—
Km 5/30/94	0.2	0.4	+8.25 ml
Km 5/31/94	0.4	0.6	+0.66 ml
Km 6/2/94	0.6	1.0	+0.35
Km 6/6/94	1.0	3.0	-0.15
Km 6/10/94	3.0	4.0	+0.31
Km 6/15/94	4.0	6.0	-0.99
Km 6/21/94	6.0	8.0	-0.69
Km 6/23/94	8.0	12.0	-0.18
Km 6/24/94	12.0	40	-0.04
Km 6/28/94	40.0	—	-0.3 ml

Continued on page: ________

STOP TEST

Wt. of C4 chunk out of sterafoam (sp?) as it was used (same saturation level) in the densitometer experiments. SAMPLE LABELED C4* CHUNK.

Km 6/3/94 $Wt_{(g)}$ = 75.608

Sample was placed in oven for 2 weeks.

wt dry 65.707 g.

Km 6/6/94 Avg. porosity for C4 = 0.32

Avg. bulk density of C4 = 1.578

Volume of C4 chunk = 65.707 / 1.578 = 41.639 cm^3

65.707 × 0.32 = 21.03 g H_2O at saturation

75.608 − 65.707 = 9.901 gms water lost in drying.

9.901/21.03 = 0.4708

Before drying sample was 47.08 % saturated.

Km 6/10/94 Length of SB-1 = 3.52 cm   wt SAT = 160.53 g

Sample ID: SB*1	TEST = Ksat		Continued on pg:	
Start time: 0:00.0	Date: 6/10/94	Stop time: 120.0 sec	Date: 6/10/94	
DP: (psig)	DT: (sec)	Fluid Levels(ml)		
	Set Pressure(psig)		Inital	Final
Confining	103.0	Confining	11.9	12.0
Inflow	~~4.5~~ 5.3	Inflow	3.2	19.6
Outflow	KM 6/10 ~~5.5~~ 4.4	Outflow	21.1	4.5
Change in Fluid level(ml)				
Confining:		Inflow:	Outflow:	

Start time: 0:00.0	Date: 6/10/94	Stop time: 90 sec	Date: 6/10/94	
DP: (psig)	DT: (sec)	Fluid Levels(ml)		
	Set Pressure(psig)		Inital	Final
Confining	103.0	Confining	12.0	12.0
Inflow	5.9	Inflow	2.0	21.9
Outflow	4.4	Outflow	21.5	2.5
Change in Fluid level(ml)				
Confining:		Inflow:	KM 6/10/94 Outflow:	

Start time: 0:00.0	Date: 6/10/94	Stop time: ~~90~~ 70 sec	Date: 6/10/94	
DP: (psig)	DT: (sec)	Fluid Levels(ml)		
	Set Pressure(psig)		Inital	Final
Confining	103.0	Confining	12.0	12.0
Inflow	6.5	Inflow	1.6	22.6
Outflow	4.4	Outflow	23.8	2.7
Change in Fluid level(ml)				
Confining:		Inflow:	Outflow:	

Start time: 0:00.0	Date: 6/10/94	Stop time: 45 sec	Date: 6/10/94	
DP: (psig)	DT: (sec)	Fluid Levels(ml)		
	Set Pressure(psig)		Inital	Final
Confining	103.0	Confining	12.0	12.0
Inflow	7.6	Inflow	1.9	22.3
Outflow	4.4	Outflow	22.2	2.0
Change in Fluid level(ml)				
Confining:		Inflow:	Outflow:	

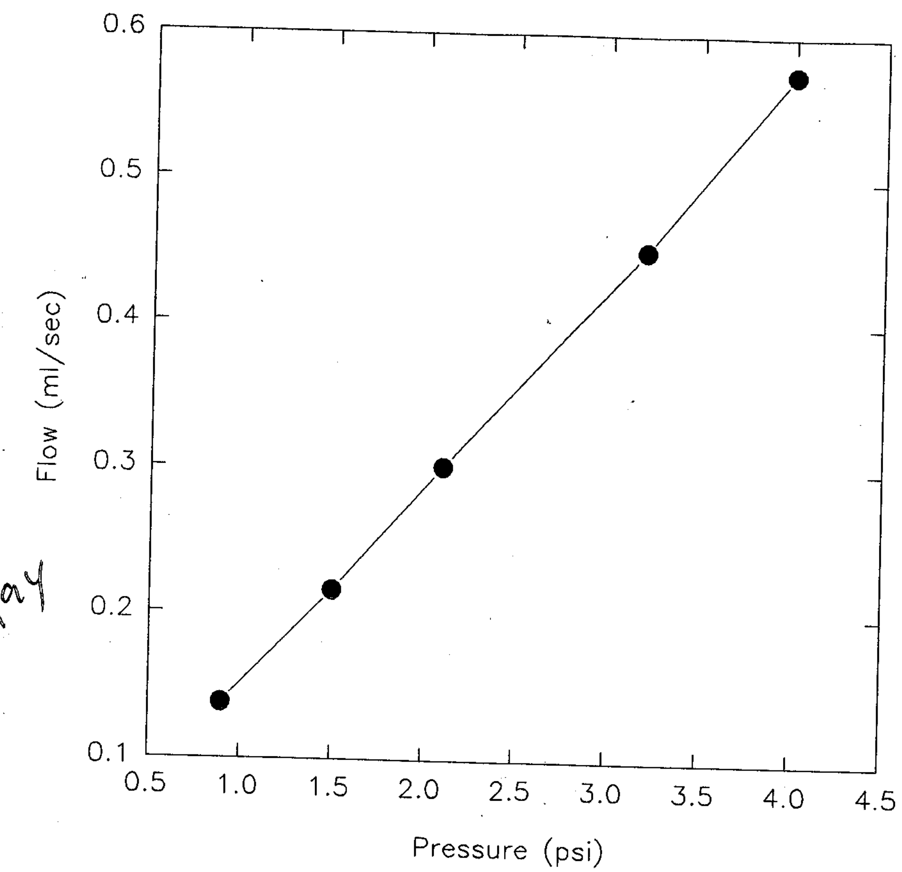
Start time: 0:00.0	Date: 6/10/94	Stop time: 35 sec	Date: 6/10/94	
DP: (psig)	DT: (sec)	Fluid Levels(ml)		
	Set Pressure(psig)		Inital	Final
Confining	103.0	Confining	12.0	12.0
Inflow	8.4	Inflow	1.5	22.1
Outflow	4.4	Outflow	22.4	2.8
Change in Fluid level(ml)				
Confining:		Inflow:	Outflow:	

KM 6/10/94

KM 6/10/94

~~QPRO File~~
SB1.SPS
← Sigma Plot File

SB*1



KM 6/10/94

sample	dP(psi	dL(cm)	A(cm^2)	Flow(	t(sec)	Flow/t	dP(cm h2	dP(pa)
S*B	0.9	3.52	19.71	16.5	120	1.38E-01	63.28	6.21E+03
	1.5	3.52	19.71	19.45	90	2.16E-01	105.46	1.03E+04
	2.1	3.52	19.71	21.05	70	3.01E-01	147.65	1.45E+04
	3.2	3.52	19.71	20.3	45	4.51E-01	224.98	2.21E+04
	4	3.52	19.71	20.1	35	5.74E-01	281.23	2.76E+04

QPRO File
KSAT.WK1
KM 6/10/94

Ksat(cm/s)	Ksat(m/s)	k (m^2)
3.88E-04	3.88E-06	3.88E-09
3.66E-04	3.66E-06	3.66E-09
3.64E-04	3.64E-06	3.64E-09
3.58E-04	3.58E-06	3.58E-09
3.65E-04	3.65E-06	3.65E-09

$\frac{16.5}{120} = 0.1375$ ✓

TEST = Ksat

Sample ID: C4*B1*1 Date: 5/19/94

Investigators: KMeyer

Notes:

Start time: 0:0.0	Date: 5/19/94	Stop time: 39:38.85	Date: 5/19/94	
DP: (psig)	DT: (sec)	Fluid Levels(ml)		
	Set Pressure(psig)		Inital	Final
Confining	102.7	Confining	10.8	10.7
Inflow	98.0	Inflow	5.7	5.9
Outflow	5.0	Outflow	18.5	18.0
Change in Fluid level(ml)				
Confining:		Inflow:		Outflow:

(crossed out: KM 5/20)

Start time:	Date: 5/19/94	Stop time:	Date:	
DP: (psig)	DT: (sec)	Fluid Levels(ml)		
	Set Pressure(psig)		Inital	Final
Confining	102.7	Confining	10.7	
Inflow	90.0	Inflow	5.85	
Outflow	5.0	Outflow	24.05	
Change in Fluid level(ml)				
Confining:		Inflow:		Outflow:

(crossed out: KM 5/23)

Start time: 2:45	Date: 5/20/94	Stop time:	Date:	
DP: (psig)	DT: (sec)	Fluid Levels(ml)		
	Set Pressure(psig)		Inital	Final
Confining	103.4	Confining	1.6	
Inflow	96	Inflow	3.0	
Outflow	5	Outflow	21.3	
Change in Fluid level(ml)				
Confining:		Inflow:		Outflow:

Start time: 1:50	Date: 5/24/94	Stop time: 10:45	Date: 5/25/94	
DP: (psig)	DT: (sec)	Fluid Levels(ml)		
	Set Pressure(psig)		Inital	Final
Confining	101.9	Confining	1.8	4.6
Inflow	100.0	Inflow	6.1	7.1
Outflow	5.0	Outflow	18.3	17.4
Change in Fluid level(ml)				
Confining:		Inflow:		Outflow:

Continued on page: __________

TEST = Ksat

Sample ID: C4*B1 Date: 5/25/94

Investigators:

Notes:
* 5/26 [illegible] VENTED was not pressurized to 10psi

Start time: 12:47	Date: 5/25/94	Stop time: 11:42	Date: 5/26/94	
DP: (psig)	DT: (sec)	Fluid Levels(ml)		
	Set Pressure(psig)		Inital	Final
Confining	104.8	Confining	4.5	4.9
Inflow	100	Inflow	7.25	8.0
Outflow	~~40~~ KM 5/25 10	Outflow	19.55	—×— *
Change in Fluid level(ml)				
Confining:		Inflow:		Outflow:

Start time: 11:45	Date: 5/26/94	Stop time: 9:57	Date: 5/27/94	
DP: (psig)	DT: (sec)	Fluid Levels(ml)		
	Set Pressure(psig)		Inital	Final
Confining	104.9	Confining	4.9	4.0
Inflow	60.0	Inflow	8.0	8.3
Outflow	10.0	Outflow	18.9	15.9
Change in Fluid level(ml)				
Confining:		Inflow:		Outflow:

Start time: 9:57	Date: 5/27/94	Stop time: 8:25	Date: 5/31/94	
DP: (psig)	DT: (sec)	Fluid Levels(ml)		
	Set Pressure(psig)		Inital	Final
Confining	102.9	Confining	2.7	4.1
Inflow	50	Inflow	8.15	7.95
Outflow	10	Outflow	24.9	23.6
Change in Fluid level(ml)				
Confining:		Inflow:		Outflow:

(crossed out: 5/31/94 KM)

Start time:	Date:	Stop time:	Date:	
DP: (psig)	DT: (sec)	Fluid Levels(ml)		
	Set Pressure(psig)		Inital	Final
Confining		Confining		
Inflow		Inflow		
Outflow		Outflow		
Change in Fluid level(ml)				
Confining:		Inflow:		Outflow:

Continued on page: __________

Sample ID: V1T *2 TEST = VPPE

Notes: From Pg 106

Investigators: KM

Date	Gas Pressure ("Hg)	New Pressure ("Hg)	Δ V (ml)
5/30/94	29	28	+0.24
KM 5/31/94	28	27	+ 0.20
KM 6/2/94	27	26	-0.12
KM 6/6/94	26	25	-0.82
6/10/94	25	24	-0.74
KM 6/15/94	24	~~24~~ 23 (KM 6/15)	-0.78
KM 6/21/94	22.6	21	+0.75
KM 6/23/94	21	19	-0.04
KM 6/24/94	19	17	+0.02
KM 6/28/94	17	15	± 0.00
KM 7/6/94	15	13	-0.18

KM 6/15/94

Continued on page: 137

6/16/94 G.W. Bulk volume of samples ~~SAND*020*1~~ SAN-020*1 (6/16/94 G.W.) and ~~SAND*020*2~~ SAN-020*2 (6/16/94 G.W.) were found using data gathered from the pycnometer. Test was run four times for each sample and the following data was obtained.

Sample	w/o sample P_r	w/o sample P	w/ sample P_r	w/ sample P
~~SAND*020*1~~ SAN-020*1 (6/16/94 G.W.)	14.00	3.70	14.00	3.93
~~SAND*020*2~~ SAN-020*2 (6/16/94 G.W.)	14.00	3.15	14.00	3.52

The bulk volume was found using the following equations:

Bulk volume = V_c without sample − V_c with sample

where V_c is the volume of air in the sample chamber and is equivalent to

$$(P_r - P)V_r/(P - P_c)$$

P_r = absolute air pressure of reservoir
P = absolute pressure of combined system
V_r = volume of reservoir = 86.63
P_c = atmospheric pressure ⇒ drops out of equation

Sample ~~SAND*020*1~~ SAN-020*1 6/16/94 G.W.

$V_{c\ w/o\ sample}$ = (14.00 − 3.70) 86.63 / 3.70 = 241.15919
$V_{c\ w/\ sample}$ = (14.00 − 3.93) 86.63 / 3.93 = 221.9756

* Bulk volume = 241.15919 − 221.9756 = 19.2163

Sample ~~SAND*020*2~~ SAN-020*2 6/6/94 G.W.

$V_{c\ w/o\ sample}$ = (14.00 − 3.15) 86.63 / 3.15 = 298.39222
$V_{c\ w/\ sample}$ = (14.00 − 3.52) 86.63 / 3.52 = 257.92114

* Bulk volume = 298.39222 − 257.92114 = 40.4711

These volumes were confirmed by measuring the change in water level when the sample is placed in a beaker.

6/10/94 J.W.

Saturated weights of samples ~~SAND*020*1~~ SAN-020*1 6/16/94 J.W. and ~~SAND*020*2~~ SAN-020*2 6/16/94 J.W.

SAMPLE	SATURATED WEIGHTS
~~SAND*020*2~~ 6/16/94 J.W.	
~~SAN-020*1~~ ~~SAND*020*1~~ 6/16/94 J.W.	~~36.131~~ 6/16/94 J.W.
SAN-020*1	36.131
SAN-020*2	76.068

KM 6/20/94 – Cape Riva Porosity

Dry WT of SAN*020*1 26.939g

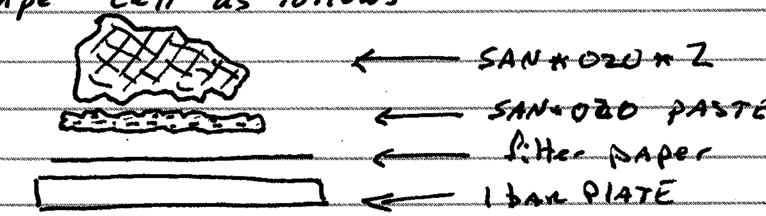
Porosity = (36.131 - 26.939)/19.2163 = 48%

KM 6/15/94

SATURATED Plate in Tempe Cell (1 bar plate) with DI WATER.

KM 6/16/94

Crushed some of the SAN*020 sample in MIXER-MILL located in Bldg 57.
Made paste of crushed sample and DI WATER.
Set up tempe cell as follows:



Using inhouse air:
set pressure in tempe at 0.2" Hg.
Weight was placed on top of sample. (8 oz)

KM 6/17/94 Pressure = 0.2" Hg ΔQ ≈ +1 ml.
set Pressure to 0.4" Hg

KM 6/17/94 Pressure = 0.4" ΔQ = +0.0 ml
set P = ~~0.6~~" Hg 0.8" Hg KM 6/17/94

KM 6/20/94 Pressure = 0.8" Hg ΔQ = 0.00 ml
set Pg = 1.4" Hg

KM 6/21/94 Pressure = 1.4" Hg ΔQ = +0.1 ml
set Pg = 1.8" Hg Q TOTAL = 0.2 ml

KM 6/23/94 Pressure = 1.8" Hg ΔQ = +0.8 ml
set Pg = 2.4" Hg Q TOTAL = 2.8 ml

* Flow amounts recorded for 6/21/94 were read wrong. They should have been ΔQ = 1.0 ml
Q TOT = 2.0 ml

Cont pg 125

6/20/94 J.W. C5·B2 was cut into three pieces all w/ ~~radius~~ diameter 6/20/94 J.W. of ~~5.09~~ 5.01 6/24/94 J.W. cm

~~C5·B2·1~~ 6/20/94 J.W.

C5·B2·1 length - 2.29 cm Wrong volumes { volume - ~~186.389~~ 46.597 6/20/94 J.W. cm³

C5·B2·2 length - 2.87 cm volume - ~~233.597~~ 58.399 cm³ 6/20/94 J.W.

C5·B2·3 length - 6.63 cm volume - ~~539.634~~ 134.908 cm³ 6/20/94 J.W.

C3·B2 was cut into 3 pieces all w/ diameter of ~~5.09~~ 5.01 cm 6/24/94 J.W.

C3·B2·1 length - 1.80 cm volume - ~~36.627~~ 35.484 cm³ 6/24/94 J.W.

C3·B2·2 length - 2.97 cm volume - ~~60.434~~ 58.549 cm³ 6/24/94 J.W.

C3·B2·3 length - 6.78 cm volume - ~~137.961~~ 133.658 cm³ 6/24/94 J.W.

A ceramic cylinder was cut into ~~two~~ three 6/20/94 J.W. pieces and ~~Add~~ 6/20/94 J.W. SA6 and SA7 both with diameter of 1.9 cm.

SA6 length - 2.57 cm volume - 29.147 cm³

SA7 length - 2.06 cm volume - 23.363 cm³

SA8 length - .28 cm volume - 3.176 cm³

6/24/94

New volumes for C5 . . .

	Volumes
C5·B2·1	45.144 cm³
C5·B2·2	56.578 cm³
C5·B2·3	136.701 cm³

KM 6/23/94

Sample ID: SB×2 TEST = VPPE 1×SB×2

Notes: From page 107

Investigators:

Date	Gas Pressure("Hg)	New Pressure("Hg)	Δ Э (ml)
KM 6/23/94	14.	12	-0.22
6/24/94	12	10	-0.18
KM 6/28/94	10	8	-0.26
———	~~——~~ KM 6/28/94	———	
KM 7/6/94	8	6	-0.26
KM 7/7/94	6	4	-0.09
KM 7/11/94	4	2	-1.4 ml
KM 7/25/94	2	0	-15.85
KM 8/4/94	0	0	-10.2 ml
	wt = 223.4 g. put in Oven.		

Continued on page: ________________

RM 6/23/94 - C3*B1 was placed in a beaker of DI water. The sample was previously cored out in the middle for "A size" subsamples. This water will be used at a later date to saturate a sample with, which will be run for a characteristic curve. It is hoped that by using water in "equilibrium" with the sample that crystal growth in the pores during testing will be minimized. Water not in equilibrium causes dissolution, mobilization and redeposition (growth) of crystals in the pore necks thereby occluding flow.

