APPENDIX 9

SAMPLE STATION 9

MONITORING WELL RI-B

PA STATE. GAME LANDS #95

PROJECT SL-110-7-101.5

2. Pre Closure Analysis (Monitoring Point 9)

The reviewer is directed to refer to the following materials during
the discussion of the chemical analyses and trends at this monitoring point:

a. Sheet 28 - which shows the sample data plotted using a time reference basis.

b. The corresponding graphs (on the 6 pages immediately following the pre closure analysis) which show the data, the regression mean line, and the field of variance.

c. Appendix 9 - which contains the raw sample data during pre closure which was utilized to develop the means, ranges, and regression analysis results.

pH Relationship
The pH at this monitoring point varied from 4.69 - 5.86 the mean value being 5.15.

Specific Conductance Relationship
The specific conductance at this monitoring point varied from 330 - 600; the mean value calculated as 458.

Acidity/Alkalinity Balance (mg/1)
The alkalinity varied from 2- 36; the mean value was 14. Regression analysis of the alkalinity values showed: A strong correlation exists where alkalinity concentrations increases as conductance increased.

The acidity varied from 57 - 288 ; the mean value was 163. Regression analysis of the sulphate values showed: An extremely strong correlation exists where acidity concentrations increased as conductance increased.

Sulphate Relationship (mg/l)
The sulphates varied from 265 - 498; the mean value was 362. Regression analysis of the sulphate values showed: A strong relationship exists where sulphate concentrations increased as conductance increased.

Total Iron Relationship (mg/l)
The total iron varied from 41 - 220 ; the mean value was 109. Regression analysis. of the ferrous iron values showed: An extremely strong correlation exists where total iron concentrations increase as conductance increases.

Ferrous Iron Relationship (mg/l)
The ferrous iron varied from 31- 195 ; the mean value was 96. Regression analysis of the ferrous iron values showed: An extremely strong correlation exists where ferrous iron concentrations increase as conductance increases.

Ferric Iron Relationship (mg/1)
The ferric iron varied from 6 - 25; the mean value was 13. Regression analysis of the ferric iron values showed: A strong correlation exists where ferric iron concentrations increase as conductance increases.

SAMPLE 9 PROJECT SL110-7-101.5:BIG BERTHA

DATE	SPEC COND UMHOS/CM	DISCHARGE C.F.S.	PH SU	ALKALINITY MG/L	ACIDITY MG/L	SULPHATES MG/L	TOTAL IRON MG/L	FERROUS IRON MG/L	FERRIC IRON MG/L	REC #
022983	600	.00	5.86	17	288	498	220.0	195.0	25.0	1
030783	400	.00	4.69	02	170	382	104.0	94.0	10.0	2
031483	500	.00	5.19	36	136	302	69.5	63.5	6.0	3
033183	330	.00	4.86	02	57	265	41.0	31.0	10.0	4

SAMPLE.NINE SPECIFIC CONDUCTANCE VS. PH

COEFFICIENT MATRIX AND AUGMENTED MATRIX

		183	20.6000
183		87890	9590.8000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

3.324391121776
0.003990401920

ORIGINAL X - Y PAIRS		PREDICTED VALUES	DEVIATION
600.0000	5.8600	5.7186	0.1414
400.0000	4.6900	4.9206	0.2306
500.0000	5.1900	5.3196	0.1296
330.0000	4.8600	4.6412	0.2188

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1
NUMBER OF X - Y PAIRS= 4
TOTAL SUMS OF SQUARE= .8014
SUMS OF SQUARES DUE TO REGRESSION= .663604
SUMS OF SQUARES DUE TO DEVIATION= .137796
GOODNESS OF FIT= .828056
MULTIPLE CORRELATION COEFFICIENT 0.90998
STANDARD DEVIATION .214318

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	.66	1	.66
DEVIATION	.14	2	.07
TOTAL VARIATION	.80	3	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE
F TEST - SIGNIFICANCE OF REGRESSION = 9.63
LEVEL .05% - CRITICAL VALUE =10.13

SAMPLE.NINE SPECIFIC CONDUCTANCE VS. ALKALINITY

COEFFICIENT MATRIX AND AUGMENTED MATRIX

	183	183	57.0000
	183	87890	29660.0000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