According to Bill Murphy purging of Nitrogen should also help in keeping the chemical reactions from taking place.

J.W. 6/24/94 More cement and ceramic samples were cored and cut to be sent for testing of thermal conductivity.

Cements -

C4·A19	dia - 1.9 cm	length - 2.57	volume - 7.287 cm³
C5·B1·1	dia - ~~5.09~~ 5.01 cm (6/27/94 J.W.)	length - 6.68	volume - ~~135.926~~ 131.687 cm³ (6/27/94 J.W.)
C5·B1·2 (NOT TO BE SENT)	dia - ~~5.09~~ 5.01 cm (6/27/94 J.W.)	length - 3.51 cm	volume - ~~71.422~~ 69.195 cm³ (6/27/94 J.W.)
C5·B1·3 (NOT TO BE SENT)	dia - ~~5.09~~ 5.01 cm (6/27/94 J.W.)	length - 1.30 cm	volume - ~~26.453~~ 25.628 cm³ (6/27/94 J.W.)

Ceramics -

SA9	dia - 1.9 cm	length - 2.26 cm	volume - 6.408 cm³
SA10	dia - 1.9 cm	length - 1.98 cm	volume - 5.614 cm³

Tempe SAN020*2 From pg 121

Km 6/24/94 P_g = 2.4" Hg — QTOT = ~~4.4 ml~~ 3.6 ml (Km 6/24/94)
Set P_g = 3.4" Hg — ΔQ = +1.6 ml

6/27/94 J.W. Cement 4 was cored and cut on 6/24/94

C4·A20	dia - 1.9 cm	length - 2.36 cm	volume - 6.691 cm³
C4·A21	dia - 1.9 cm	length - 2.41 cm	volume - 6.833 cm³
C4·A22	dia - 1.9 cm	length - 2.72 cm	volume - 7.712 cm³
C4·A23	dia - 1.9 cm	length - 2.54 cm	volume - 7.202 cm³

Km 6/27/94 TEMPE SAN*020*2

Date	P_g	Q
Km 6/27/94	P_g = 3.3" Hg; set P_g = 4" Hg	QTOT = 5.0 ml; ΔQ = 1.4 ml
Km 6/28/94	P_g = 4.0" Hg; set P_g = 5" Hg	QTOT = 6.0 ml; ΔQ = +1.0 ml
Km 6/30/94	P_g = 5" Hg; set P_g = 6" Hg	QTOT = 7.7 ml; ΔQ = +1.7 ml
Km 7/1/94	P_g = 6" Hg; set P_g = 7" Hg	QTOT = 9.0 ml; ΔQ = +1.3 ml
Km 7/6/94	P_g = 7" Hg; set P_g = 8" Hg	QTOT = 10.2 ml; ΔQ = +1.2 ml
Km 7/7/94	P_g = 8" Hg; set P_g = 9" Hg	QTOT = 11 ml; ΔQ = +0.8 ml
Km 7/8/94	P_g = 9" Hg; set P_g = 10" Hg	QTOT = 11.6 ml; ΔQ = +0.6 ml

Cont pg 140

TEST = AquaLab

Notes: ① Initial saturated weight and activity

Investigators: Yr: 1994

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
① C3A*1	4/21	3.724	3.720	.992	26.4
C3A*2	4/21	2.785	2.779	.992	26.3
C3A*3	4/21	3.534	3.532	.992	26.5
C3A*4	4/21	4.028	4.025	.993	26.2
C3A*5	4/21	4.044	4.042	.992	26.1
C3A*6	4/21	3.888	3.884	.994	26.5
C3A*7	4/21	3.608	3.604	.991	26.5
C3A*8	4/21	3.765	3.763	.992	26.5
C3A*9	4/21	3.235	3.232	.994	26.6
C3A*10	4/21	3.564	3.560	.995	26.5
C3A*1	4/22	3.559	3.558	.991	26.0
C3A*2	4/22	2.645	2.645	.986	26.2
C3A*3	4/22	3.395	3.389	.990	26.2
C3A*4	4/22	3.869	3.868	.993	26.4
C3A*5	4/22	3.931	3.927	.991	26.4
C3A*6	4/22	3.729	3.727	.994	26.5
C3A*7	4/22	3.448	3.446	.994	26.4
C3A*8	4/22	3.621	3.620	.991	26.1
C3A*9	4/22	3.106	3.105	.990	26.4
C3A*10	4/22	3.418	3.415	.989	26.2
C3A*1	4/25	3.431	3.428	.982	25.6
C3A*2	4/25	2.538	2.538	.979	25.7
C3A*3	4/25	3.299	3.296	.986	25.8
C3A*4	4/25	3.746	3.744	.985	25.8
C3A*5	4/25	3.775	3.771	.985	25.9
C3A*6	4/25	3.609	3.606	.988	26.0
C3A*7	4/25	3.335	3.332	.989	26.0
C3A*8	4/25	3.497	3.494	.988	26.0
C3A*9	4/25	3.000	2.999	.986	26.1
C3A*10	4/25	3.302	3.302	.983	26.1

Continued on page: 127

TEST = AquaLab

Notes:

Investigators: Yr: 1994

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
C3A*1	4/27	3.359	3.357	.965	26.1
C3A*2	4/27	2.475	2.473	.940	26.2
C3A*3	4/27	3.215	3.212	.974	26.2
C3A*4	4/27	3.724	3.718	.979	26.2
C3A*5	4/27	3.698	3.695	.978	26.2
C3A*6	4/27	3.526	3.524	.973	26.0
C3A*7	4/27	3.257	3.257	.979	26.3
C3A*8	4/27	3.421	3.419	.976	26.2
C3A*9	4/27	2.935	2.932	.965	26.3
C3A*10	4/27	3.240	3.240	.966	26.2
C3A*1	4/28	3.318	3.315	.943	25.1
C3A*2	4/28	2.445	2.442	.903	25.1
C3A*3	4/28	3.171	3.169	.962	25.1
C3A*4	4/28	3.673	3.670	.977	25.2
C3A*5	4/28	3.653	3.651	.966	25.2
C3A*6	4/28	3.484	3.482	.960	25.3
C3A*7	4/28	3.211	3.209	.964	25.3
C3A*8	4/28	3.374	3.374	.957	25.4
C3A*9	4/28	2.897	2.896	.946	25.4
C3A*10	4/28	3.201	3.200	.944	25.5
C3A*1	4/29	3.198	3.198	.843	25.6
C3A*2	4/29	2.332	2.332	.729	25.6
C3A*3	4/29	3.044	3.044	.866	25.8
C3A*4	4/29	3.508	3.507	.902	25.8
C3A*5	4/29	3.520	3.519	.893	25.9
C3A*6	4/29	3.355	3.355	.875	25.9
C3A*7	4/29	3.066	3.065	.818	26.0
C3A*8	4/29	3.227	3.226	.848	26.0
C3A*9	4/29	2.785	2.784	.843	26.0
C3A*10	4/29	3.087	3.087	.859	26.1

Continued on page: 128

TEST = AquaLab

Notes:

Investigators: [signature] Yr: 1994

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
C3A*1	5/2	3.155	3.155	.771	24.8
C3A*2	5/2	2.301	2.301	.638	24.9
C3A*3	5/2	2.994	2.992	.801	25.0
C3A*4	5/2	3.437	3.437	.823	25.1
C3A*5	5/2	3.456	3.456	.824	25.2
C3A*6	5/2	3.300	3.300	.794	25.3
C3A*7	5/2	3.034	3.034	.771	25.3
C3A*8	5/2	3.173	3.173	.756	25.3
C3A*9	5/2	2.744	2.744	.795	25.3
C3A*10	5/2	3.037	3.037	.788	25.4
DI H_2O	5/4	NA	NA	.999	24.3
NaCl	5/4	NA	NA	.756	24.4
C3A*1	5/4	3.133	3.132	.720	24.9
C3A*2	5/4	2.292	2.291	.581	25.0
C3A*3	5/4	2.966	2.966	.735	25.3
C3A*4	5/4	3.401	3.401	.763	25.5
C3A*5	5/4	3.424	3.424	.707	25.6
C3A*6	5/4	3.273	3.270	.737	25.8
C3A*7	5/4	3.010	3.010	.680	25.8
C3A*8	5/4	3.139 (49) 5/4/94	3.148	.694	25.9
C3A*9	5/4	2.710	2.710	.706	25.9
C3A*10	5/4	3.013	3.013	.729	26.0
C3A*1	5/5	3.087	3.086	.584	26.2
C3A*2	5/5	2.275	2.275	.473	26.2
C3A*3	5/5	2.922	2.923	.610	26.2
C3A*4	5/5	3.365	3.365	.683	26.2
C3A*5	5/5	3.384	3.384	.699	26.2
C3A*6	5/5	3.236	3.236	.658	26.2
C3A*7	5/5	2.968	2.968	.537	26.2
C3A*8	5/5	3.121	3.120	.611	26.2
C3A*9	5/5	2.674	2.674	.570	26.2
C3A*10	5/5	2.979	2.979	.617	26.2

Continued on page: 129

TEST = AquaLab

Notes:

Investigators: [signature] Yr: 1994

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
C3A*1	5/6	3.075	3.075	.546	27.0
C3A*2	5/6	2.268	2.268	.454	27.1
C3A*3	5/6	2.908	2.908	.564	27.1
C3A*4	5/6	3.336	3.336	.617	27.1
C3A*5	5/6	3.365	3.364	.650	27.1
C3A*6	5/6	3.216	3.215	.596	27.1
C3A*7	5/6	2.958	2.958	.488	27.1
C3A*8	5/6	3.107	3.107	.567	27.1
C3A*9	5/6	2.662	2.662	.521	27.1
C3A*10	5/6	2.962	2.962	.566	27.1
NaCl	5/12/94	—	—	.757	25.4
NaCl	5/12/94	—	—	.756	26.6
DI H_2O	5/12/94	—	—	1.000	26.2
MgCl			—	.330	27.1
C3A*1	5/12/94	3.065		0.614	27.2
DI H_2O	5/13/94			0.999	25.4
DI H_2O	5/16/94			1.000	24.1
C3A*1	5/16/94	3.071	3.070	0.636	24.9
C3A*2	5/16/94	2.273	2.273	0.576	25.3
C3A*3	5/16/94	2.906	2.908	0.647	25.5
C3A*4	5/16/94	3.326	3.325	0.655	26.3
C3A*5	5/16/94	3.355	3.356	0.698	26.4
C3A*6	5/16/94	3.207	3.207	0.635	26.4
C3A*7	5/16/94	2.958	2.959	0.589	26.5
C3A*8	5/16/94	3.103	3.102	0.630	26.6
C3A*9	5/16/94	Bkm 5/16 2.661	2.661	0.605	26.6
C3A*10	5/16/94	2.957	2.956	0.611	26.7
DI H_2O	5/16/94			0.999	26.4

Continued on page: 130

TEST = AquaLab

Notes:

Investigators: [signature]

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
C3*A1	5/23/94	3.018	3.020	.407	26.7
C3*~~A2~~ ~~A5~~ A2 5/23	5/23/94	2.242	2.244	.329	26.9
C3*~~A4~~ A3 5/23	5/23/94	2.879	2.876	.521	27.5
C3*A5	5/23/94	3.309	3.307	.561	27.6
C3*A6	5/23/94	3.185	3.183	.548	27.5
C3*A7	5/23/94	2.946	2.945	.486	27.4
C3*A8	5/23/94	3.086	3.085	.554	27.5
C3*A9	5/23/94	2.650	2.651	.543	27.5
C3*A10	5/23/94	2.951	2.949	.592	27.6
C3*A4	5/23/94	3.288	3.287	.539	27.6
DI before run	5/23/94	—	—	.999	25.9
DI-after run	5/23/94	—	—	.998	27.5
C3A*1	5/				
C3A*2					
C3A*3					
C3A*4					
C3A*5					
C3A*6					
C3A*7					
C3A*8					
C3A*9					
C3A*10					
DI before	5/31	—	—		
NaCl before	5/31	—	—	.755	22.3

5/31/94

Continued on page: 131

TEST = AquaLab

Initial Notes:

Investigators:

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
C3A*1	6/1	~~3.005~~ 3.006 6/1	3.006	.312	25.7
C3A*2	6/1	2.242	2.241	.335	26.0
C3A*3	6/1	2.867	2.867	.477	26.0
C3A*4	6/1	3.275	3.274	.484	25.9
C3A*5	6/1	3.303	3.303	.546	25.7
C3A*6	6/1	3.173	3.171	.492	25.8
C3A*7	6/1	2.941	2.939	.483	25.8
C3A*8	6/1	3.064	3.063	.483	25.7
C3A*9	6/1	2.631	2.631	.462	25.9
C3A*10	6/1	2.930	2.929	.504	25.7

Continued on page 132

6/1/94

Continued on page: 132

TEST = AquaLab

Initial Notes: AIR TEMP. = 22°C
47% RH
TEMP. OF WATER ENTERING MACHINE = 20°C

Investigators: JW 6/21/94 Yr: 1994

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
DI before	6/21	—	—	.999	20.6
NaCl before	6/21	—	—	.756	20.6
C3A-1	6/21	3.032	3.031	.521	20.8
C3A-2	6/21	2.258	2.258	.517	20.7
C3A-3	6/21	2.873	6/21 gw ~~2.878~~ 2.873	.535	20.8
C3A-4	6/21	3.280	3.280	.536	20.8
C3A-5	6/21	3.302	3.303	.568	20.8
C3A-6	6/21	3.176	3.175	.528	20.8
C3A-7	6/21	2.948	2.948	.516	20.7
C3A-8	6/21	3.072	3.071	.518	20.8
C3A-9	6/21	2.640	2.639	.519	20.8
C3A-10	6/21	2.930	2.931	.533	20.9
DI After	6/21	—	—	.998	20.5
NaCl After	6/21	—	—	.755	20.5

FINAL AIR TEMP – 22°C
47% RH, varied from 47 to 46 during testing

JW 6/21/94

Continued on page:

TEST = AquaLab

Initial Notes:

Investigators: JW Yr: 1994

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
C4*A1	6/1/94	3.752	3.747	.966	25.6
C4*A2	6/1	3.954	3.952	.956	25.4
NaCl after	6/1	—	—	.754	25.2
DI after	6/1	—	—	.996	25.2
NaCl before	6/2	—	—	.756	22.2
DI before	6/2	—	—	.998	21.9
C4*A3	6/2	3.828	3.824	.940	22.7
C4*A4	6/2	4.987	4.984	.937	22.9
C4*A5	6/2	3.163	3.162	.919	23.2
C4*A6	6/2	3.634	3.631	.905	23.4
C4*A7	6/2	2.850	2.850	.818	23.7
C4*A8	6/2	3.395	3.393	.835	23.7
C4*A9	6/2	3.319	3.319	.789	23.9
C4*A10	6/2	3.863	3.861	.825	24.0
C4*A11	6/2	3.232	3.230	.812	24.2
NaCl before	6/6	—	—	.756	22.1
DI before	6/6	—	—	.999	21.7
C4*A12	6/6	2.867	2.866	.732	22.4
C4*A13	6/6	3.318	3.318	.730	22.7
C4*A14	6/6	4.282	4.279	.881	22.8
C4*A15	6/6	3.024	3.023	.868	23.1
C4*A16	6/6	2.628	2.628	.885	23.3
C4*A17	6/6	2.946	2.944	.896	23.4
C4*A18	6/6	3.860	3.860	.824	23.5
NaCl after	6/6	—	—	.753	23.1
DI after	6/6	—	—	.996	23.4

Continued on page: 134

TEST = AquaLab

Initial Notes: 56% RH, 22°C
temp of water going into machine - 20°C

Investigators: J.W. Yr: 1994

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
DI before	~~6/16~~ 6/17 J.W.	—	—	.998	22.2
NaCl before	~~6/16~~ 6/17 J.W.	—	—	.756	22.1
C4·A1	~~6/16~~ 6/17 J.W.	3.650	3.649	.903	22.1
C4·A2	~~6/16~~ 6/17 J.W.	3.889	3.887	.901	22.2
C4·A3	~~6/16~~ 6/17 J.W.	3.750	3.748	.864	22.2
C4·A4	~~6/16~~ 6/17 J.W.	4.919	4.919	.891	22.5
C4·A5	~~6/16~~ 6/17 J.W.	3.127	3.126	.863	22.8
C4·A6	~~6/16~~ 6/17 J.W.	3.618	3.616	.883	22.8
C4·A7	~~6/16~~ 6/17 ~~6/16 J.W.~~	2.830	2.828	.764	22.9
C4·A8	~~6/16~~ 6/17	3.355	3.355	.763	22.8
C4·A9	6/17	3.305	3.305	.750	22.3
DI after	6/17	—	—	.997	22.2
NaCl after	6/17	—	—	.758	22.5

Temp - 22°C
52% RH

6/20/94 J.W. ⇒ Air temp = ~~6/20 22°C~~ 22°C
51% RH

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
DI before	6/20	—	—	.999	20.5
NaCl before	6/20	—	—	.756	20.7
C4·A10	6/20	3.825	3.824	.726	20.8
C4·A11	6/20	3.171	3.171	.621	20.8
C4·A12	6/20	2.841	2.841	.639	20.9

6/21/94 J.W. ⇒ Air temp. = 22°C
53% RH

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
DI before	6/21	—	—	.999	20.6
NaCl before	6/21	—	—	.756	20.5
C4·A13	6/21	3.295	3.295	.661	20.8
C4·A14	6/21	4.200	4.198	.714	20.8
C4·A15	6/21	2.990	2.989	.786	20.7
C4·A16	6/21	2.581	2.580	.737	20.7

Continued on page:

Km 7/6/94

Sample ID: SANCOR 004 TEST = VPPE 3

Notes: from page 110

Investigators: KM

Date	Gas Pressure("Hg)	New Pressure("Hg)	Δ Q (ml)
Km 7/6/94	24	26	+1.42
Km 7/7/94	26	30	+0.14
Km 7/11/94	30	34	+0.82 ml
Km 7/25/94	34	40	+0.92 ml
Km 7/27/94	40	—	+0.34 ml
Km 7/27/94 wt of sample, ring, + filter paper = 158.96 g			
put in oven to dry			

Continued on page:

Sample ID: SAN COR 005 TEST = VPPE4

Notes: From pg 111

Investigators: Km

Date	Gas Pressure("Hg)	New Pressure("Hg)	Δ ϑ (ml)
Km 7/6/94	24	26	+0.28
Km 7/7/94	26	30	+0.17
Km 7/11/94	30	34	+0.16 ml
Km 7/25/94	34	40	-0.30 ml
Km 8/8/94	40	34	-1.10 ml
Km 12/16/94	wt of core/filter paper + Ring		53.843 g
Km 12/16/94	Placed in oven to dry		
Km 1/23/95	Wt of dry core/filter paper + Ring and		
watch glass 94.54 g			

Continued on page: ________________

Km 7/6/94

Km 7/7/94

Sample ID: VIT * 2 TEST = VPPE

Notes: From Pg 118

Investigators: Km

Date	Gas Pressure("Hg)	New Pressure("Hg)	Δ ϑ (ml)
Km 7/7/94	13	10	-.09 ml
Km 7/11/94	10	8	-.03 ml
~~Km 7/11/94~~			~~-.03~~ Km 7/11/94
Km 7/25/94	8	6	-3.79 ml
~~Km 8/8/94~~	~~2~~ Km 8/8/94	~~2~~ Km 8/8/94 0	—
Km 8/8/94	6	4	-3.32
Km 12/16/94	wt of sample filter paper + Ring		275.78 g
Km 12/16/94	Placed in Oven to dry	go to pg 163	

Continued on page: 163

MINOAN CENTRIFUGE TEST

7/14/94 g.w. Centrifuge test for Minoan samples. Samples were packed into tubes and saturated w/ deionized water.

Weights of empty tubes w/ filter paper –
1- 14.0g 3- 13.9 g 5- 14.0 g 7- 14.2 g
2- 14.0g 4- 13.9 g 6- 13.8 g 8- 13.9 g

Centrifuged w/ excess water for 15 min @ 150 RPM to assure complete saturation. Initial conditions –

Tube 1 — SAN·COR·002 — 20.5 ml — 41.2 g
Tube 2 — SAN·COR·002 — 21.0 ml — 42.0 g
Tube 3 — SAN·COR·002 — 15.5 ml — 34.8 g
Tube 4 — SAN·COR·002 — 15.0 ml — 34.1 g
Tube 5 — SAN·COR·003 — 11.0 ml — 27.8 g
Tube 6 — SAN·COR·001 — 10.5 ml — 28.2 g
Tube 7 — SAN·COR·002 — 7.5 ml — 22.1 g
Tube 8 — SAN·COR·001 — 8.0 ml — 24.5 g

NOTE: ALL SPEEDS VARY W/ IN 2 BELOW AND 3 ABOVE IF NOT OTHERWISE STATED.

SAT OVERNIGHT. WEIGHTS:
1- 41.1 3- 34.8 5- 27.8 7- 22.0
2- 41.9 4- 34.0 6- 28.2 8- 24.4

10 MIN, 200 RPM. Wts-
1- 41.1 3- 34.8 5- 27.8 7- 22.0
2- 41.9 4- 34.0 6- 28.2 8- 24.4

KM 7/26/94

COPY OF TEST LOCATED IN CC#047

5 MIN, 200 RPM. High speed of 207.0 RPM. Wts-
1- 41.1 3- 34.8 5- 27.8 7- 22.0
2- 41.9 4- 34.0 6- 28.2 8- 24.4

7/14/94 g.w.
10 MIN, ~~200~~ 400 RPM. Low speed - 392.0 RPM, High speed - 411 RPM. Wts-
1- 40.7 3- 34.5 5- 27.5 7- 21.9
2- 41.6 4- 33.7 6- 28.0 8- 24.2

10 MIN, 400 RPM. Low speed - 395.0 RPM, High speed - 408.0 RPM.
1- 40.6 3- 34.5 5- 27.5 7- 21.9
2- 41.5 4- 33.7 6- 28.0 8- 24.2

5 MIN, 400 RPM. High speed of 410.0 RPM. wts -
1- 40.5 3- 34.5 5- 27.5 7- 21.9
2- 41.4 4- 33.7 6- 27.9 8- 24.2

5 MIN, 400 RPM. Low speed - 394.0 RPM, High speed - 410.0 RPM
1- 40.5 3- 34.5 5- 27.5 7- 21.9
2- 41.4 4- 33.7 6- 27.9 8- 24.2

Volumes unchanged.

10 MIN, 600 RPM — wts —
1- 39.1 3- 33.7 5- 27.2 7- 21.8
2- 40.4 4- 33.1 6- 27.6 8- 24.0

5 MIN, 600 RPM. Low speed - 596.0 RPM, High Speed - 606.0 RPM. Wts
1- 38.9 3- 33.6 5- 27.2 7- 21.8
2- 40.3 4- 33.0 6- 27.6 8- 24.0

5 MIN, 600 RPM. Low - 594.0 RPM, High - 604.0 RPM. Wts-
1- 38.8 3- 33.6 5- 27.1 7- 21.8
2- 40.2 4- 33.0 6- 27.6 8- 24.0

5 MIN, 600 RPM (599.0 - 601.0 RPM) Wts- KM 7/26/94

MINOAN CENT. TEST CONTINUED

5 MIN, 600 RPM. Low - 589.0 RPM, High - 605.0 RPM. wts-
1- 38.7 3- 33.5 5- 27.0 7- 21.8
2- 40.1 4- 32.9 6- 27.5 8- 23.9

5 MIN, 600 RPM. wts-
1- 38.7 3- 33.5 5- 27.0 7- 21.7
2- 40.1 4- 32.9 6- 27.5 8- 23.9

New Volumes:
1- 20 ml 3- 15.5 ml 5- 11.0 ml 7- 7.5 ml
2- 21 ml 4- 15.0 ml 6- 10.5 ml 8- 8.0 ml

10 MIN, 800 RPM. wts-
1- 37.5 3- 32.5 5- 26.5 7- 21.5
2- 38.9 4- 32.0 6- 26.9 8- 23.5

10 MIN, 800 RPM. Low - 795.0 RPM, High - 807.0 RPM. wts-
1- 37.3 3- 32.3 5- 26.5 7- 21.5
2- 38.7 4- 31.8 6- 26.8 8- 23.4

5 MIN, 800 RPM. wts-
1- 37.2 3- 32.3 5- 26.4 7- 21.5
2- 38.6 4- 31.8 6- 26.8 8- 23.4

5 MIN, 800 RPM. wts -
1- 37.2 3- 32.3 5- 26.4 7- 21.4
2- 38.6 4- 31.7 6- 26.8 8- 23.4

5 MIN, 800 RPM. wts -
1- 37.2 3- 32.3 5- 26.4 7- 21.4
2- 38.6 4- 31.7 6- 26.8 8- 23.4

New Volumes:
1- 20 ml 3- 15.5 ml 5- 11.0 ml 7- 7.5 ml
2- 21 ml 4- 15.0 ml 6- 10.5 ml 8- 8.0 ml

KM 7/26/94

10 MIN, 1000 RPM. WTS -
1- 36.6 3- 31.7 5- 25.9 7- 21.2
2- 38.0 4- 31.2 6- 26.2 8- 22.9

10 MIN, 1000 RPM. LOW - 991.5, HIGH - 1006. WTS -
1- 36.5 3- 31.6 5- 25.8 7- 21.1
2- 37.8 4- 31.1 6- 26.1 8- 22.9

5 MIN, 1000 RPM. HIGH - 1005. WTS -
1- 36.5 3- 31.6 5- 25.8 7- 21.1
2- 37.8 4- 31.1 6- 26.1 8- 22.8

5 MIN, 1000 RPM. LOW - 991.0, HIGH - 1005. WTS -
1- 36.5 3- 31.6 5- 25.8 7- 21.1
2- 37.8 4- 31.1 6- 26.1 8- 22.8

New Volumes:
1- 20.0 ml 3- 15.5 ml 5- 11.0 ml 7- 7.5 ml
2- 20.5 ml 4- 15.0 ml 6- 10.5 ml 8- 8.0 ml

10 MIN, 1200 RPM. WTS-
1- 36.1 3- 31.3 5- 25.5 7- 20.9
2- 37.5 4- 30.8 6- 25.9 8- 22.6

10 MIN, 1200 RPM. LOW - 1192, HIGH - 1206. WTS -
1- 36.1 3- 31.2 5- 25.5 7- 20.9
2- 37.4 4- 30.7 6- 25.8 8- 22.6

Sat overnight. WTS-
1- 36.1 3- 31.2 5- 25.5 7- 20.9
2- 37.4 4- 30.7 6- 25.8 8- 22.6

5 MIN, 1200 RPM (1199 - 1201 RPM) WTS-
1- 36.0 3- 31.2 5- 25.5 7- 20.8
2- 37.4 4- 30.7 6- 25.7 8- 22.5

KM 7/26/94

Tempe SAN#020#2 from pg 125

7/11/94 P_g = 10" Hg Q_{TOT} = 12.05 ml
set P_g = 12" Hg ΔQ = +0.45 ml

7/15/94 P_g = 12" Hg Q_{TOT} = 12.05 ml
set P_g = 16" Hg ΔQ = +0.0

7/25/94 P_g = 16" Hg Q_{TOT} = 12.05 ml
set P_g = 22" Hg ΔQ = +0.0

8/3/94 wt of Rock = 54.7 g
placed in oven to dry.

8/5/94 wt of sample = 54.3 g

MINDAN CENT. TEST CONT.

5 MIN, 1200 RPM (1199 - 1201 RPM), wts -
1- 36.0 3- 31.2 5- 25.4 7- 20.8
2- 37.4 4- 30.7 6- 25.7 8- 22.5

5 MIN, 1200 RPM wts -
1- 36.0 3- 31.2 5- 25.4 7- 20.8
2- 37.3 4- 30.7 6- 25.7 8- 22.5

5 MIN, 1200 RPM (1199 - 1201 RPM) wts -
1- 36.0 3- 31.2 5- 25.4 7- 20.8
2- 37.3 4- 30.7 6- 25.7 8- 22.5

New Volumes -
1- 20.0 ml 3- 15.5 ml 5- 11.0 ml 7- 7.5 ml
2- 20.5 ml 4- 15.0 ml 6- 10.5 ml 8- 8.0 ml

10 MIN, 1400 RPM (1398 - 1402 RPM) wts -
1- 35.8 3- 31.1 5- 25.3 7- 20.7
2- 37.2 4- 30.5 6- 25.6 8- 22.4

5 MIN, 1400 RPM (1399 - 1401 RPM) wts -
1- 35.8 3- 31.0 5- 25.3 7- 20.7
2- 37.1 4- 30.4 6- 25.6 8- 22.4

5 MIN, 1400 RPM (1398 - 1402 RPM) ~~wts~~ 7/14/94 [illegible] Low - 1396, High - 1409 wts -
1- 35.8 3- 31.0 5- 25.3 7- 20.7
2- 37.1 4- 30.4 6- 25.6 8- 22.4

5 MIN, 1400 RPM. Low - 1392 RPM, HIGH - 1404 RPM
1- 35.8 3- 31.0 5- 25.3 7- 20.7
2- 37.1 4- 30.4 6- 25.6 8- 22.4

New Volumes -
1- 20.0 ml 3- 15.0 ml 5- 11.0 ml 7- 7.0 ml
2- 20.5 ml 4- 15.0 ml 6- 10.5 ml 8- 8.0 ml

KM 7/26/94

10 MIN, 1600 RPM. Low - 1595 RPM, HIGH - 1605. wts -
1- 35.6 3- 30.9 5- 25.2 7- 20.6
2- 36.9 4- 30.3 6- 25.5 8- 22.3

5 MIN, 1600 RPM. wts -
1- 35.6 3- 30.8 5- 25.2 7- 20.6
2- 36.9 4- 30.3 6- 25.5 8- 22.3

5 MIN, 1600 RPM. Low - 1594 RPM, HIGH - 1606 RPM. wts -
1- 35.6 3- 30.8 7/14/94 [illegible] 5- 25.1 7- 20.5
2- 36.9 4- 30.3 6- 25.4 8- 22.2

5 MIN, 1600 RPM. Low 1592. wts -
1- 35.6 3- 30.8 5- 25.1 7- 20.5
2- 36.8 4- 30.2 6- 25.4 8- 22.2

5 MIN, 1600 RPM. wts -
1- 35.6 3- 30.8 5- 25.1 7- 20.5
2- 36.8 4- 30.2 6- 25.4 8- 22.2

New Volumes -
1- 20.0 ml 3- 15.0 ml 5- 11.0 ml 7- 7.0 ml
2- 20.5 ml 4- 15.0 ml 6- 10.5 ml 8- 8.0 ml

10 MIN, 1800 RPM. wts -
1- 35.5 3- 30.7 5- 25.0 7- 20.5
2- 36.7 4- 30.1 6- 25.3 8- 22.2

5 MIN, 1800 RPM. HIGH - 1805 RPM. wts -
1- 35.5 3- 30.7 5- 25.0 7- 20.5
2- 36.7 4- 30.1 6- 25.3 8- 22.2

5 MIN, 1800 RPM. wts -
1- 35.5 3- 30.7 5- 25.0 7- 20.4
2- 36.7 4- 30.1 6- 25.3 8- 22.1

KM 7/26/94

MINOAN CENT. TEST CONT.

5 MIN, 1800 RPM, WTS–
1– 35.4 3– 30.6 5– 25.0 7– 20.4
2– 36.6 4– 30.0 6– 25.3 8– 22.1

5 MIN, 1800 RPM. WTS–
1– 35.4 3– 30.6 5– 25.0 7– 20.4
2– 36.6 4– 30.0 6– 25.3 8– 22.1

New Volumes –
1– 20.0 ml 3– 15.0 ml 5– 10.5 ml 7– 7.0 ml
2– 20.0 ml 4– 15.0 ml 6– 10.0 ml 8– 7.5 ml

10 MIN, 2000 RPM WTS–
1– 35.3 3– 30.5 5– 24.9 7– 20.4
2– 36.5 4– 29.9 6– 25.2 8– 22.1

5 (7/14/94 GW) ~~10~~ MIN, 2000 RPM, WTS–
1– 35.3 3– 30.5 5– 24.9 7– 20.4
2– 36.5 4– 29.9 6– 25.2 8– 22.1

5 MIN, 2000 RPM. WTS–
1– 35.3 3– 30.5 5– 24.9 7– 20.4
2– 36.5 4– 24.9 6– 25.2 8– 22.1

New Volumes–
1– 20.0 ml 3– 15.0 ml 5– 10.5 ml 7– 7.0 ml
2– 20.0 ml 4– 15.0 ml 6– 10.0 ml 8– 7.5 ml

5 MIN, 2400 RPM, WTS–
1– 35.2 3– 30.4 5– 24.9 7– 20.3
2– 36.4 4– 29.8 6– 25.2 8– 22.0

5 MIN, 2400 RPM, WTS–
1– 35.2 3– 30.4 5– 24.8 7– 20.3
2– 36.3 4– 29.8 6– 25.1 8– 22.0

KM 7/26/94

5 MIN, 2400 RPM, WTS–
1– 35.1 3– 30.4 5– 24.8 7– 20.3
2– 36.3 4– 29.8 6– 25.1 8– 22.0

5 MIN, 2400 RPM. WTS–
1– 35.1 3– 30.3 5– 24.8 7– 20.3
2– 36.3 4– 29.8 6– 25.1 8– 22.0

5 MIN, 2400 RPM, WTS –
1– 35.1 3– 30.3 5– 24.8 7– 20.3
2– 36.3 4– 29.8 6– 25.1 8– 22.0

New Volumes:
1– 19.5 ml 3– 15.0 ml 5– 10.5 ml 7– 7.0 ml
2– 20.0 ml 4– 15.0 ml 6– 10.0 ml 8– 7.5 ml

Sat overnight. WTS–
1– 35.1 3– 30.3 5– 24.8 7– 20.3
2– 36.3 4– 29.7 6– 25.1 8– 22.0

5 MIN, 2800 RPM, WTS–
35.1 3– 30.3 5– 24.8 7– ~~36.~~ 20.3 (7/14/94 GW)
2– 30.2 4– 29.7 6– 25.1 8– 22.0

5 MIN, 2800 RPM. WTS–
1– 35.0 3– 30.3 5– 24.7 7– 20.2
2– 36.2 4– 29.7 6– 25.1 8– 21.9

5 MIN, 2800 RPM. WTS–
1– 35.0 3– 30.3 5– 24.7 7– 20.2
2– 36.2 4– 29.7 6– 25.1 8– 21.9

New Volume –
1– 19.5 ml 3– 15.0 ml 5– 10.0 ml 7– 7.0 ml
2– 20.0 ml 4– 15.0 ml 6– 10.0 ml 8– 7.5 ml

KM 7/26/94

MINOAN CENT TEST CONT.

7/14/94 GW Minoan Samples weighed in beakers after centrifuging and before oven drying –

Weight of empty beakers –
1– 103.3 3 – 68.0 5 – 67.2 7 – 67.6
2 – 175.4 4 – 67.3 6 – 162.2 8 – 67.2

Weight of beakers w/ samples before ~~or~~ oven drying – (7/14/94 GW)
1– 124.2 3– 84.3 5 – 77.8 7 – 73.5
2 – 197.6 4– 82.9 6 – 173.3 8– 75.2

7/25/94 GW
wts. of beakers w/ samples after oven drying –
1– 121.8 g 3– 82.3 g 5 – 76.6 g 7 – 72.8 g
2 – 195.0 g 4– 81.2 g 6 – 172.0 g 8 – 74.2 g

KM 7/26/94

7/29/94 J.W. Volumetric Pressure Plate Extractor test for Cape River I

VPPE set up in the same manner as that explained in the Nopal Lab Book 078, pages 6-7.

A fist-sized piece of the Cape River rock was cut using a hand ~~saw~~ 7/29/94 J.W. saw. ~~Then the cut piece was~~ 7/29/94 J.W. The bottom of the cut sample was determined to be the side exposed to the cutting of the saw. This surface was then filed down to a smooth, straight surface —

First, the sample was filed using an ordinary file but this process was too slow and inefficient. So the sample was then rubbed against a cinder block until flat. Finally, sand paper was used to finish the ~~#~~ 7/29/94 J.W. surface smoothing it as much as possible.

Cont. page 146 KM 8/8/94

~~8/3/94~~ 8/3/94

8/3/94 J James

Saturated Cape River samples using the following procedure:

Samples placed in K_{sat} chamber. A vacuum was drawn on the chamber using the water jet pump. The vacuum was found to be -13.76 psi. CO_2 was injected into the chamber to a pressure of 10 psi to aid in air displacement. This was followed by once again drawing a vacuum on the chamber. This procedure was repeated three times. A final vacuum was drawn and allowed to sit overnight (≈12 hrs). The chamber was then filled with Deionized-deaired water and pressurized to 80 psi. This was allowed to sit for 24 hrs to complete saturation.

8/8/94 J James

Removed saturated samples. Gathered following data: (Cape River)

Cup #1	Sample	wt in H_2O (g)	Vol in H_2O (ml)	Sat. wt (g)	Sample Cup wt (g)
1	CRA#1	1.775	2.5	3.894	1.913
2	CRA#2	2.004	2.4	4.398	1.905
3	CRA#3	1.120	1.6	2.553	1.908
4	CRA#4	.800	1.4	2.162	1.914
5	CRA#5	1.146	1.2	2.517	1.937
6	CRA#6	1.419	1.9	3.138	1.909
7	CRA#7	.433	1.0	1.683	1.914
8	CRA#8	.380	.9	1.027	1.905
8	CRA#9	1.011	1.1	2.251	1.905
9	CRA#10	.978	1.4	2.211	1.927
10	CRA#11	.956	1.0	1.991	1.913

Continued on page 157

 from pg 144

8/4/94 JW. VPPE6 - CAPERIVA CONTINUED Km 8/9/94

Cape Riva 1 was saturated overnight and set up in VPPE. First, a peice of filter paper was fitted over the ceramic plate and soaked. Then a paste of Cape Riva was needed to spread over the bottom of the sample so the sander in Bldg. 57 was used to grind it into ~~sand~~ 8/4/94 powder. This powder was made into a mud-like paste by adding water. Finally, this substance was spread on the bottom, flat-side of the rock and placed on top of the filter paper, mud side down.