25.077984403119
0.085962807439

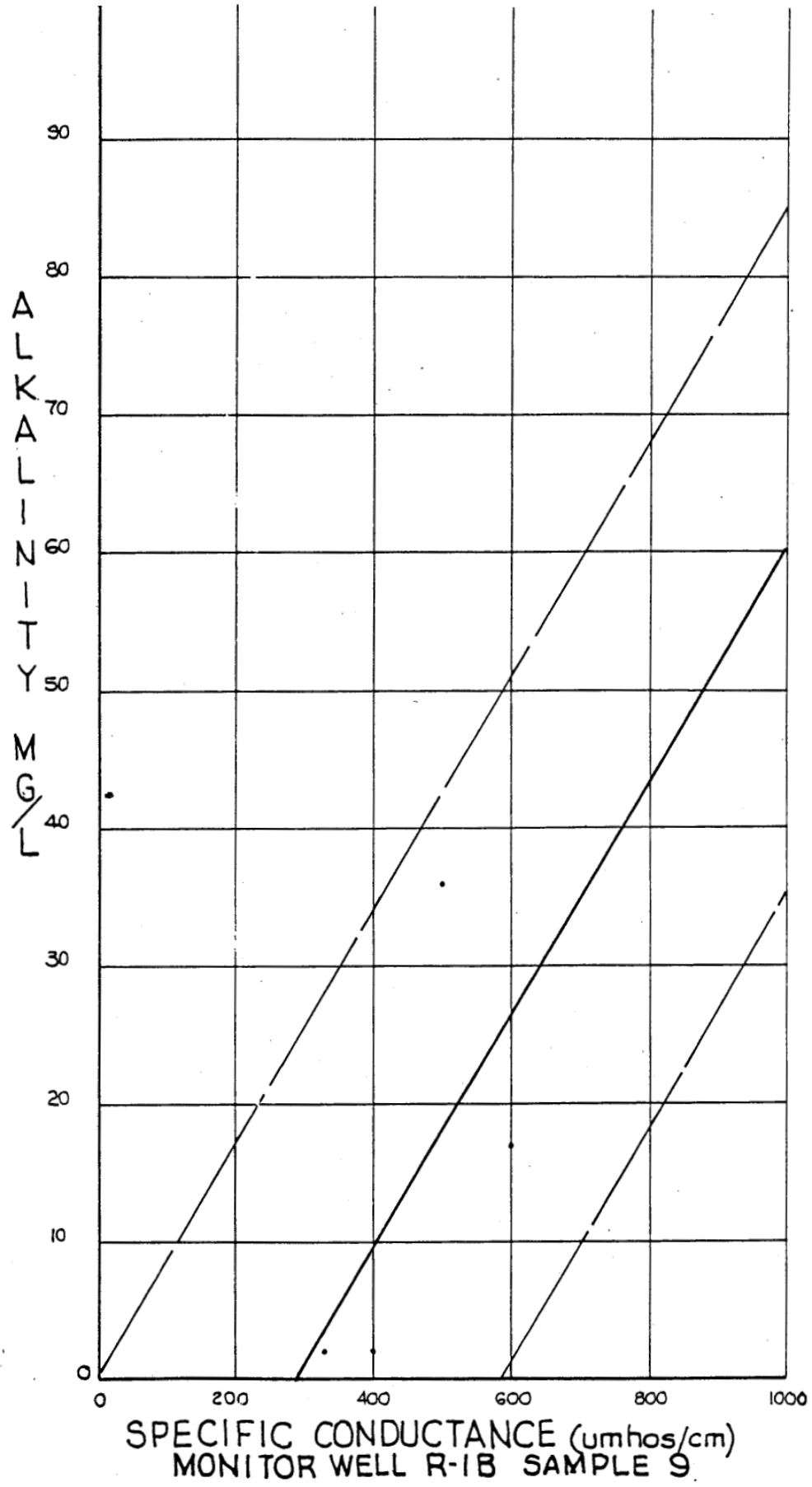
ORIGINAL X - Y PAIRS		PREDICTED VALUES	DEVIATION
600.0000	17.0000	26.4997	9.4997
400.0000	2.0000	9.3071	7.3071
500.0000	36.0000	17.9034	18.0966
330.0000	2.0000	3.2897	1.2897