Before put into chamber, the saturated Cape Riva Sample was weighed — 336.66 g

~~Km 8/8/94 $P_g = 1.4''Hg$ $\Delta Q = +1.3 ml$~~
~~set $P_g = 1.8''Hg$~~ Km 8/8/94

Km 8/8/94 $P_g = 0.8''Hg$ $\Delta Q = +0.12 ml$
set $P_g = 1.4''Hg$ cont pg 162

8/15/94 JJames

Placed sample SA*4 and a new chip of ceramic in oven (110°C) to dry. This was done to determine if there has been contamination of the "SA" samples.

Initial conditions as follows:

Sample	wt(g)	A(w)	T(C)
SA*4	3.384	.502	23.4
Ceramic	2.123	.501	23.4

8/17/94 JJames

Samples were removed and measured, one at a time, to prevent the possibility of gaining moisture from the air. Samples were cooled in ~~jar~~ JJ 8/17/94 sealed jar with desicant.

Sample	wt(g)	A(w)	T(C)
SA*4	3.383	.549	23.1
Ceramic	2.122	.549	23.2

8/15/94 JJames

Sample NR62*AzH*4 was used to develop new method for drying samples. NR62*AzH*4 had a recorded dry weight of 3.288g this sample was placed (while hot) in a vaccum chamber along with hot desicant and a vacuum was drawn on the chamber (-13.7 psi). Initial conditions as follows: NR62*AzH*4 wt. 3.290 g
A(w): .539 @ 23.4°C

8/16/94 JJames

Sample NR62*AzH*4 removed from vacuum chamber.

Final measurement: NR62*AzH*4 wt: 3.277 g
A(w): .112 @ 23.5°C

TEST Complete

8/23/94 JJames

Cement samples dried in vacuum (w/ desicant) for 18 hrs.

Data taken:

Sample ID	dry wt (g)
CH*A1	3.295
CH*A17	2.658
CH*A11	2.986
CH*A5	2.863
CH*A9	3.088
CH*A15	2.735
CH*A12	2.666
CH*A6	3.301
CH*A14	3.400
CH*A8	3.108
CH*A10	3.588
CH*A18	3.575
CH*A3	3.439
CH*A7	2.648
CH*A13	3.104
CH*A2	3.552
CH*A16	2.363

8/23/94 JJames (Cement C4+A)

Samples (Cement) placed in Saturator and exposed to a vacuum of ~~11.8" Hg~~ 8/23/94 - 13.9 psi. CO_2 was then injected into chamber to a pressure of 10 psi and held for 1 min. Vacuum was redrawn to 13.9 and held for 5 min. Cycle was repeated 3 times and a final vacuum drawn and left for 20 hrs.

8/24/94 JJames (Cement C4+A)

Samples chamber filled with de-aired, de-ionized water and pressurized to 50 psi for 24 hrs.

8/26/94 JJames

C4+A Cement samples removed from saturator. Following data taken:

Sample	wt(g) Sat	wt(g) in water
C4+A 14	4.672	2.307
C4+A 1	3.866	1.938
C4+A 6	3.908	1.943
C4+A 12	3.167	1.581
C4+A 8	3.745	1.840
C4+A 3	3.991	2.018
C4+A 15	3.312	1.628
C4+A 17	3.184	1.575
C4+A 5	3.395	1.686
C4+A 2	4.104	2.074
C4+A 10	4.191	2.116
C4+A 18	4.159	2.111
C4+A 7	3.059	1.563
C4+A 11	3.520	1.770
C4+A 9	3.649	1.822
C4+A 13	3.657	1.842
C4+A 16	2.855	1.402

Samples placed in oven to dry.

9/2/94 JJames

Samples removed from oven and weighed:

Sample	Dry wt(g)
C4+A 18	3.438
C4+A 14	3.764
C4+A 1	3.156
C4+A 16	2.294
C4+A 3	3.288
C4+A 9	2.974
C4+A 2	3.374
C4+A 11	2.885
C4+A 13	2.998
C4+A 8	3.002
C4+A 17	2.572
C4+A 5	2.746
C4+A 12	2.582
C4+A 10	3.448
C4+A 6	3.168
C4+A 15	2.657
C4+A 7	2.546

9/27/94 JJames

Initial weights of taped and sealed samples from Santorini Greece. Samples still sealed. Scale used: Id. N45601 Cal.: 23 Jun 94 Due: 23 Dec 94

Sample Id.	1st wt(g)	2nd wt(g)	3rd wt(g)
FLD-94 d	55.706	55.706	55.706
FLD-94 c	67.012	67.012	67.011
FLD-94 b	61.785	61.785	61.784
FLD-94 e	55.493	55.493	55.493
MIN 94-b	183.66	183.66	183.66
FLD-94 a	299.69	299.69	299.69
PHI-b	151.31	151.31	151.31
PHI-a	143.70	143.70	143.70
FLD-94 f	217.86	217.86	217.86
MIN-94 a	188.55	188.55	188.55
DI94-5w	63.930	63.930	63.929
DI94-8w	60.100	60.100	60.100
DI94-11w	63.704	63.704	63.704
DI94-14w	48.414	48.414	48.414
DI94-17w	50.316	50.316	50.316
DI94-17d	47.532	47.532	47.532
DI94-14d	47.465	47.465	47.465
DI94-11d	57.446	57.446	57.446
DI94-8d	55.694	55.694	55.694
DI94-5d	61.570	61.570	61.570
DI94-16d	50.408	50.408	50.408
DI94-16w	59.120	59.120	59.120
DI94-15w	56.596	56.596	56.596
DI94-13d	52.339	52.339	52.339
DI94-15d	47.424	47.424	47.426
DI94-13w	50.984	50.984	50.984
DI94-12w	54.880	54.880	54.880
DI94-10w	62.615	62.615	62.615
DI94-8w	66.049	66.049	66.049
DI94-9d	57.012	57.012	57.012
DI94-7d	55.412	55.412	55.412
DI94-7w	59.834	59.834	59.834

Continued on pg. 151

9/27/94 (Cont)

Sample Id.	1st wt(g)	2nd wt(g)	3rd wt(g)
DI94-10d	55.703	55.703	55.703
DI94-12d	50.534	50.534	50.534
DI94-6d	57.053	57.053	57.053
DI94-6w	55.315	55.315	55.315

Sample moisture content Scale used: Id: N45601 Cal. 23 Jun 94 Due 23 Dec 94

9/27/94 JJames

Following samples removed from taped and sealed containers and transfered to 40ml glass containers. Wt(g) of containers taken before transfer. Samples weighed and then dried until consistant weights obtained. Moisture content = initial weight - final (dry) weight.

Sample Id.	Container wt (g)	Container + Sample wt(g)
DI94-5w	28.957	62.053
DI94-8w	28.029	58.005
DI94-11w	28.921	61.721
DI94-14w	28.567	46.748
DI94-17w	28.370	48.220
DI94-5d	28.808	60.088
DI94-8d	28.389	54.282
DI94-11d	~~28.~~ 27.850 9/27/94	55.055
DI94-14d	28.885	46.009
DI94-17d	~~28~~ 29.077 9/27/94	46.393

All measurement repeated until 3 consecutive measurement consistant to ±0.000 g.

9/27/94 JJames Samples placed in oven set to 105°C to dry.

Jlm 9/27/94 Lab temperature ~25°C RH: ~43%

9/28/94 JJames Samples removed from oven to weigh. Samples then returned to oven. Scale Id. N45601 Cal. 23 Jun 94 Due 23 Dec 94

Sample Id.	weight(g)	Sample Id.	weight (g)
DI94-5w	55.547	DI94-5d	59.598
DI94-8w	52.997	DI94-8d	53.924
DI94-11w	54.585	DI94-11d	54.297
DI94-14w	42.331	DI94-14d	45.888
DI94-17w	43.484	DI94-17d	①46.277

① Some mass lost due to dust. 9/28/94 JJames

9/29/94 [signature]

Samples removed from oven and weighed until 3 consecutive weight = ± .001 g.

DI94-5w	55.536 g	DI94-5d	59.585
DI94-8w	52.995 g	DI94-8d	53.914
DI94-11w	54.564 g	DI94-11d	54.286
DI94-14w	42.322 g	DI94-14d	45.884
DI94-17w	43.484 g	DI94-17d	46.270

Samples returned to oven at 105°C.

9/30/94 [signature]

Samples removed from oven and weighed until 3 consecutive weight = ± .001 g. Scale used Id. N45601 Cal. 23 Jun 94 due 23 Dec 94

Sample Id.	Weight (g)	Sample Id.	Weight (g)
DI94-5w	55.531	DI94-5d	59.578
DI94-8w	52.983	DI94-8d	53.908
DI94-11w	54.557	DI94-11d	54.279
DI94-14w	42.316	DI94-14d	45.879
DI94-17w	43.471	DI94-17d	46.261

Samples returned to oven at 105°C

10/4/94 [signature]

Samples removed from oven and weighed. Scale used Id. No. N45601 Cal 23 Jun 94 Due 23 Dec 94.

Sample Id.	Weight (g)	Sample Id.	Weight (g)
DI94-5w	55.512	DI94-5d	59.563
DI94-8w	52.960	DI94-8d	53.885
DI94-11w	54.551	DI94-11d	54.274
DI94-14w	42.296	DI94-14d	45.861
DI94-17w	43.453	DI94-17d	46.244

Samples returned to oven at ~~85~~ 105°C [initials] 10/4/94

Continued on page ~~154~~ [initials] 10/5/94 155

[signature] 10/5/94

TEST = AquaLab

Notes: Minnan samples : Cups are bottoms only

* Weights have sample cup weights subtracted.

① Air dried samples for 5 min. [initials] 8/5/94

② Air dried samples for 10 min [initials] 8/10/94

Sample identification

Samples 1-4 : San. Cor. 002

Samples 5-8 : San. Cor. 002

Samples 9-10 : San. Cor. 003

Samples 11-12 : San. Cor. 001

Investigators: [signature]

	Sample ID	Date	*Initial Weight(g)	~~Final Weight(g)~~ [initials] 8/5/94 Sample	Activity	T(C)
	Sample Cup 1	8/5/94	1.932	MA#1		
	Sample Cup 2	8/5/94	1.932	MA#2		
	Sample Cup 3	8/5/94	1.938	MA#3		
	Sample Cup 4	8/5/94	1.915	MA#4		
	Sample Cup 5	8/5/94	1.913	MA#5		
	Sample Cup 6	8/5/94	1.907	MA#6		
	Sample Cup 7	8/5/94	1.906	MA#7		
	Sample Cup 8	8/5/94	1.905	MA#8		
	Sample Cup 9	8/5/94	1.916	MA#9		
	Sample Cup 10	8/5/94	1.934	MA#10		
	Sample Cup 11	8/5/94	1.929	MA#11		
	Sample Cup 12	8/5/94	1.914	MA#12		
	TEST: 1	8/5/94	1.915	TA#1		
	MA#1	8/5/94	5.317	5.313	.998	23.8
	MA#2	8/5/94	4.448	4.446	.998	23.8
	MA#3	8/5/94	2.978	2.974	.999	23.8
	MA#4	8/5/94	3.792	3.790	.997	23.9
	MA#5	8/5/94	5.635	5.634	.998	24.0
	MA#6	8/5/94	4.042	4.039	1.000	23.9
	MA#7	8/5/94	3.286	3.282	1.000	23.7
	MA#8	8/5/94	3.615	3.611	.998	24.0
	MA#9	8/5/94	4.855	4.854	1.000	23.9
	MA#10	8/5/94	5.239	5.238	.998	24.0
	MA#11	8/5/94	4.994	4.989	.996	24.1
	MA#12	8/5/94	6.620	6.619	.998	24.1
	TEST: 1	8/5/94	7.527	7.527	.999	23.7
①	MA#1	8/10/94	5.228	5.226	1.000	23.6
	MA#2	8/10/94	4.408	4.404	1.000	23.6
	MA#3	8/10/94	2.925	2.924	.999	23.5
	MA#4	8/10/94	3.742	3.740	.998	23.7
	MA#5	8/10/94	5.588	5.587	1.001	23.7
②	MA#6	8/10/94	3.925	3.923	.999	23.2
	MA#7	8/10/94	3.172	3.169	1.000	23.4

Continued on page: 154

[signature] 9/30/94

TEST = AquaLab

Notes:

Investigators: [signature]

Sample ID	Date	Initial Weight(g)	Final Weight(g)	Activity	T(C)
MA*8	8/17/94	3.453	3.452	.999	23.4
MA*9	8/17/94	4.730	4.725	1.000	23.2
MA*10	8/17/94	5.098	5.096	.999	23.4
~~MA*11~~	~~8/17/94~~ [signature] 9/30/94				
~~MA*12~~	~~8/17/94~~ [signature] 9/30/94				

[signature] 9/30/94

[signature] 9/30/94

Continued on page:

10/5/94 [signature]

Samples removed from oven and weighed. Scale used id: N45601

Cal: 23 Jun 94 Due 23 Dec 94.

Sample	Weight(g)	Sample	weight(g)
DI94-5w	55.512	DI94-5d	59.561
DI94-8w	52.955	DI94-8d	53.882
DI94-11w	54.544	DI94-11d	54.266
DI94-14w	42.292	DI94-14d	45.857
DI94-17w	43.449	DI94-17d	46.238

Samples returned to oven at 105°C

10/6/94 [signature] Scale: Id. N45601 Cal. 23 Jun 94 Due 23 Dec 94

Samples removed from oven and weighed

Sample	Weight(g)	Sample	weight(g)
DI94-5w	55.512	DI94-5d	59.561
DI94-8w	52.955	DI94-8d	53.883
DI94-11w	54.544	DI94-11d	54.267
DI94-14w	42.292	DI94-14d	45.857
DI94-17w	43.450	DI94-17d	46.239

Sample weight change < ± .001 for two consecutive days. The samples are dry. Samples returened to oven to maintain dry condition prior to volume determination. Oven set at 105°C

10/6/94 [signature] Moisture contents

DI94-*	Moisture content(g) =	Initial wt(g)	- Dry wt(g)
DI94-5w	6.541	33.096	26.555
DI94-8w	5.050	29.976	24.926
DI94-11w	7.177	32.800	25.623
DI94-14w	4.456	18.181	13.725
DI94-17w	4.770	19.850	15.080
DI94-5d	0.527	31.280	30.753
DI94-8d	0.399	25.893	25.494
DI94-11d	0.788	27.205	26.417
DI94-14d	0.152	17.124	16.972
DI94-17d	0.154	17.316	17.162

10/7/94 JJames Scale: N45601 Cal. 23 Jun 94 Due 23 Dec 94

Sample preparation for moisture content analyses. Samples ~~removed from~~ JJ 10/7/94 unsealed from cap & tape bound container. Aluminum foil base attached to sample cylined using lock wire to hold. Each foil and wire combination weighed and recorded below. Weight of sample cylinder must be determined at a later date. Initial weight of Cylinder + wire & foil recorded.

Sample Id	Wire & Foil weight (g)	Initial weight (g)
DI94-6w	.567	50.699
DI94-7w	.539	55.261
DI94-9w	.508	61.763
DI94-10w	.563	58.470
DI94-12w	.623	50.464
DI94-13w	.608	46.224
DI94-15w	.571	51.358
DI94-16w	.539	54.048
DI94-6d	.539	52.312
DI94-7d	.552	50.987
DI94-9d	.547	52.627
DI94-10d	.577	51.353
DI94-12d	.586	46.226
DI94-13d	.572	47.575
DI94-15d	.602	42.755
DI94-16d	.622	45.643

10/12/94 JJames Scale: N45601 Cal: 23 Jun 94 Due 23 Dec 94

Samples Removed from oven (at 105°C) and weighed.

Sample	Weight (g)	Sample	Weight (g)
DI94-6w	47.826	DI94-6d	52.067
DI94-7w	49.149	DI94-7d	50.158
DI94-9w	57.073	DI94-9d	52.196
DI94-10w	52.204	DI94-10d	50.874
DI94-12w	44.497	DI94-12d	46.052
DI94-13w	41.923	DI94-13d	47.378
DI94-15w	44.612	DI94-15d	42.635
DI94-16w	47.061	DI94-16d	45.478

Samples returned to oven at 105°C

Continued on page 158

10/7/94 JJames Scale used Id. N45601 Cal. 23 Jun 94 due 23 Dec 94

Weight of taped and sealed samples taken to determine moisture loss.

Sample	Sealed weight (g)	wt. Lost (g)
DI94-7d	55.409	.003
DI94-9d	57.007	.005
DI94-10d	55.698	.005
DI94-12d	50.531	.003
DI94-13d	52.335	.004
DI94-15d	47.424	.002
DI94-16d	50.403	.005

10/7/94 JJames Scale used Id. N45601 Cal. 23 Jun 94 due 23 Dec 94

Commenced Aqualab tests on Cape Riva samples. Raw aqualab data stored on 3.5' ~~floppy~~ Disc labeled "AQUALAB 'CRA' retention data. Final Run data follows: Note: all weights have sample cup weight subtracted.

Sample	Initial wt (g)	Final wt (g)	Aw	T(C)
1	3.795	3.787	See below	
2	4.106	4.102	See below	

Discontinued run due to too much moisture present in material (and on walls of sample Cups). Allowed samples to air-dry for the following times:

Sample	time (minutes)	Sample	time (minutes)
~~3~~ 1 JJ 10/7/94	60	6	70
2	62	7	72
3	64	8	74
4	66	9	76
5	68	10	78

10/11/94 JJames

Aqualab test on Cape Riva Samples: Scale used N45601 Cal 23 Jun 94 Due 23 Dec 94

All weight are with sample Cup weights subtracted.

Sample	Initial wt (g)	Final wt (g)	Aw	T(C)
1	3.445			

Samples still too "wet". Discontinued test. Air dried samples for 60 min

10/13/94 JJames Scale: N45601 Cal: 23 Jun 94 Due: 23 Dec 94

Samples removed from oven (at 105°C) and weighed.

Sample	weight (g)	Sample	weight (g)
DI94-6w	47.826	DI94-6d	52.059
DI94-7w	49.164	DI94-7d	50.158
DI94-9w	57.076	DI94-9d	52.197
DI94-10w	52.208	DI94-10d	50.877
DI94-12w	44.494	DI94-12d	46.047
DI94-13w	41.920	DI94-13d	47.375
DI94-15w	44.606	DI94-15d	42.634
DI94-16w	47.052	DI94-16d	45.478 ①

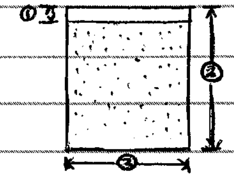
① Loss of mass due to spillage. JJ 10/13/94 Sample was dry at time of spill. JJ 10/13/94

Samples returned to oven at 105°C

Pages 1 through 158 of this Scientific Notebook were reviewed for compliance with QAP-001 in response to Corrective Action Request 94-02. Corrections and clarifications were made as appropriate. In some cases, the date of a change will reflect the date of this review rather than the date of the original Scientific Notebook entry.