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1
NUMBER OF X - Y PAIRS= 4
TOTAL SUMS OF SQUARE= 780.75
SUMS OF SQUARES DUE TO REGRESSION= 307.961758
SUMS OF SQUARES DUE TO DEVIATION= 472.788242
GOODNESS OF FIT= .394443
MULTIPLE CORRELATION COEFFICIENT 0.62805
STANDARD DEVIATION 12.553728

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	307.96	1	307.96
DEVIATION	472.79	2	236.39
TOTAL VARIATION	780.75	3	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE
F TEST - SIGNIFICANCE OF REGRESSION = 1.30
LEVEL .05% - CRITICAL VALUE =10.13


ALKALINITY MG/L
90
80
70
60
50
40
30
20
10
0
0
200
400
600
800
1000
SPECIFIC CONDUCTANCE (umhos/cm)
MONITOR WELL R-1B SAMPLE 9

SAMPLE.NINE SPECIFIC CONDUCTANCE VS. ACIDITY

COEFFICIENT MATRIX AND AUGMENTED MATRIX

	183	183	651.0000
	183	87890	327610.0000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

- 164.141571685663
0.714517096581

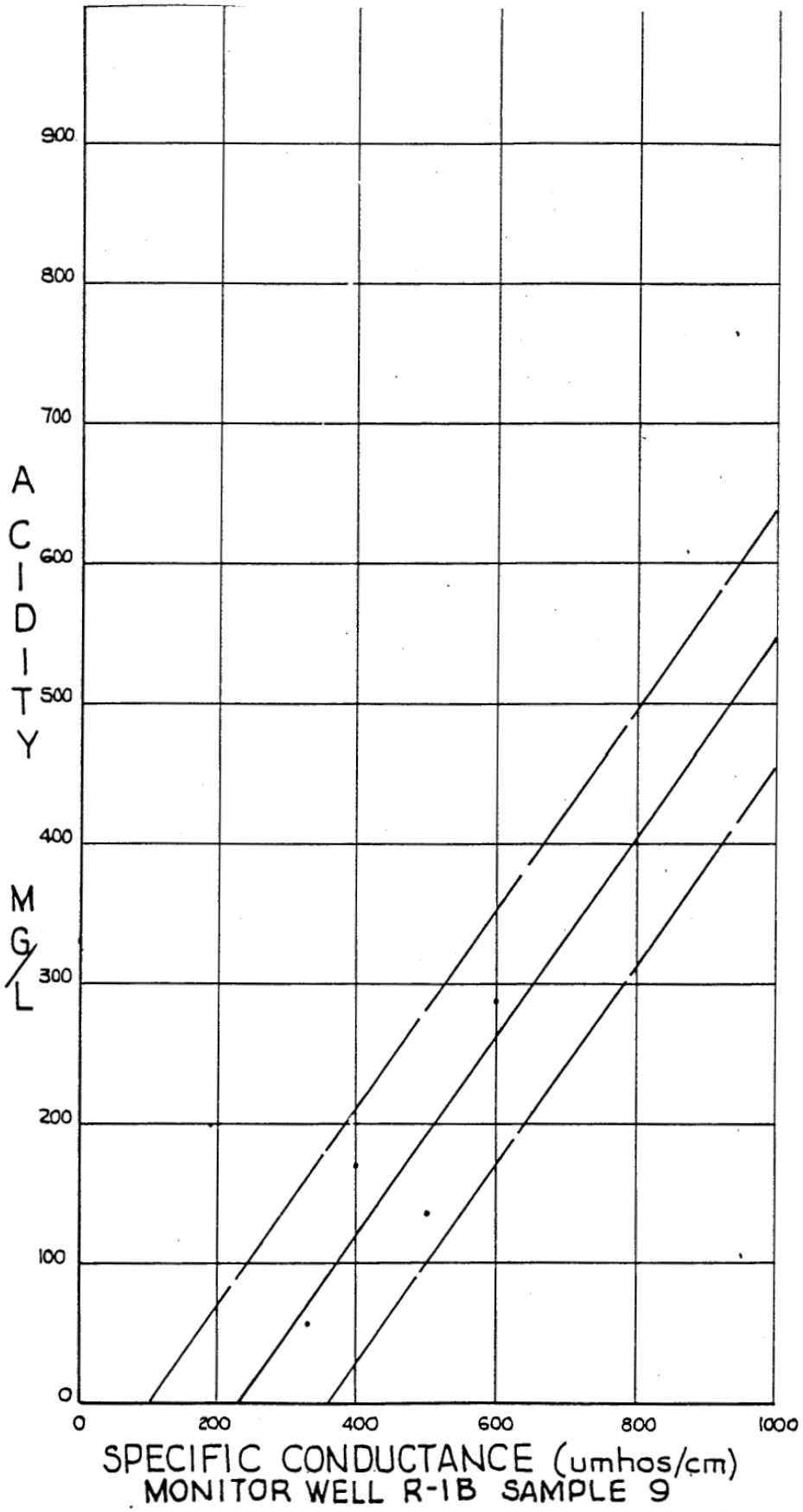
ORIGINAL X - Y PAIRS		PREDICTED VALUES	DEVIATION
600.0000	288.0000	264.5687	23.4313
400.0000	170.0000	121.6653	48.3347
500.0000	136.0000	193.1170	57.1170
330.0000	57.0000	71.6491	14.6491