Randy Folck
SwRI - QA
10/28/94

11/1/94 JJames The following procedure will be used on all DI-94 Samples. DI94 Samples will removed from oven (set to 105°C) and cooled to ambient room temperature in sealed container filled with desicant. The volume of material will be determined by subtracting the space above the sample from the total volume of the container (See figure 1)



(figure 1)

① = Space above sample
② : Total volume (height)
③ : Diameter ($\frac{1}{2}d$ = radius)

Volume above sample: $\pi r^2 h_{①}$ = Volume$_{①}$

Total Volume: $\pi r^2 h_{②}$ = Volume$_{②}$

$r = \frac{1}{2}$ diameter

Volume of sample = Volume$_{②}$ - Volume$_{①}$.

11/2/94 JJ

Sample	Total Volume (cm^3)		Volume above (cm^3)		Sample V (cm^3)
DI94-6d	20.47 ~~20.828~~ JJ 11/1/94	-	1.31	=	19.16 ~~19.51~~ JJ 11/1/94
DI94-7d	20.47 ~~20.828~~ JJ 11/1/94	-	3.15	=	17.32 ~~17.67~~ JJ 11/1/94
DI94-9d	20.47 ~~20.828~~ JJ 11/1/94	-	3.35	=	17.12
DI94-10d	20.47	-	1.59	=	18.88
DI94-12d	20.47	-	.87	=	19.60
DI94-13d	20.47	-	.74	=	19.73
DI94-15d	20.47	-	.69	=	19.78
DI94-16d					
DI94-6w					
DI94-7w					
DI94-9w					
DI94-10w					
DI94-12w					
DI94-13w					
DI94-15w					
DI94-16w					

[signature] 11/2/94 KM 12/14/94

Moisture Contents of DI94 samples

Sample	Initial wt (g)	final wt (g) DRY wt	Moisture Content (g)
DI94-6d	52.312	52.067	.245
DI94-7d	50.987	50.158	.829
DI94-9d	52.627	52.197	.430
DI94-10d	51.353	50.877	.476
DI94-12d	46.226	46.047	.179
DI94-13d	47.575	47.375	.200
DI94-15d	42.755	42.634	.121
DI94-16d	45.643	45.478	.165
DI94-6dw ([signature] 11/2/94)	50.699	47.826	2.873
DI94-7dw ([signature] 11/2/94)	55.261	49.164	6.097
DI94-9dw ([signature] 11/2/94)	61.763	57.076	4.687
DI94-10dw ([signature] 11/2/94)	58.470	52.208	6.262
DI94-12dw ([signature] 11/2/94)	50.464	44.494	5.970
DI94-13dw ([signature] 11/2/94)	46.224	41.920	4.304
DI94-15dw ([signature] 11/2/94)	51.358	44.606	6.752
DI94-16dw ([signature] 11/2/94)	54.048	47.052	6.996

[signature] 11/2/94

Procedure for measurement of porosity using the gas pycnometer (constant volume method) are found in Agronomy No. 9 part 1 Methods of Soil Analysis page 448. Name of article: Porosity analyses by R.E. Danielson and PL Sutherland © 1986.

Sample	P_c (psig)	P (psig)	P_f (psig)	Volume (Sample) (cm³)	Porosity
DI94-6d	15.00	3.78	3.89	[signature] 11/1/94 ~~14.51~~ 19.16	~~48.33~~ 47.39 [signature] 11/1/94
DI94-7d	15.00	3.78	3.88	[signature] 11/1/94 ~~17.67~~ 17.32	47.40
DI94-9d	15.00	3.82	3.92	17.12	47.49
DI94-10d	15.00	3.83	3.93	18.88	52.60
DI94-12d	15.00	5.41	5.61	19.60	54.69
DI94-13d	15.00			19.78	

11/4/94 [signature]

CRA Samples 1, 2, 4, 5, 6 Resaturated in accordance with procedure on page 145.

11/8/94 [signature]

New Saturated weights measured for CRA 1, 2, 4, 5, 6. Scale used: Id: N45601 Cal: 23 Jun 94 Due 23 Dec 94

Sample	Saturated wt (g)	Sample Cup wt (g)
CRA-1	3.866	1.916
CRA-2	4.320	1.907
CRA-4	2.044	1.939
CRA-5	2.491	1.909
CRA-6	3.117	1.903

12/19/94 [signature]

Resaturated Cape Riva samples IAW procedure on page 145. Some loss of mass due to low consolidation, was observered. New dry weights will be obtained. New Sat. weights below. Scale use N45601 Cal 23 Jun 94 due 23 Dec 94.

Sample	Sat. Wt (g)	Sample	Sat wt (g)
CRA-1	3.801	CRA-7	1.643
CRA-2	4.305	CRA-8	3.236
CRA-4	2.028	~~[illegible]~~ [signature] 12/19/94	
CRA-5	~~4~~ [signature] 12/19/94 ~~3.081~~ 3.089	CRA-9	2.182
CRA-6	2.470	CRA-10	1.972

Km 11/15/94 VPPE6 - Cape Rin4 cont From pg 146

Km	11/15/94	P_g = 1.4" Hg set P_g = 1.8" Hg	
Km	11/16/94	P_g = 1.8" Hg set P_g = 2.2" Hg	ΔQ = +0.73 ml
Km	11/18/94	P_g = 2.2" Hg set P_g = 2.6" Hg	ΔQ = 1.30 ml
Km	11/21/94	P_g = 2.6" Hg set P_g = 3.0" Hg	ΔQ = +1.40 ml
Km	11/22/94	P_g = 3.0" Hg set P_g = 3.4" Hg	ΔQ = +1.01 ml
Km	11/28/94	P_g = 3.4" Hg set P_g = 3.8" Hg	ΔQ = +1.20 ml
Km	11/30/94	P_g = 3.8" Hg set P_g = 4.2" Hg	ΔQ = +2.85 ml
Km	12/1/94	P_g = 4.2" Hg set P_g = 4.6" Hg	ΔQ = +2.10 ml
Km	12/5/94	P_g = 4.6" Hg set P_g = 5.0" Hg	ΔQ = +6.50 ml
Km	12/16/94	P_g = 5.0" Hg set P_g = 5.4" Hg	ΔQ = +3.45 ml
Km	12/19/94	P_g = 5.4" Hg set P_g = 5.8" Hg	ΔQ = +1.55 ml

cont pg 165

From Pg 137 VIT*2

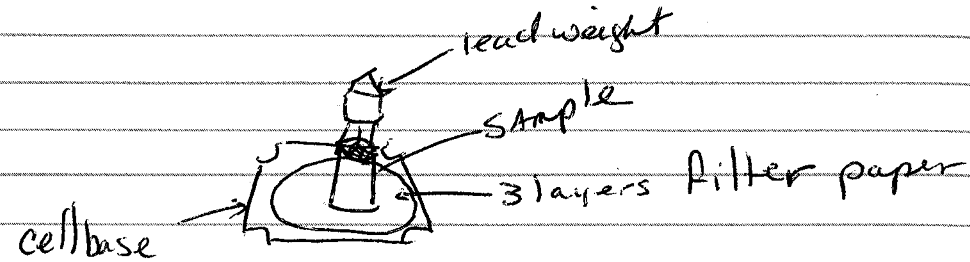
Km 12/16/94 Sample shrank away from sides of cylinder est. vol loss of 5 to 8%

Km 4/19/95

VPPE 5 - MIN DI-94-12D

12/19/94 KM Sample Dry Wt 46.047 g

Placed sample (dry) in cell as below:



introduced water onto plate. Sample soaked up water due to capillary action. (Took approx. 2-3 min for top to become wet).

Sealed cell. Will leave overnight before starting test

KM 12/20/94 Removed air bubbles from under plate set water to 0.00.

KM 12/23/94	$P_g = 0.5$ "Hg set $p_g = 0.8$ "Hg	$\Delta Q = 0.0$
KM 12/26/94	$P_g = 0.8$ "Hg set $p_g = 1.0$ "Hg	$\Delta Q = +0.43$ ml
KM 12/28/94	$P_g = 1.2$ "Hg Set $p_g = 1.6$ "Hg	$\Delta Q = +0.22$ ml
KM 12/30/94	$P_g = 1.6$ "Hg set $P_g = 2.0$ "Hg	$\Delta Q = +0.79$ ml
KM 1/2/95	$P_g = 2.0$ "Hg set $p_g = 2.4$ "Hg	$\Delta Q = +0.69$ ml
KM 1/11/95	$P_g = 2.4$ "Hg set $P_g = 2.8$ "Hg	$\Delta Q = +0.17$ ml

to pg 177

From 162

VPPE6 - Cape River

KM 12/20/94	$P_g = 5.8$ "Hg set $P_g = 6.2$ "Hg	$\Delta Q = +3.73$ ml
KM 12/22/94	$P_g = 6.2$ "Hg set $P_g = 6.6$ "Hg	$\Delta Q = +2.70$ ml
KM 12/23/94	$P_g = 6.6$ "Hg set $P_g = 7$ "Hg	$\Delta Q = +2.25$ ml
KM 12/26/94	$P_g = 7$ "Hg set $p_g = 7.4$ "Hg	$\Delta Q = +2.25$ ml
KM 12/28/94	$P_g = 7.4$ "Hg Set $p_g = 7.8$ "Hg	$\Delta Q = +2.10$ ml
KM 12/30/94	$P_g = 7.8$ "Hg set $p_g = 8.2$ "Hg	$\Delta Q = +1.75$ ml
KM 1/2/95 (KM 1/2/95)	$P_g = 8.2$ "Hg set $p_g = 8.4$ "Hg	$\Delta Q = +1.20$ ml
KM 1/11/95	$P_g = 8.4$ "Hg set $p_g = 8.8$ "Hg	$\Delta Q = +1.0$ ml
KM 1/12/95	$P_g = 8.8$ "Hg set $P_g = 9.2$ "Hg	$\Delta Q =$ ~~+7.3 ml~~ +0.73 ml (KM 1/12/95)
KM 1/21/95	$P_g = 9.1$ "Hg set $P_g = 9.6$ "Hg	$\Delta Q = +1.10$ ml
KM 1/26/95	$P_g = 9.6$ "Hg set $P_g = 10$ "Hg	$\Delta Q = +1.55$ ml
KM 1/30/95	$P_g = 10.0$ "Hg set $P_g = 10.4$ "Hg	$\Delta Q = +1.15$ ml

TO pg 179

Cape Reva - Centrifuge Test

12/20/94 KM

Wt of Centrifuge tubes
1) 13.761g
2) 13.669g
3) 13.851g

Saturated Rocks on 12/19 by:
1) Placing dry rocks in Permeameter
2) Pulled vaccuum
3) Introduced DI-deaired water to cover
4) Put under 20 psi pressure

Measured volume of rocks by Archimedes method using dI-deaired water.
Volume of rocks (± 0.1 cm³ estimated)
1) ~~5.55 cm³~~ KM 12/20/94 9.7 cm³
2) 5.55 cm³
3) 6.55 cm³

Placed saturated rocks in tubes
Wt of tubes and saturated rocks
1) 31.517g
2) 24.315g
3) ~~25.68~~ KM 12/20/94 25.699g

Wt of sat. rocks = (Wt of tubes + rocks) - (Tube wt)
1) 31.517g - 13.761g = 17.756g
~~2) 13.669g - 2~~ KM 12/22/94
2) 24.315g - 13.669g = 10.646g
3) 25.699g - 13.851g = 11.848g

Placed samples in centrifuge

Ran @ 146 RPM - 30 min. Wt of samples + tubes
1) 31.443g 2) 24.309g 3) 25.618g

Centrifuged at 175 RPM for 30 min
1) 31.409g 2) 24.293g 3) 25.576g

Centrifuged at 303 RPM for 1 hr.
1) 31.227g 2) 24.175g 3) 25.462g

KM 12/21/94 Wt of samples + tubes at beginning of day
1) 31.207 2) 24.158 3) 25.442g
noticed a little condensation on sides of tubes
T in Lab = 22°C RH = 34%

Ran at @ 377 RPM for 2 hours; wt of samples + tubes
1) 31.106g 2) 24.113g 3) 25.395

KM 12/22/94 Ran @ 460 RPM overnight i.e. ≅ 19 hrs
1) 30.721g 2) 23.778g 3) 25.070g

KM 12/23/94 Ran @ 693 RPM overnight i.e. 24 hrs
1) 29.639g 2) 23.145g 3) 24.553g

KM 12/23/94 Ran @ 776 RPM for 2 hours
1) 29.378g 2) 23.102g 3) 24.395g

Ran @ 859 RPM for 1.5 hours
1) 29.095g 2) 22.964g 3) 24.146

KM 12/26/94 Wt before running
1) 29.055g 2) 22.928g 3) 24.108

Ran at 1086 RPM for 4 hours
1) 28.522g 2) 22.605g 3) 23.821g

KM 12/30/94 WT before Running
1) 28.460g 2) 22.535g 3) 23.745g

12/27/94 KM — Placed C6*B*1 core in oven to measure moisture content. wt_i = 456.0 g (wt before drying).

12/30/94 KM — WT of C6*B*1 406.0g
noticed many microfractures formed upon drying.

12/30/94 KM — Ran at 1384 RPM for 2 hours
1) 28.073 2) 22.320 3) 23.393

12/30/94 KM — Ran at 1457 RPM for 2.5 hours
1) 27.930 2) 22.221 3) 23.287

Ran at 1709 RPM for 1 hr 10 min
1) 27.703 2) 22.086 3) 23.059

KM 1/2/95

KM 1/2/95 — Wt of C6*B*1 406.0g

KM 1/2/95 — Wt of tubes
1) 27.661 2) 22.046 3) 23.022

Ran at 1959 RPM for 1.5 hours
1) 27.584g 2) 21.938g 3) 22.898g

Ran at 2212 RPM for 1 hour
Centrifuge got hot. Points may not be good
1) 27.419g 2) 21.818g 3) 22.746g
Upon cooling, condensation formed on tubes.

Took sample out of tube #3. Broke into pieces. Gave to G James for aqualab testing.
Placed sample #1 and #2 in oven to dry

1/4/95 KM — Sat wt of C6*B*1 = 506.3 g

$n_{eff} = \frac{Wt_{sat} - Wt_{dry}}{Vol}$ $Vol = \pi r^2 h = \pi\left(\frac{5.1cm}{2}\right)^2 10.95cm = 223.69 cm^3$

$= \frac{(506.3g - 406.0g)}{223.69 cm^3} \times 100$

$= 44.8\%$

Sat % before drying on 12/27

$= \frac{Wt_i - Wt_{dry}}{Wt_{sat} - Wt_{dry}} \times 100$

$= \frac{456.0 - 406.0}{506.3 - 406.0} \times 100 = \frac{50.0}{100.3} = 50.4\%$

$\rho_{bulk} = \frac{Mass\ dry}{Vol} = \frac{406.0}{223.69} = 1.82$

KM 1/5/95 from p168 — data from G James Aqualab sample

Cape Riva (tube 3) from Centrifuge
Sample cup wt: 1.935g
Initial wt: 1.915g
Final wt: 1.915g
T(C): 24.0°C
Aw: .997
Potential: 4.12 Bar

KM KM

kOG"15:52:18",".967","23.76"
"15:53:31",".981","23.78"
"15:54:48",".987","23.84"
"15:56:05",".99","23.91"
"15:57:22",".992","23.91"
"15:58:38",".993","23.92"
"15:59:54",".995","23.93"
"16:01:11",".995","23.97"
"16:02:27",".996","23.99"
"16:03:44",".997","23.99"
"16:05:01",".998","23.96"
"16:06:18",".996","24.01"
"16:07:35",".998","23.99"
"16:08:52",".999","23.94"
"16:10:09",".997","23.98"
"16:11:26",".997","23.95"
"16:12:43",".999","23.92"

KM 1/5/95 Measured 100.02g H_2O into beaker
Placed Cape Riva sample (saturated) into beaker. Sample ID = CRA 14
wt of submerged saturated rock = 138.30
Volume of sample = 120 ml - 100 ml = 20 cm^3

CRA15
100 mls H_2O into beaker wt = 100.00 g
wt w/ CRA15 = 145.46 g
Volume of Sample = 122.6 ml - 100 ml = 22.6 cm^3

CRA16
120 mls H_2O into beaker wt = 120.07
wt/w CRA16 = 167.16 g
Volume of CRA16 = 146 ml - 120 ml = 26 cm^3

CRA17
175 mls H_2O into 200 ml beaker wt - 175.02 g
wt/w CRA17 = 283.38 g ~~233.6 ml~~ = KM 1/5/95
Volume of CRA17 = 233.6 ml - 200 ml = 33.6 cm^3

Volumes are ± 5%

Left samples in beakers w/ enough water to cover them.
Put @ .5 ml Chlorox into ea. to prevent bugs from growing. Covered w/ parafilm.

KM 1/5/95 Cut 3 ALT subsamples from saturated core. ~~C-6*B*1~~ KM 1/5/95
This core is the same one used to determine moisture content of the densitometer experiment done by R. Green.
Samples named AL*BN*2 thru AL*BN*4.

Physical Characteristics

	height	wt (SAT)	vol
AL*BN*2	0.94 cm	45.486 g	
AL*BN*3	1.15 cm	54.348 g	
AL*BN*4	1.28 cm	60.141 g	

Placed samples in 15 bar extractor (w/ 15 bar plate).
Used @ 7 sheets of filter paper + used 8 oz fishing weights on top.

Set PG = 10 psi.

KMT 1/11/95 P_G = 10 psi : Gas had run out on 1/9/95 replaced tank + reset to 10 psi.

Wt of Samples

AL*BN*2	45.456
AL*BN*3	54.329
AL*BN*4	60.146

Set P_G = 20 psi

KM 1/21/95 P_G = 20 psi
Wt of Samples

AL*BN*2	45.453
AL*BN*3	54.316
AL*BN*4	60.155

KM 1/5/95

Took apart C4 cylinder used for densitometer experiment. Specimen felt damp to the touch. There was a ~~no~~ (KM 1/5/95) gradation in color from outside edge towards center, where the outside was darker.

Chipped off 6 pieces 2 from outside edge 2 from the middle & 2 from the inside around the heater.

Weight of chips

1-O	136.72
2-O	42.378
3-M	151.18
4-M	24.788
5-I	13.027
6-I	36.058

Placed in oven at ~105C to dry

KM 1/10/95 Wt of dry C-4 samples

1-O	114.22
2-O	35.159
3-M	126.52
4-M	20.943
~~5-I~~	~~35.158~~ KM 1/10/95
6-I	31.467
5-I	11.412

KM 1/10/95

G James took 3 pieces of the C-3 cylinder and ran them in the Aqua lab.

Results are on the following pages.


```
kOGCement C-3 Inner sample RH: 62% Lab Temp: 26C   ***Potential: 66.0 bar***
"13:12:45",".943","24.78"
"13:14:06",".953","24.4"
"13:15:29",".954","24.26"
"13:16:52",".953","24.2"
"13:18:17",".953","24.16"
"13:19:42",".953","24.16"
"13:21:07",".953","24.14"
"13:22:31",".953","24.14"
kOGkOGCement C-3 Middle sample RH: 62% Lab Temp: 26C   ***Potential: 48.8 bar***
"13:23:56",".954","24.15"
"13:32:11",".951","24.32"
"13:33:36",".961","24.16"
"13:35:03",".959","24.2"
"13:36:30",".965","24.05"
"13:37:58",".962","24.04"
"13:39:26",".964","24.02"
"13:40:54",".965","24.02"
"13:42:22",".963","24.09"
"13:43:51",".963","24.1"
"13:45:20",".964","24.08"
"13:46:49",".965","24.08"
"13:48:18",".965","24.09"
"13:49:47",".966","24.08"
"13:51:16",".966","24.09"
"13:52:44",".965","24.12"
"13:54:13",".965","24.14"
"13:55:43",".965","24.17"
```

KM 1/11/95

```
kOGkOGCement C-3 Outer sample RH: 58% Lab Temp: 26C    ***Potential: 61.7 bar***
"14:07:01",".94","25.12"
"14:08:21",".963","24.68"
"14:09:44",".964","24.5"
"14:11:08",".961","24.43"
"14:12:34",".959","24.33"
"14:14:00",".959","24.26"
"14:15:26",".958","24.24"
"14:16:53",".956","24.25"
"14:18:19",".956","24.24"
"14:19:46",".957","24.24"
"14:21:13",".957","24.22"
"14:22:41",".957","24.21"
"14:24:08",".956","24.23"
"14:25:35",".956","24.24"
"14:27:02",".956","24.21"
"14:28:28",".956","24.21"
kOG
```

KM 1/11/95

kmi/10/95 Wt of C-3 samples before drying

1-0 49.248 g
2-0 73.777 g
3-M 33.496 g
4-M 53.929 g
5-I 17.761 g
6-I 35.369 g

KM 1/11/95 Wt of samples (C-3)

10 41.638 g 3 M 28.831 g 5 I 15.048 g
20 62.257 g 4 M 46.784 g 6 I 30.496 g

KM 1/12/95 10 41.663 g 3M 28.850 g 5I 15.062 g
20 62.301 g 4M 46.809 g 6I 30.495 g

These weights are higher than those taken yesterday, presumably due to increased RH in lab.

KM 1/13/95 SATURATED Samples

KM 1/17/95 Wt of saturated samples

1 0 52.946
2 0 79.303 g
3 M ~~33.946~~ KM 1/19 37.055
4 M 59.982
5 I 19389
6 I 39.159

Volume of C-3 samples

1-0 ~~37~~ KM 1/19 25 cm^3
2-0 37 cm^3
3-M ~~27.5~~ KM 1/19 17.5 cm^3
4-M 28 cm^3
5I 9 cm^3
6I 18 cm^3

Km 1/10/95 Saturated C-4 samples.

Km 1/11/95 Wt of C-4 samples (saturated)

1-O	137.41
2-O	~~42.378~~ Km 1/11/95 42.705
3-M	153.57
4-M	25.250
5-I	13.868
6-I	38.374

Put 150 ml into a [Km 1/11/95] 250 ml grad cylinder
broke up C4 1-O sample and put into cylinder. Volume final = 219 ml.
Vol of 1-O sample = 219 - 150 = 69 cm³
(Assume ρ_{H_2O} = 1.000.)

Followed above procedure for remaining samples. Used smaller (ie 100 ml grad. cyl.) when possible.

Sample	Init H_2O	Final Level	Vol sample
2-O	50ml	71.7ml	21.7 cm³
3-M	150ml	228.0ml	78cm³
4-M	60ml	72.9ml	12.9cm³
5-I	50ml	57.1ml	7.1cm³
6-I	55ml	80.1ml	25.1cm³

From pg 164 (VPPE5)

Km 1/12/95 P_g = 2.8"Hg ΔQ = +0.41ml
did not change level.

Km 1/23/95 P_g = 2.8"Hg ΔQ = +0.20ml
set P_g = 3.2"Hg

Km 1/26/95 P_g = ~~3.2"Hg~~ Km 1/26/95 = 3.3" Hg ΔQ = +0.38 ml
set P_g = 3.6"Hg

KM 1/30/95 P_g = 3.4"Hg ΔQ = 0.00
set P_g = 4.0"Hg

Km 2/7/95 P_g = 4.0"Hg ΔQ = +0.50ml
set P_g = 4.4"Hg

Km 2/13/95 P_g = 4.6"Hg ΔQ = +0.29ml
set P_g = 5.0"Hg

Km 2/16/95 P_g = 5.0"Hg ΔQ = +0.46ml
set P_g = 5.4"Hg

Km 2/23/95 P_g = 5.4"Hg ΔQ = +0.24ml
set P_g = 5.8"Hg

Km 2/27/95 P_g = 5.8"Hg ΔQ = +0.20ml
set P_g = 6.4"Hg

Km 3/7/95 P_g = 6.4"Hg ΔQ = +0.18ml
set P_g = 7.0"Hg

Km 3/14/95 P_g = 6.4"Hg ΔQ = +0.00ml
set P_g = 7.0"Hg

Km 4/19/95 P_g = 7.0"Hg ΔQ = -0.60ml
checked for leaks found none
set P_g = 10"Hg

From pg 171 15bar AL

Km 1/30/95 Pg ~ 40 psi

AL*BN*2	45.438	
AL*BN*3	54.315	54.298
AL*BN*4	60.126	

set Pg = 75 psi

Km 2/7/95 Pg = 75 psi

AL*BN*2	45.415
AL*BN*3	54.264
AL*BN*4	60.083

set Pg = 115 psi

Km 2/13/95 Pg = 114 psi

AL*BN*2	45.409
AL*BN*3	54.250
AL*BN*4	60.072

set Pg = 145 psi

Km 2/16/95 Pg = 145 psi

AL*BN*2	45.388
AL*BN*3	54.231
AL*BN*4	60.047

from pg 165

VPPE6 CAPERINA cont

Km 2/7/95	Pg = 10.4" Hg set Pg = 10.8" Hg	ΔQ = +0.90 ml
Km 2/13/95	Pg = 10.8" Hg set Pg = 11.2" Hg	ΔQ = +1.00 ml
Km ~~2/17/95~~ 2/16/95 (16 Km 2/14/95)	Pg = 11.2" Hg set Pg = 11.6" Hg	ΔQ = +0.87 ml
Km 2/23/95	Pg = 11.6" Hg set Pg = 12" Hg	ΔQ = +0.54 ml
Km 2/27/95	Pg = 12.0" Hg set Pg = 12.4" Hg	ΔQ = +0.75 ml
Km 3/2/95	Pg = 12.4" Hg set Pg = 13" Hg	ΔQ = +0.42 ml
Km 3/14/95	Pg = 13" Hg set Pg = 14" Hg	ΔQ = +0.73 ml
~~Km 3/31/95~~	~~Pg =~~ Km 4/13/95	
Km 4/19/95	Pg = 14" Hg set Pg = 16" Hg	ΔQ = +0.51 ml
Km 4/28/95	Pg = 16" Hg	ΔQ = +1.75 ml

seems like getting alot of air through plate

~~Test discontinued~~ Km 4/28/95

KM 2/10/95 Took apart Apache Leap cylinder from Densitometer Test. Collected the following samples

Sample	wt
BOTTOM OUTER EDGE 1	83.42 g
BOTTOM OUTER EDGE 2	60.647 g
BOTTOM CENTER 1	48.818 g
BOTTOM CENTER 2	58.479 g
MIDDLE CENTER	47.504 g
BOTTOM 12 cm from CENTER	7.776 g
TOP OUTER EDGE	30.089 g
TOP CENTER	73.604 g
TOP 4-8 cm from center	22.671 g
TOP 8-12 cm. from center	18.923 g
TOP at 7cm from center	14.198
* TOP OUTER EDGE	56.575

* This sample looks like it really was taken from the middle outer edge

Placed samples in oven to dry at 105°C

KM 2/16/95 Wt of dry samples

	wt.
Bottom outer edge 1	82.52 g
Bottom outer edge 2	60.018 g
Bottom center 1	48.469 g
Bottom center 2	58.076 g
Middle center	47.153 g
Bottom 12 cm from center	7.692 g
Top outer edge	29.786 g
Top center	72.794 g
top 4-8 cm from center	22.422 g
top 8-12 cm from center	18.719 g
Top at 7 cm from center	14.047 g
* Top outer edge	56.016 g

Cont from pg 180

KM 2/16/95 Placed samples in saturator & pulled vacuum. Let in CO_2, pulled vacuum, let in CO_2, pulled vacuum let in CO_2 pulled vacuum. Left overnight under vacuum.

~~KM 2/20/95~~ KM 2/20/95

~~Wt of saturated Samp~~ KM 2/20/95

KM 2/20/95 On 2/17/95 introduced Deaired DI H_2O into saturator. Hooked saturator up to B·K control panel and placed it under 40 psi of head.

On 2/20/95 weighed saturated samples & figured volume using Archemedes method

Sample	Wt.	~~Vol~~ KM 2/20/95 Vol
Bottom outer edge 1	85.15 g	32 cm³
Bottom outer edge 2	61.869 g	24.5 cm³
Bottom center 1	49.741 g	19.5 cm³
Bottom center 2	59.728 g	24 cm³
Middle center	48.582 g	19 cm³
Bottom 12 cm from center	7.922 g	KM 2/20/95 3~~4~~ cm³
Top outer edge	30.674 g	12 cm³
Top center	75.190 g	30 cm³
Top 4-8 cm from center	23.139 g	8.5 cm³
Top 8-12 cm from center	19.395 g	7 cm³
Top at 7cm from center	14.504 g	6 cm³
* Top outer edge	57.647 g	22.5 cm³

Bottom of cylinder is considered that side which the heater ~~a~~ went through.

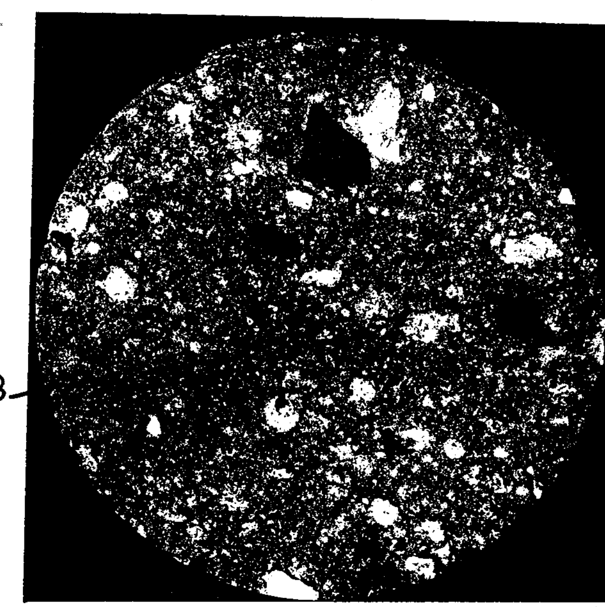
KM ~~2/24/95~~ 2/27/95 KM

Set up VPPE4 w/ 5bar plate.
Sample = CRA 17 (SATURATED).
used cra paste to establish contact.
using 100psi gage (ID# 1593007) turned on pressure until it started to register at 4psi, backed off pressure 'till it didn't register anymore but had some unknown starting pressure ≤ 2psi

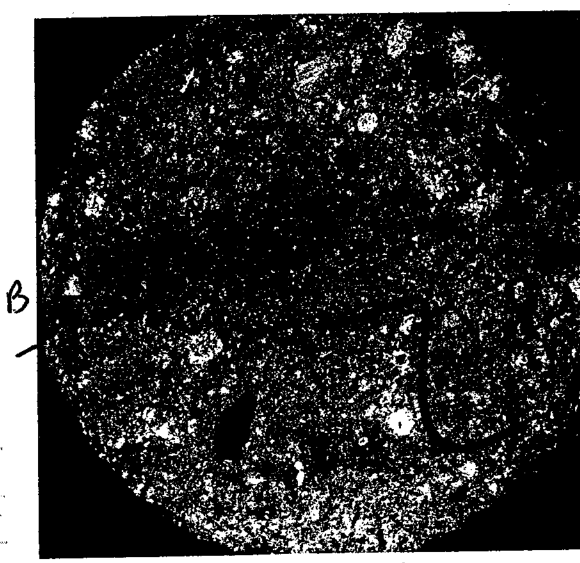
KM	3/6/95	Set P_g = 5psig	
	3/7/95	P_g = 5 psig	ΔQ = +8.10ml
	3/14/95	P_g = 5psig	ΔQ = +4.20ml
	3/31/94	P_g = 5psig	ΔQ = +2.70ml
	4/19/95	P_g = 5psig	ΔQ = +2.95ml
	6/23/95	P_g = 5psig	ΔQ = −2.0ml
	6/28/95	set P_g = 10psig	

KM 3/1/95 - Cut ALT sample received from Sitakanta Mohanty. This sample is a cutting (2 pieces) from the sample used in the fracture flow test under Sitakanta M. & Asad Chowdhury. I know it is an SRM sample but not the extension (ie. SRM.xx.xx)

The piece which has a fracture was cored using the 3" bit w/ water as the drilling fluid. The core stayed in one piece.
Analysis of the fracture through the core showed:



ALT*B*FRAC 1 TOP



ALT*B*FRAC 1 BOTTOM

TOP

SIDE A BOTTOM

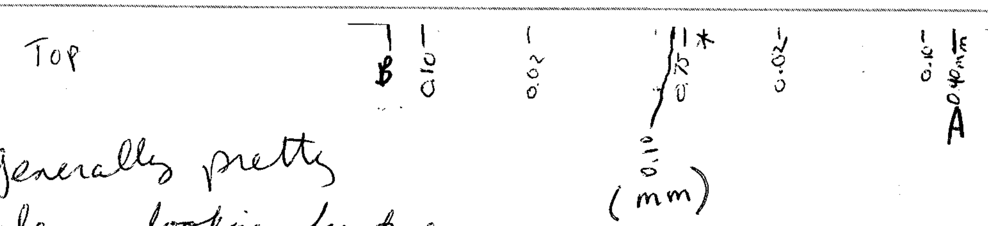
KM KM

TOP

SIDE B - BOTTOM

km 3/2/95

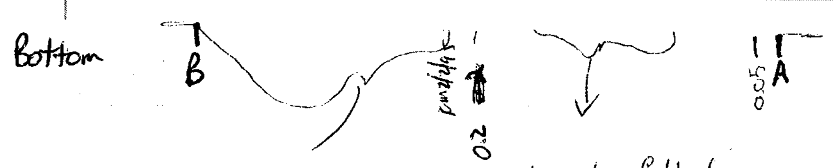
Aperature widths measured along trace of fracture



generally pretty
clean looking fracture.
w/ MnO_2 coating.

km 3/2/95

Having this side up may help to
decrease clogging of ~~po~~ fracture throats
w/ detritus materials.



approx
0.10 – 0.15 ~~0.20~~

mostly filled
or apparently filled w/ white
chalky dusty looking stuff

km 3/2/95

widths are in milimeters

km 3/2/95 Sample height = 4.1cm
Sample Diameter = 7.6cm

km 3/2/95

km 3/2/95 Length of fracture trace side a ≅ ~~4.2cm~~ 4.25cm
side b ≅ 4.2cm

Placed sample in oven to dry.

RM 3/7/95 Santorini Sample Moisture Content
-drying out period

1st weight measurement

Sample	Weight (g)
FLD94A	288.28
FLD94F	205.61
MIN94A	179.56
MIN94B	174.56
PHI A	132.85
PHI B	141.42
FLD94B	57.73
FLD94C	62.81
FLD94D	51.73
FLD94E	51.41

4/10/95 RM - Drying out several Santorini Samples

Sample	1st Measurement	Today's Measurement
FLD94A	288.28	288.13
FLD94F	205.61	205.23
MIN94A	179.56	179.43
MIN94B	174.56	174.39
PHI A	132.85	132.78
PHI B	141.42	141.35
FLD94B	57.73	57.71
FLD94C	62.81	62.81
FLD94D	51.73	51.70
FLD94E	51.41	51.40

} Considered dry. End caps all had cracks. Each covered & left for volume measurement.

4/11/95 RM

Santorini Samples · Wts of cylinders ~~to~~ bottom caps + media

Sample	Weight (g)
FLD 94A	288.10
FLD 94F	205.17
MIN94A	179.39
MIN94B	174.35
PHI A	132.76
PHI B	141.34

Two cylinders had cracked end caps. All have been removed from oven.

RM 4/19/95 - Santorini Samples have been capped and left at Lab Temp + RH since 4/11/95.

4/19/95 RM

Set up VPPE #3 with 5 bar plate. Plate had been SATURATING for 2½ weeks.

Sample = CRA 14 Volume of sample = 20cm³

Placed CRA 14 into cell and set water level to 0.00ml no pressure placed on cell.

RM 5/10/95 Bulk Volume - Cape Riva

CRA 16 + CRA 15 bulk volume were measured using Archemedes method

CRA 16 -

Sample was saturated in beaker (150ml). level was brought to 140 ml. Sample was removed and allowed to drain. final level of water was 117 ml

$$Vol_{BULK} = Vol_{init} - Vol_{final}$$

$$140 - 117 = 23\ cm^3$$

CRA 15

$$130 - 108 = 22\ cm^3$$

RM 5/10/95 Poured water off samples - Placed CRA 15 + 16 in oven to dry

* Before placing in oven - Sample + Beaker were weighed

CRA 15 = 45.295

CRA 16 = 46.740

RM 5/12/95 Wt of dry Samples CRA 16 = 33.684 g CRA 15 = 33.701 g

5/11/95
KM

Measureing Bulk Volume of Cape Riva samples used in aqualat experements.

Procedure: Archemedes Method.

Samples were saturated by placing them in a 25 ml graduated cylinder. Deaired DI water was added to cover the samples. A vacuum was pulled on the grad. cylinder and the cylinder was placed on a shaker table. When air bubbles ceased to be emmitted from the sample the vacuum was released + shaker table was turned off. The samples were considered saturated.

The volume of the sample was determined by dropping the saturated sample into a graduated cylinder which contained a known amt. of water. The rise in the water level was taken as the sample volume.

Readability of the graduated cyl. was ± ~~0.01 ml.~~ KM 5/11/95 0.1 ml.