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1
NUMBER OF X - Y PAIRS= 4
TOTAL SUMS OF SQUARE= 27638.75
SUMS OF SQUARES DUE TO REGRESSION= 21276.532843
SUMS OF SQUARES DUE TO DEVIATION= 6362.217157
GOODNESS OF FIT= .769808
MULTIPLE CORRELATION COEFFICIENT 0.87739
STANDARD DEVIATION 46.051483

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	21276.53	1	21276.53
DEVIATION	6362.22	2	3181.11
TOTAL VARIATION	27638.75	3	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE
F TEST - SIGNIFICANCE OF REGRESSION = 6.69
LEVEL .05% - CRITICAL VALUE =10.13


900
800
700
600
500
400
300
200
100
0
ACIDITY MG/L
0
200
400
600
800
1000
SPECIFIC CONDUCTANCE (umhos/cm)
MONITOR WELL R-1B SAMPLE 9

SAMPLE.NINE SPECIFIC CONDUCTANCE VS. SULPHATES

COEFFICIENT MATRIX AND AUGMENTED MATRIX

		183	1447.0000
183		87890	690050.0000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

53.850029994001
0.673005398920

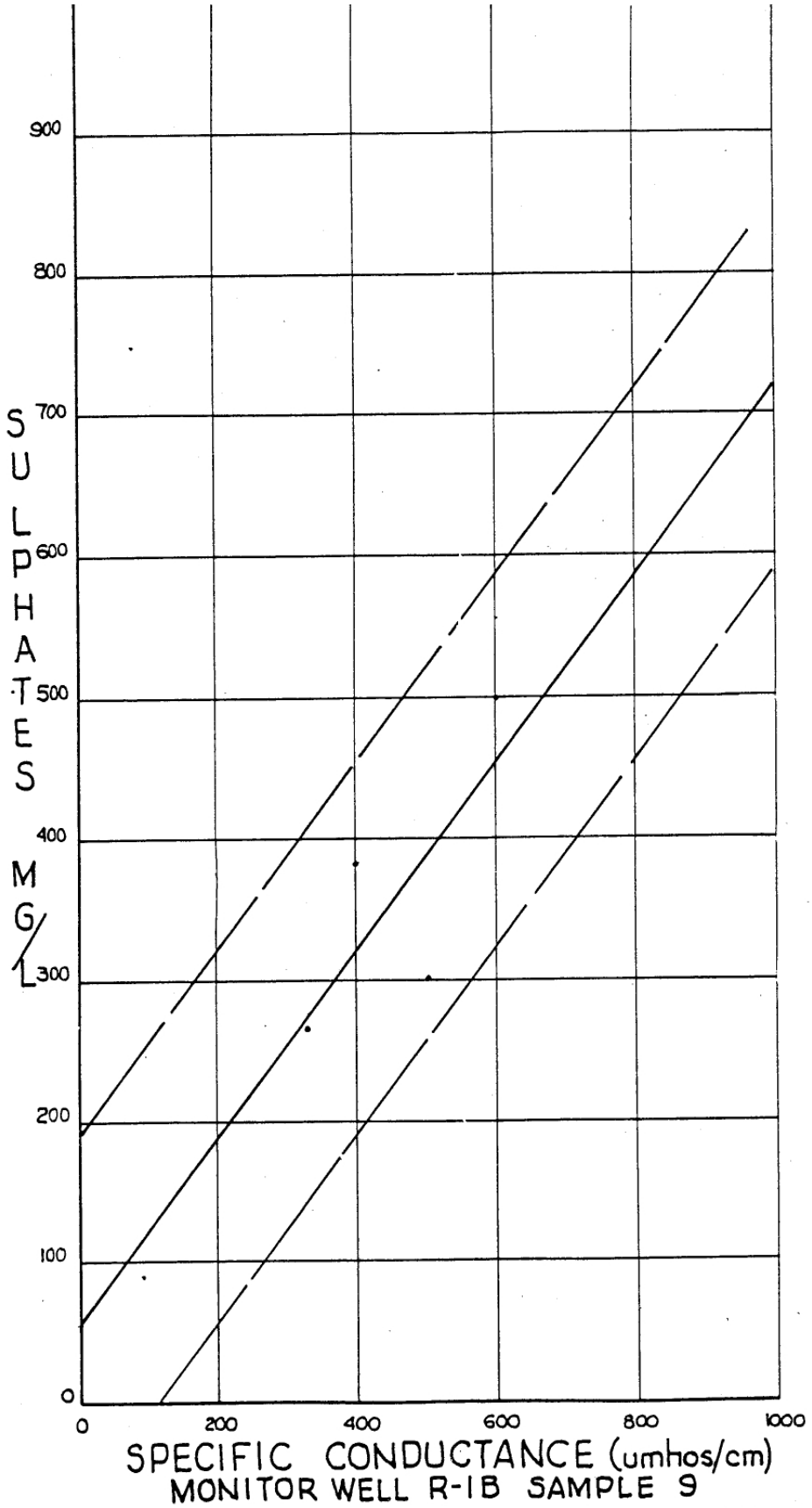
ORIGINAL X - Y PAIRS		PREDICTED VALUES	DEVIATION
600.0000	498.0000	457.6533	40.3467
400.0000	382.0000	323.0522	58.9478
500.0000	302.0000	390.3527	88.3527
330.0000	265.0000	275.9418	10.9418