The samples were measured on 5/11/95 + 5/12/95. KM

KM 5/12/95 Results:

KM 5/12/95

Cape Riva Porosity

Sample Cup	Sample Vol.	Wt H2O	Porosity
CRA1	2.2	0.979	0.45
CRA2	2.4	1.181	0.49
CRA4	1.2	0.748	0.62
CRA5	1.6	0.843	0.53
CRA6	1.4	0.654	0.47
CRA7	1	0.628	0.63
CRA8+9	2	1.011	0.51
CRA10	1.2	0.583	0.49
CRA11	1	0.456	0.46
CRA15	22	11.594	0.53
CRA16	23	13.076	0.57

5/23/95

Sample	WT (init as	bulkVOL(C CALIPER	WT (f)holde	WT topcap	WT holde 4/21/95	WT dry m 4/21/95	WT init media on 4/21/95	Wt water in sample 4/21/95	GrainVo 4/21/95	porosity 4/21/95	Saturation 4/21/95	Error+ 4/21/95	Error- 4/21/95
9/27/94	9/27/94	3/28/95	4/11/95										
FLD-94D	55.706	18.691827	51.73	3.546	26.577	21.607	25.583	0.43	11.255	0.3978444	0.05782337		
FLD-94C	67.012	19.702196	62.81	3.682	26.577	32.551	36.753	0.52	14.869	0.2453063	0.107592		
FLD-94B	61.785	19.702196	57.73	3.719	26.577	27.434	31.489	0.336	13.432	0.318267	0.05358374		
FLD-94E	55.493	19.504515	51.41	3.586	26.577	21.247	25.33	0.497	11.255	0.4229343	0.0602488		
MIN-94B	183.66	130.46829	174.35	8.401	44.23	121.719	131.029	0.909	56.369	0.5679492	0.01226731		
FLD-94A	299.69	127.94018	288.1	8.715	44.23	235.155	246.745	2.875	89.721	0.2987284	0.07522364		
PHI-B	151.31	115.57052	141.34	9.087	44.23	88.023	97.993	0.883	44.143	0.6180466	0.0123621		
PHI-A	143.7	130.10713	132.76	10.279	44.23	78.251	89.191	0.661	51.203	0.6064575	0.00837722		
FLD-94F	217.86	137.24	205.17	8.379	44.23	152.561	165.251	4.311	72.838	0.4692678	0.06693859		
MIN-94A	188.55	122.70339	179.39	8.101	44.23	127.059	136.219	1.059	59.754	0.5130236	0.01682294		

KMg

Sample	WT (init as	WT(beaker)	WT(smpl+b	WT(bk+s)d	Wt beake	WT dry m	WT dry m	WT init med	Wt wate using	Wt water in	GrainVol	Bulk Volu	porosity	Saturation
9/27/94	9/27/94	9/27/94	9/27/94	10/6/94	4/21/95	10/6/94	4/21/95	9/27/94	10/6/94	4/21/95	4/21/95	4/21/95	4/21/95	4/21/95
DI94-5W	63.93	28.957	62.053	55.512	28.416	26.555	26.504	33.096	6.541	6.592	10.3272	20.9322	0.50664	0.6216
DI94-8W	61.1*	28.029	58.005	52.955	28.416	24.926	24.874	29.976	5.05	5.102	10.3272	20.9322	0.50664	0.4811
DI94-11W	63.704	28.921	61.721	54.544	28.416	25.623	25.574	32.8	7.177	7.226	10.3272	20.9322	0.50664	0.6814
DI94-14W	48.414	28.567	46.748	42.292	28.416	13.725	13.694	18.181	4.456	4.487	7.0222	20.9322	0.66453	0.3226
DI94-17W	50.316	28.37	48.22	43.449	28.416	15.079	15.024	19.85	4.771	4.826	7.1636	20.9322	0.65777	0.3505
DI94-17D	47.532	29.077	46.393	46.238	28.416	17.161	17.084	17.316	0.155	0.232	8.2222	20.9322	0.6072	0.0183
DI94-14D	47.465	28.885	46.009	45.857	28.416	16.972	16.914	17.124	0.152	0.21	7.5169	20.9322	0.64089	0.0157
DI94-11D	57.446	27.85	55.055	54.266	28.416	26.416	26.374	27.205	0.789	0.831	10.3272	20.9322	0.50664	0.0784
DI94-8D	55.694	28.389	54.282	53.882	28.416	25.493	25.454	25.893	0.4	0.439	10.3272	20.9322	0.50664	0.0414
DI94-5D	61.57	28.808	60.088	59.561	28.416	30.753	30.674	31.28	0.527	0.606	11.7215	20.9322	0.44003	0.0658

Sample	WT (init as recieved	WTcyl+w+f only	WTs+C+W initial	WTs+cyl+ dry	VOL(CM CALIPER	bulkVOL(CALIPER	WT dry m 4/21/95	WT init med 4/25/95	Wt wate 4/25/95	Bulk Vol 4/25/95	GrainVol 4/25/95	porosity 4/25/95	Saturatio 4/25/95	Error+ 4/25/95
9/27/94	9/27/94	04/26/95	10/7/94	10/13/94	11/1/94	3/28/95								
DI94-16D	50.408	25.721	45.643	45.478		19.878	19.757	19.922	0.165	20.93221	9.0719	0.544	0.00451	
DI94-16W	59.12	25.603	54.048	47.052		20.669	21.449	28.445	6.996	20.93221	9.8095	0.525	0.17784	
DI94-15W	56.596	25.648	51.358	44.606		20.888	18.958	25.71	6.752	20.93221	7.9602	0.619	0.20006	
DI94-13D	52.339	25.713	47.575	47.375	19.73	20.5149	21.662	21.862	0.2	20.93221	9.2566	0.549	0.00535	
DI94-15D	47.426	25.71	42.755	42.634	17.78		16.924	17.045	0.121	20.93221				
DI94-13W	50.984	25.693	46.224	41.92		19.307	16.227	20.531	4.304	20.93221	7.2156	0.626	0.13961	
DI94-12W	54.88	25.736	50.464	44.494		20.185	18.758	24.728	5.97	20.93221	8.702	0.569	0.16826	
DI94-10W	62.615	25.108*	58.47	52.208		20.9761	27.1	58.47	31.37	20.93221	9.8095	0.532	0.79613	
DI94-9D	57.012	25.642	52.627	52.197	17.12	17.484	26.555	26.985	0.43	20.93221	11.2766	0.355	0.00873	
DI94-7D	55.412	25.647	50.987	50.158	17.32	20.449	24.511	25.34	0.829	20.93221	9.8095	0.52	0.02109	
DI94-7W	59.834	25.649	55.261	49.164		20.339	23.515	29.612	6.097	20.93221	9.4411	0.536	0.16062	
DI94-10D	55.703	25.653	51.353	50.877	18.88	18.758	25.224	25.7	0.476	20.93221	10.1773	0.457	0.01161	
DI94-12D	50.534	25.694	46.226	46.047	19.6		20.353	20.532	0.179	20.93221				
DI94-6D	57.053	25.655	52.312	52.059	19.16	16.7809	26.404	26.657	0.253	20.93221	9.2566	0.448	0.00676	
DI94-6W	55.315	25.685	50.699	47.826		20.427	22.141	25.014	2.873	20.93221	9.0719	0.556	0.07818	
DI94-9W	66.049*	25.609	61.763	57.076		20.778	31.467	36.154	4.687	20.93221	12.7328	0.387	0.08734	

KJS 5/23/95

Sample: PHI+A

Ksat Summary

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Time: Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	10	—	5/16/95	—	—	KMg

Fluids (ml) Initial: Confining	Inflow	Outflow	Final: Confining	Inflow	Outflow	Notes
22.0	21.2	21.7	22.0	1.5	1.9	

Time 30 cc

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Time: Start time	Start date	Stop time	Stop date	Investigator
	35.1	20	10	—	5/17/95			KMg

Fluids (ml) Initial: Confining	Inflow	Outflow	Final: Confining	Inflow	Outflow	Notes
22.2	21.5	23.0	22.2	3.8	4.7	

Time 33 cc

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Time: Start time	Start date	Stop time	Stop date	Investigator
	35.1	20	10	—	5/17/95			KMg

Fluids (ml) Initial: Confining	Inflow	Outflow	Final: Confining	Inflow	Outflow	Notes
35.1	21.3	23.3	22.2	3.7	5.2	

Time 35 cc

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Time: Start time	Start date	Stop time	Stop date	Investigator
	35.1	20	10	—	5/17/95			KMg

Fluids (ml) Initial: Confining	Inflow	Outflow	Final: Confining	Inflow	Outflow	Notes
22.2	21.4	22.4	22.2	3.7	4.6	

Continued on page:

KJ 5/23/95

Sample:

Ksat Summary

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	35.1	20	5	—	5/17/95	—	—	KKg	27 sec

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
22.2	20.9	22.7	22.2	0.7	2.5	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
~~22.2~~ KM 5/17/95	35.1	20	5	—	5/17/95	—	—	KKg	25 sec

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
22.2	21.5	23.0	22.2	3.2	4.7	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	35.1	20	5	—	5/17/95			KKg	27 sec

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
22.2	21.3	22.6	22.2	1.7	2.8	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	35.1	20	5	—	5/17/95	—	—	KKg	25 sec

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
22.2	21.6	23.2	22.2	3.35	4.9	

Continued on page:

KJ 5/23/95

Sample: PH1-A

Ksat Summary

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	~~20~~ KM 5/17/95 35.1	20	15	—	5/17/95	—		KMg	1:20 sec

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
22.2	21.5	23.2	22.2	0.5	2.1	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
~~22.2~~ KM 5/17/95	35.1	20	15	—	5/17/95	—	—	KMg	1:15 sec

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
22.2	21.7	23.4	22.2	~~23.2~~ 22 (KM 5/17/95)	3.8	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	35.1	20	15	—	5/17/95	—	—	KKg	1:10 sec

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
4.7	21.4	23.4	4.7	1.9	3.6	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	35.1	20	15	—	5/17/95	—		KKg	1:15 sec

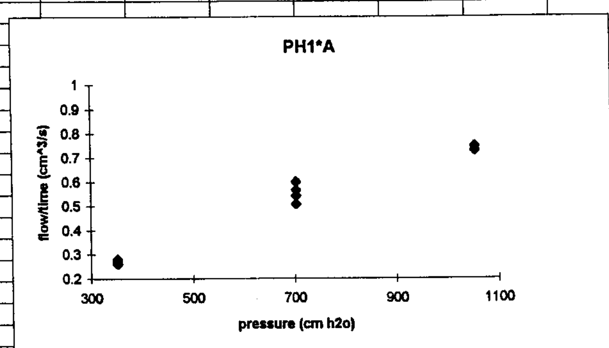
Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
4.7	22.0	23.1	4.7	1.9	2.9	

Continued on page:

KJ 5/23/95

PH1-94A2.XLS

	dH (cm H	flow (cm^	time (s)	Area	Ksat(cm/s	k(m^2)
10	703.072	19.75	35	16.6106	0.000350	3.57E-13
10	703.072	18	30	16.6106	0.000372	3.8E-13
10	703.072	17.85	33	16.6106	0.000336	3.43E-13
10	703.072	17.75	35	16.6106	0.000315	3.21E-13
15	1054.608	20.2	27	16.6106	0.000310	3.16E-13
15	1054.608	18.3	25	16.6106	0.000303	3.09E-13
15	1054.608	19.7	27	16.6106	0.000302	3.08E-13
15	1054.608	18.275	25	16.6106	0.000303	3.09E-13
5	351.536	21.05	80	16.6106	0.000327	3.33E-13
5	351.536	19.55	75	16.6106	0.000324	3.3E-13
5	351.536	19.65	70	16.6106	0.000349	3.56E-13
5	351.536	20.15	75	16.6106	0.000334	3.4E-13



KJ 5/23/95

Prepared by Kristi James 5/17/95

Sample: Min 94A

Ksat Summary

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Time	Investigator
	30.8	20	10	—	5/12/95		—	5:17.30	KMG
	30.8	20	10	—	5/12/95	—	—	7:00	KMG
	30.8	20	10	—	5/12/95	—	—	7:30	KMG
	30.8	20	10	—	5/12/95	—	—	7:30	KMG

Fluids (ml)

Initial Confining	Initial Inflow	Initial Outflow	Final Confining	Final Inflow	Final Outflow	Notes
6.0	20.5	21.2	6.0	3.9	3.9	
6.0	22.1	23.3	6.0	1.8	3.0	
6.0	23.0	23.3	6.0	1.9	2.2	
6.0	23.0	23.5	6.0	2.2	2.8	

Continued on page:

KJ 5/23/95

Sample: Min 94A

Ksat Summary

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Time	Investigator
3	31.0	20.0	5.0	–	5/12/95	–	–	5:30	KM
	31.0	20.0	5.0	–	5/12/95	–	–	5:30	KM
	31.0	20.0	6.0	–	5/12/95	–	–	5:47	KM
	31.0	~~23.5~~ 20.0 (KJ 5/12/95)	5.0	–	5/12/95	–	–	5:30	KM

Fluids (ml)

Initial Confining	Initial Inflow	Initial Outflow	Final Confining	Final Inflow	Final Outflow	Notes
5.8	22.8	22.3	5.8	1.6	0.9	
5.8	23.0	23.5	5.8	1.9	2.4	
5.8	22.5	23.8	5.8	0	1.3	
5.8	23.0	23.7	5.8	1.3	2.2	

Continued on page:

KJ 5/23/95

Sample: Min 94A

Ksat Summary

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Time	Investigator
	35.0	30	10	–	5/12/95	–	–	3:30	KM
	35.0	30	10	–	5/12/95	–	–	3:30	KM
	35.0	30	10	–	5/12/95	–	–	3:31	KM
	35.0	30	10	–	5/12/95	–	–	3:38	KM

Fluids (ml)

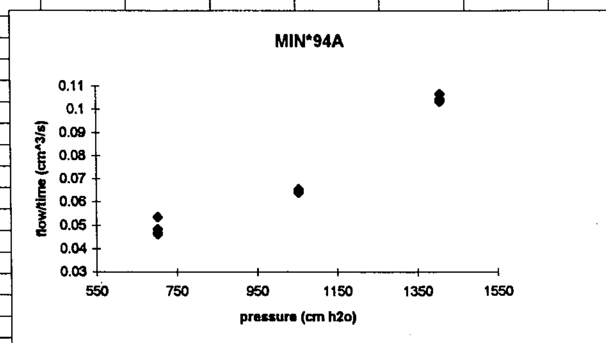
Initial Confining	Initial Inflow	Initial Outflow	Final Confining	Final Inflow	Final Outflow	Notes
6.0	23.0	24.0	6.0	0.5	1.7	
6.0	23.0	23.6	6.0	1.0	1.6	
6.0	23.0	23.7	6.0	1.0	1.7	
6.0	23.0	23.2	6.0	0.4	0.7	

Continued on page:

KJ 5/23/95

MIN94A.XLS

	dH	flow	time	Area	Ksat(cm/s	k(m^2)		
10	703.072	16.95	317.36	16.6106	0.000551	5.62E-13		
10	703.072	20.3	420	16.6106	0.000498	5.08E-13		
10	703.072	21.1	450	16.6106	0.000484	4.93E-13		
10	703.072	20.75	450	16.6106	0.000475	4.85E-13		
15	1054.608	21.3	330	16.6106	0.000444	4.53E-13		
15	1054.608	21.1	330	16.6106	0.000440	4.48E-13		
15	1054.608	22.5	347	16.6106	0.000446	4.55E-13		
15	1054.608	21.6	330	16.6106	0.000450	4.59E-13		
20	1406.144	22.4	210	16.6106	0.000550	5.61E-13		
20	1406.144	21.95	210	16.6106	0.000539	5.5E-13		
20	1406.144	22	211	16.6106	0.000538	5.48E-13		
20	1406.144	22.55	218	16.6106	0.000533	5.44E-13		



Prepared by Kristi James 5/12/95

KJ 5/23/95

①

Sample: FLD + 94A

Ksat Summary

Pressure (psig)							Time 1:51	
dP (psig)	Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	30.8	20	10	—	5/4/95	—	—	KMJ

Fluids (ml)						Notes
Initial			Final			
Confining	Inflow	Outflow	Confining	Inflow	Outflow	
4.0	23.3	22.6	4.0	2.7	3.2	

Pressure (psig)							Time 2:08	
dP (psig)	Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	30.8	20	10	—	5/4/95	—	—	KMJ

Fluids (ml)						Notes
Initial			Final			
Confining	Inflow	Outflow	Confining	Inflow	Outflow	
3.9	23.7	23.6	3.9	0.9	0.9	

Pressure (psig)							Time 2:10	
dP (psig)	Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	30.8	20	10	—	5/4/95	—	—	KMJ

Fluids (ml)						Notes
Initial			Final			
Confining	Inflow	Outflow	Confining	Inflow	Outflow	
3.9	22.1	23.2	3.9	0.8	2.0	

Pressure (psig)							Time 2:20	
dP (psig)	Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	30.8	20	10	—	5/4/95	—	—	KMJ

Fluids (ml)						Notes
Initial			Final			
Confining	Inflow	Outflow	Confining	Inflow	Outflow	
3.9	23.5	23.4	3.9	1.0	1.0	

Continued on page:

KJ 5/23/95

②

FLD 94A ~~RJH~~ 1/14/97

Sample:

Ksat Summary

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	30.9	20	5	—	5/4/95	—	—	Kmg	1:20

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
3.9	23.0	23.2	3.9	1.1	1.0	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	30.9	20	5	—	5/4/95	—	—	Kmg	1:20

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
3.9	23.1	22.8	3.9	1.7	1.5	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	30.9	20	5	—	5/4/95	—	—	Kmg	1:20

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
3.9	23.0	23.3	3.9	1.2	1.6	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	30.9	20	5	—	5/4/95	—	—	Kmg	1:27

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
3.9	23.0	23.0	3.9	0	0	

Continued on page:

KJ 5/23/95

③

FLD 94A ~~RJH~~ 1/14/97

Sample:

Ksat Summary

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	35.9	30	10	—	5/4/95	—	—	Kmg	0:53

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
4.6	23.1	23	4.6	1.5	1.3	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	35.9	30	10	—	5/4/95	—	—	Kmg	0:57 ??

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
4.6	23.3	23.5	4.6	0.5	0.7	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	35.9	30	10	—	5/4/95	—	—	Kmg	0:55

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
4.6	23.3	24.3	4.6	0.7'	1.4	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
	35.9	30	10	—	5/4/95	—	—	Kmg	0:54

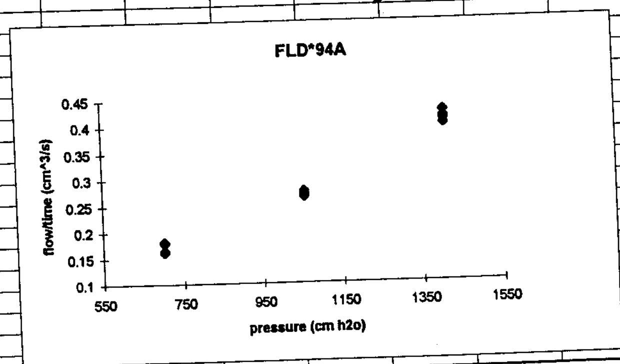
Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
4.6	23.8	24.0	4.6	0.9	1.0	

Continued on page:

KJ 5/23/95

fld*94a

	dH	flow	time	Area	Ksat(cm/s	k(m^2)
10	703.072	22.75	128	16.6106	0.000122	1.24E-13
10	703.072	20	111	16.6106	0.000123	1.26E-13
10	703.072	21.25	130	16.6106	0.000112	1.14E-13
10	703.072	22.45	140	16.6106	0.000110	1.12E-13
15	1054.608	22.05	80	16.6106	0.000126	1.28E-13
15	1054.608	21.35	80	16.6106	0.000122	1.24E-13
15	1054.608	21.75	80	16.6106	0.000124	1.27E-13
15	1054.608	23	87	16.6106	0.000121	1.23E-13
20	1406.144	21.65	53	16.6106	0.000140	1.43E-13
20	1406.144	22.8	57	16.6106	0.000137	1.4E-13
20	1406.144	22.75	55	16.6106	0.000142	1.45E-13
20	1406.144	22.95	54	16.6106	0.000146	1.48E-13



Prepared by Kristi James 5/16/95

KJ 5/23/95

T-B

Sample: PH1A

Ksat Summary

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	10	—	—	—	5/12/95	KMJ

Time 51.34 s

Fluids (ml)

Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow
19.2	3.2	0.5	19.2	23.6	21.6

Notes: After this test Removed air from system (sample)

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	10	—	5/12/95	—	—	KMJ

Time 38 sec

Fluids (ml)

Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow
20	2.0	1.3	20.0	22.9	22.3

Notes

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	10	—	—	—	5/12/95	KMJ

Time 35 sec

Fluids (ml)

Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow
20.0	2.4	0.5	20.0	22.4	20.6

Notes

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	10	—	—	—	5/12/95	KMJ

Time

Fluids (ml)

Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow
20.0	1.6	1.1	20.0	18.5	18.0

Notes

Continued on page:

KJ 5/23/95

Sample: PH1-A Ksat Summary B-T

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Time: Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	10	—	—	5/12/95	—	KMg

Fluids (ml) Initial: Confining	Inflow	Outflow	Final: Confining	Inflow	Outflow	Notes
20.5	21.2	24.3	20.5	5.8	8.8	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Time (40 sec): Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	10	—	5/12/95	—		KMg

Fluids (ml) Initial: Confining	Inflow	Outflow	Final: Confining	Inflow	Outflow	Notes
20.5	20.6	24.0	20.5	0.4	3.8	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Time (40 sec): Start time	Start date	Stop time	Stop date	Investigator
20.5	34.9	20	10	—	5/12/95	—		KMg

Fluids (ml) Initial: Confining	Inflow	Outflow	Final: Confining	Inflow	Outflow	Notes
	22.0	23.8	20.5	1.5	3.0	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Time (40 sec): Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	10	—	5/12/95	—	—	KMg

Fluids (ml) Initial: Confining	Inflow	Outflow	Final: Confining	Inflow	Outflow	Notes
20.5	22.0	23.6	20.5	1.0	2.5	

Continued on page:

KS 5/23/95

Sample: PH1-A Ksat Summary

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Time (30): Start time	Start date	Stop time	Stop date	Investigator
	34.6	20	5	—	5/12/95	—		KMg

Fluids (ml) Initial: Confining	Inflow	Outflow	Final: Confining	Inflow	Outflow	Notes
20.2	22.0	24.0	20.2	-0.2	1.8	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Time (30): Start time	Start date	Stop time	Stop date	Investigator
	34.8	20	5	—	5/12/95	—		KMg

Fluids (ml) Initial: Confining	Inflow	Outflow	Final: Confining	Inflow	Outflow	Notes
20.2	21.2 (~~22.2~~)	22.7 (~~23.2~~) 5/12/95	20.2 (~~20.2~~)	0	0.9	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Time (30): Start time	Start date	Stop time	Stop date	Investigator
	34.8	20	5	—	5/12/95			KMg

Fluids (ml) Initial: Confining	Inflow	Outflow	Final: Confining	Inflow	Outflow	Notes
20.2	22.2	23.6	20.2	1.2	2.6	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Time (30): Start time	Start date	Stop time	Stop date	Investigator
	34.8	20	5	—	5/12/95	—	—	KMg

Fluids (ml) Initial: Confining	Inflow	Outflow	Final: Confining	Inflow	Outflow	Notes
20.2	23.0	24.0	20.2	1.7	2.4	

Continued on page:

KS 5/23/95

Sample: PH1 A 1/14/97

Ksat Summary

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Time	Investigator
	34.9	30	15	—	5/12/95	—	—	24	[signature]
	34.9	30	15	—	5/12/95	—	—	25	[signature]
	34.9	30	15	—	5/12/95	—	—	25	[signature]
	34.9	30	15	—	5/12/95	—	—	25 cm 30	[signature]

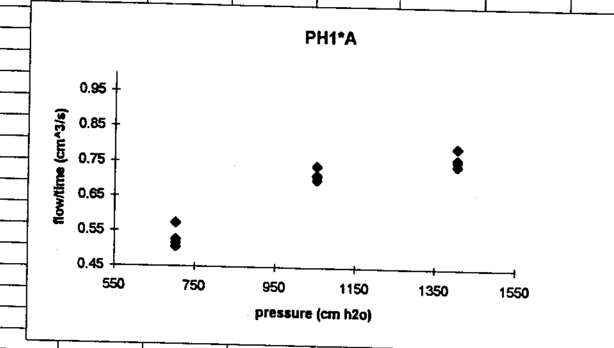
Fluids (ml) Initial Confining	Initial Inflow	Initial Outflow	Final Confining	Final Inflow	Final Outflow	Notes
20.0	22.2	23.7	20.0	2.4	3.7	
20.0	21.3	23.8	20.0	2.3	4.6	
20.0	21.4	23.4	20.6	2.7	4.4	
20.0	21.7	23.7	26.0	-0.6	1.3	

Continued on page:

KJ 5/23/95

PH1-94A.XLS

	dH (cm H	flow (cm^	time (s)	Area	Ksat(cm/s	k(m^2)
10	703.072	20.2	40	16.6106	0.000314	3.2E-13
10	703.072	20.65	40	16.6106	0.000320	3.27E-13
10	703.072	21.05	40	16.6106	0.000327	3.33E-13
10	703.072	20.05	35	16.6106	0.000356	3.63E-13
15	1054.608	22.2	30	16.6106	0.000306	3.12E-13
15	1054.608	21.25	30	16.6106	0.000293	2.99E-13
15	1054.608	21	30	16.6106	0.000290	2.96E-13
15	1054.608	21.45	30	16.6106	0.000296	3.02E-13
20	1406.144	19.9	25	16.6106	0.000247	2.52E-13
20	1406.144	19.1	25	16.6106	0.000237	2.42E-13
20	1406.144	18.95	25	16.6106	0.000235	2.40E-13
20	1406.144	22.35	30	16.6106	0.000231	2.36E-13



Prepared by Kristi James 5/17/95

KJ 5/23/95

Sample: Filter Paper (10 sheets) Ksat Summary

Time 3 ~~[illegible]~~ ??

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	10	—	5/17/95	—	—	KMg

Fluids (ml)

Initial Confining	Initial Inflow	Initial Outflow	Final Confining	Final Inflow	Final Outflow	Notes
9.6	22.1	23.5	9.6	1.1	2.5	

Time 7.76 sec

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	10	—	5/17/95	—	—	KMg

Fluids (ml)

Initial Confining	Initial Inflow	Initial Outflow	Final Confining	Final Inflow	Final Outflow	Notes
9.6	22.0	22.9	9.6	1.2	2.2	

Time 7.65 sec

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	10	—	5/17/95	—		KMg

Fluids (ml)

Initial Confining	Initial Inflow	Initial Outflow	Final Confining	Final Inflow	Final Outflow	Notes
9.6	22.0	23.5	9.6	1.0	2.4	

Time

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	~~20~~ 34.9	~~15~~ 20	15	—	5/17/95	—	—	KMg

Fluids (ml)

Initial Confining	Initial Inflow	Initial Outflow	Final Confining	Final Inflow	Final Outflow	Notes
	22.3	2.4				

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KJ 5/23/95

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Sample: Ksat Summary

Time 13.12 sec

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	15	—	5/17/95	—	—	KMg

Fluids (ml)

Initial Confining	Initial Inflow	Initial Outflow	Final Confining	Final Inflow	Final Outflow	Notes
9.6	22.7	23.5	9.6	1.2	1.9	

Time 12.97 sec

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	15	—	5/17/95	—	—	KMg

Fluids (ml)

Initial Confining	Initial Inflow	Initial Outflow	Final Confining	Final Inflow	Final Outflow	Notes
9.6	22.1	23.8	9.6	0.65	2.3	

Time 31.97 sec

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	34.9	20	18	—	5/17/95	—	—	KMg

Fluids (ml)

Initial Confining	Initial Inflow	Initial Outflow	Final Confining	Final Inflow	Final Outflow	Notes
9.6	22.7	23.7	9.6	0.4	1.2	

Time 31.12 sec

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator
	~~20~~ 34.9	20	18	—	5/17/95	—	—	KMg

Fluids (ml)

Initial Confining	Initial Inflow	Initial Outflow	Final Confining	Final Inflow	Final Outflow	Notes
9.6	22.3	24.1	9.6	0.4	2.1	

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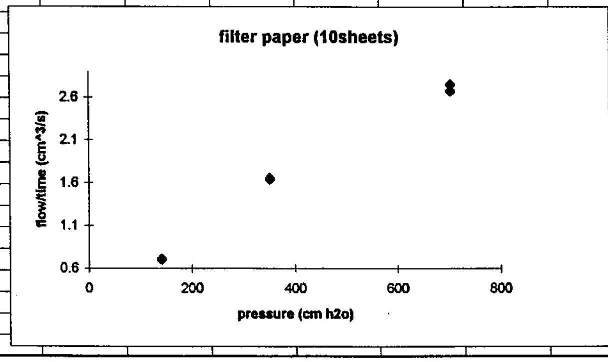
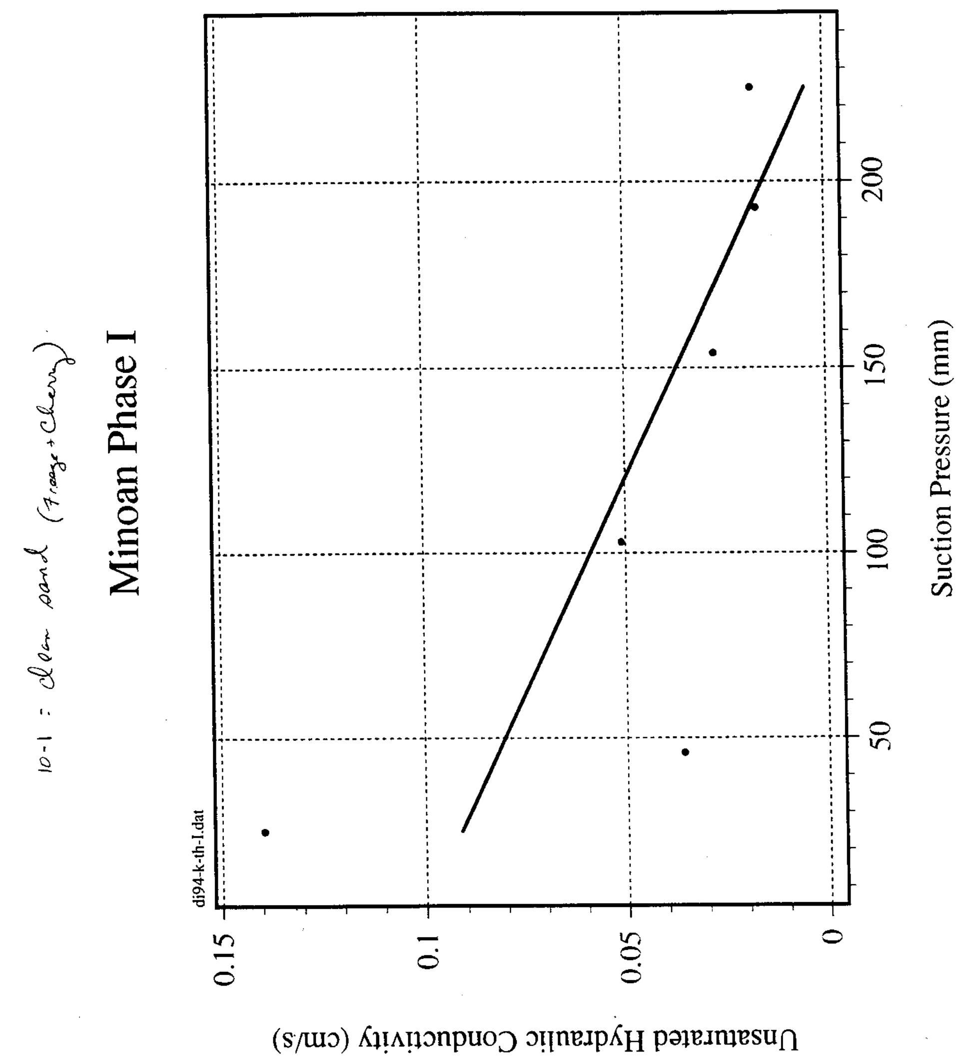
KJ 5/23/95

FILPAP.XLS

	dH (cm H	flow (cm^	time (s)	Area	Ksat(cm/s	k(m^2)
10	703.072	20.75	7.76	16.6106	0.000046	4.67E-14
10	703.072	21.05	7.65	16.6106	0.000047	4.81E-14
5	351.536	21.55	13.12	16.6106	0.000056	5.74E-14
5	351.536	21.475	12.97	16.6106	0.000057	5.78E-14
2	140.6144	22.4	31.97	16.6106	0.000060	6.12E-14
2	140.6144	21.95	31.12	16.6106	0.000060	6.16E-14



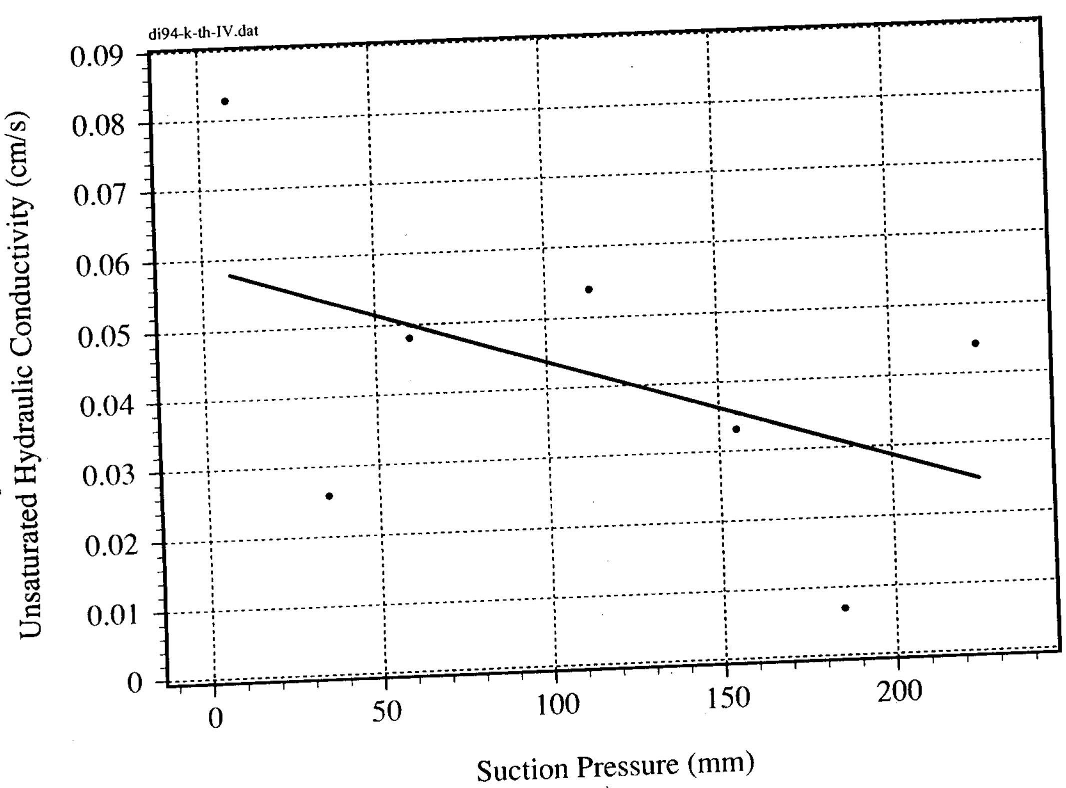
KJ 5/23/95



KJ 5/23/95

10^{-2} to 10^{-1} = silts to clean sand (Freeze + Cherry)

Minoan Phase IV



KJ 5/23/95

As Received:

	Orig Vol	Orig Porosity
PH194*A	130.11	61%
FCD 94*A	127.94	30%
MIN 94*A	122.7	51%

Permeameter

	*Grain Vol	**Measured Vol	New Porosity
PHI 94*A	~~72~~ 51.20	120.43	57%
FCD 94*A	89.72	132.88	32%
MIN 94*A	59.75	126.24	53%

* From Pycnometer

** measured Vol taken while sample was at rest i/ not when under confining pressure ≅ 35 psi

KJ 5/23/95

Sample: Welded 1420/2470 **Ksat Summary**

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
1	30	20	19		7/12/95			KMJames	*1:15.67

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
18.5	22.0	–	18.5	~~20.0~~ 20	–	* Adjusted inflow pressure during test; was a bit low

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
1	30	20	1		7/12/95			KMJames	0:55.70

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
18.5	22.0	–	18.5	4.0		

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
1	30	20	19		7/12/95			KMJames	1:03.44

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
18.5	22.0	–	18.5	2.0	–	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
1	30	20	19		7/12/95			KMJames	1:02.93

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
18.5	22.0	–	18.5	2.0	–	

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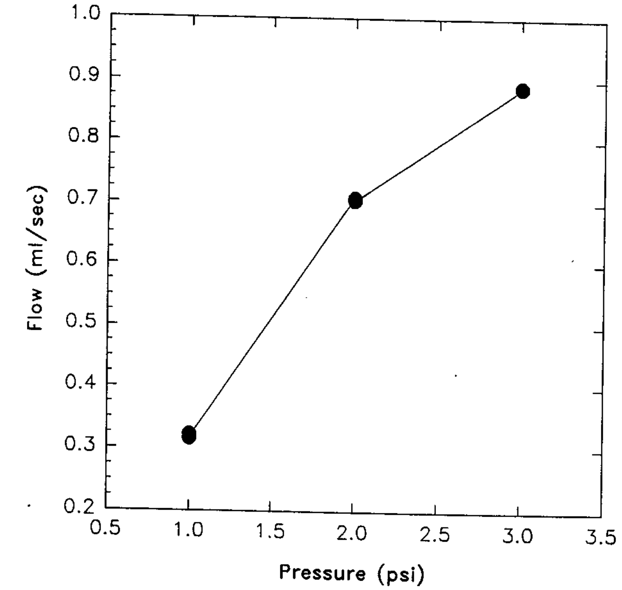
KM James 7/17/95

Welded 1420/2470 media



Sample: **Ksat Summary**

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
2	30	20	18	–	7/12/95	–	–	KMJames	0:22.59

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
18.5	19.0	–	18.5	3.0	–	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
2	30	20	18	–	7/12/95	–	–	KMJames	0:28.45

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
18.5	22.0	–	18.5	2.0	–	

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
3	~~20~~ 30	20	17	–	7/12/95	–		KMJames	0:22.53

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
18.5	22.0	–	2.0			

dP (psig)	Pressure (psig) Confining	Inflow	Outflow	Start time	Start date	Stop time	Stop date	Investigator	Time
3	30	20	17	–	7/12/95	–	–	KMJames	0:22.47

Fluids (ml) Initial Confining	Inflow	Outflow	Final Confining	Inflow	Outflow	Notes
18.5	22.0	–	18.5 ~~20~~	2.0		

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KM James 7/17/95

I have reviewed this Scientific Notebook and find it in compliance with QAP-001 and ~~is therefore~~ there is sufficient technical information so that another qualified individual could repeat the activity.

(Asadul H. Chowdhury)
Element Manager-RDCO
1/15/97