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1
NUMBER OF X - Y PAIRS= 4
TOTAL SUMS OF SQUARE= 31904.75
SUMS OF SQUARES DUE TO REGRESSION= 18876.118926
SUMS OF SQUARES DUE TO DEVIATION= 13028.631074
GOODNESS OF FIT= .59164
MULTIPLE CORRELATION COEFFICIENT 0.76918
STANDARD DEVIATION 65.900509

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	18876.12	1	18876.12
DEVIATION	13028.63	2	6514.32
TOTAL VARIATION	31904.75	3	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE
F TEST - SIGNIFICANCE OF REGRESSION = 2.90
LEVEL .05% - CRITICAL VALUE =10.13


900
800
700
600
500
400
300
200
100
0
SULPHATES MG/L
0
200
400
600
800
1000
SPECIFIC CONDUCTANCE (umhos/cm)
MONITOR WELL R-1B SAMPLE 9

SAMPLE.NINE SPECIFIC CONDUCTANCE VS. TOTAL IRON

COEFFICIENT MATRIX AND AUGMENTED MATRIX

		183	434.5000
	183	87890	221880.0000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

144.921115776845

0.554199160168

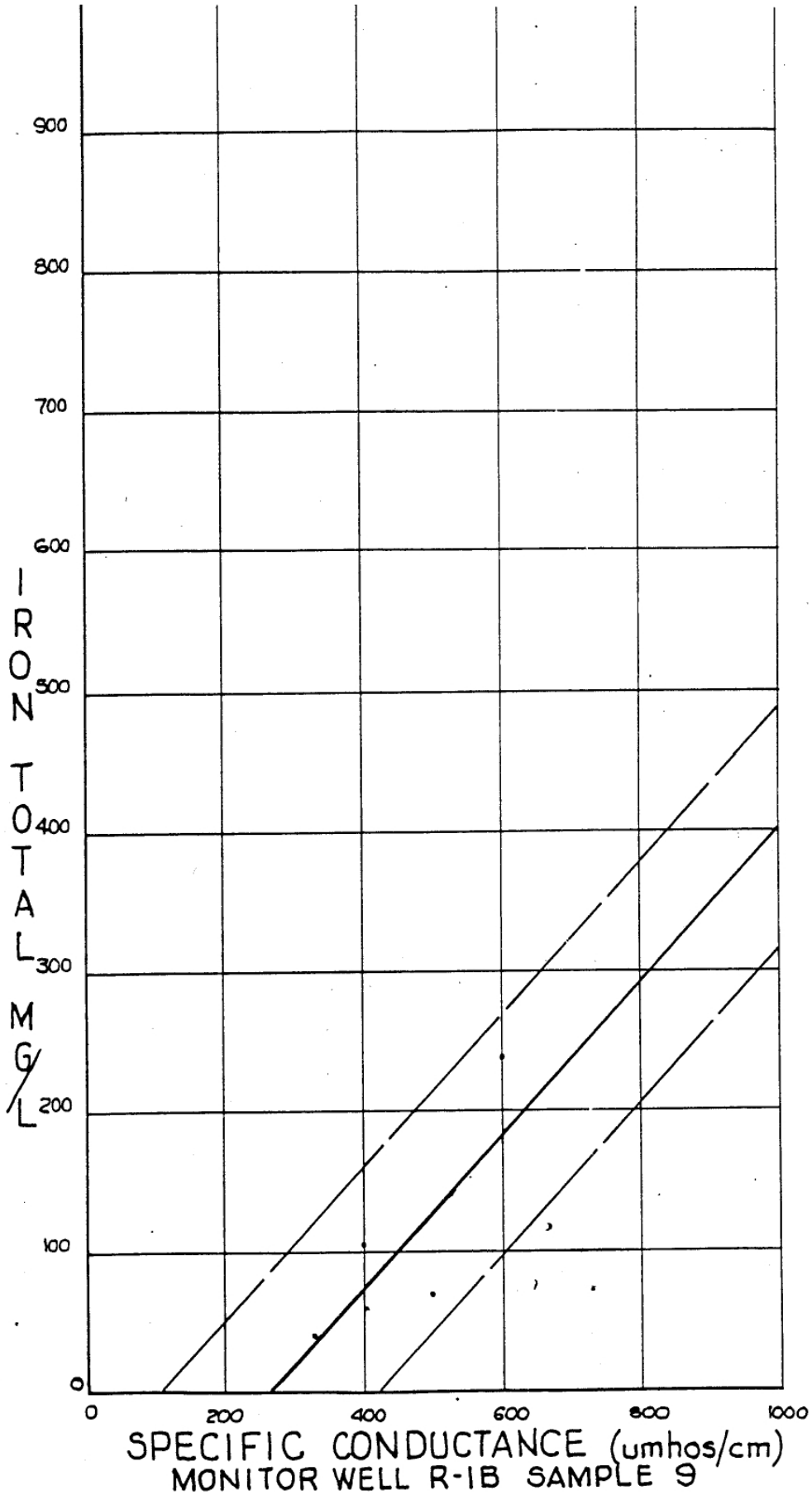
ORIGINAL X - Y PAIRS		PREDICTED VALUES	DEVIATION
600.0000	220.0000	187.5984	32.4016
400.0000	104.0000	76.7585	27.2415
500.0000	69.5000	132.1785	62.6785
330.0000	41.0000	37.9646	3.0354

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1
NUMBER OF X - Y PAIRS= 4
TOTAL SUMS OF SQUARE= 18529.6875
SUMS OF SQUARES DUE TO REGRESSION= 12799.922353
SUMS OF SQUARES DUE TO DEVIATION= 5729.765147
GOODNESS OF FIT= .690779
MULTIPLE CORRELATION COEFFICIENT 0.83113
STANDARD DEVIATION 43.702651

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	12799.92	1	12799.92
DEVIATION	5729.77	2	2864.88
TOTAL VARIATION	18529.69	3	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE
F TEST - SIGNIFICANCE OF REGRESSION = 4.47
LEVEL .05% - CRITICAL VALUE =10.13


900
800
700
600
500
400
300
200
100
0
IRON TOTAL MG/L
0
200
400
600
800
1000
SPECIFIC CONDUCTANCE (umhos/cm)
MONITOR WELL R-1B SAMPLE 9

SAMPLE.NINE SPECIFIC CONDUCTANCE VS. FERROUS IRON

COEFFICIENT MATRIX AND AUGMENTED MATRIX

		183	383.5000
183		87890	196580.0000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

136.072285542891

0.506988602280

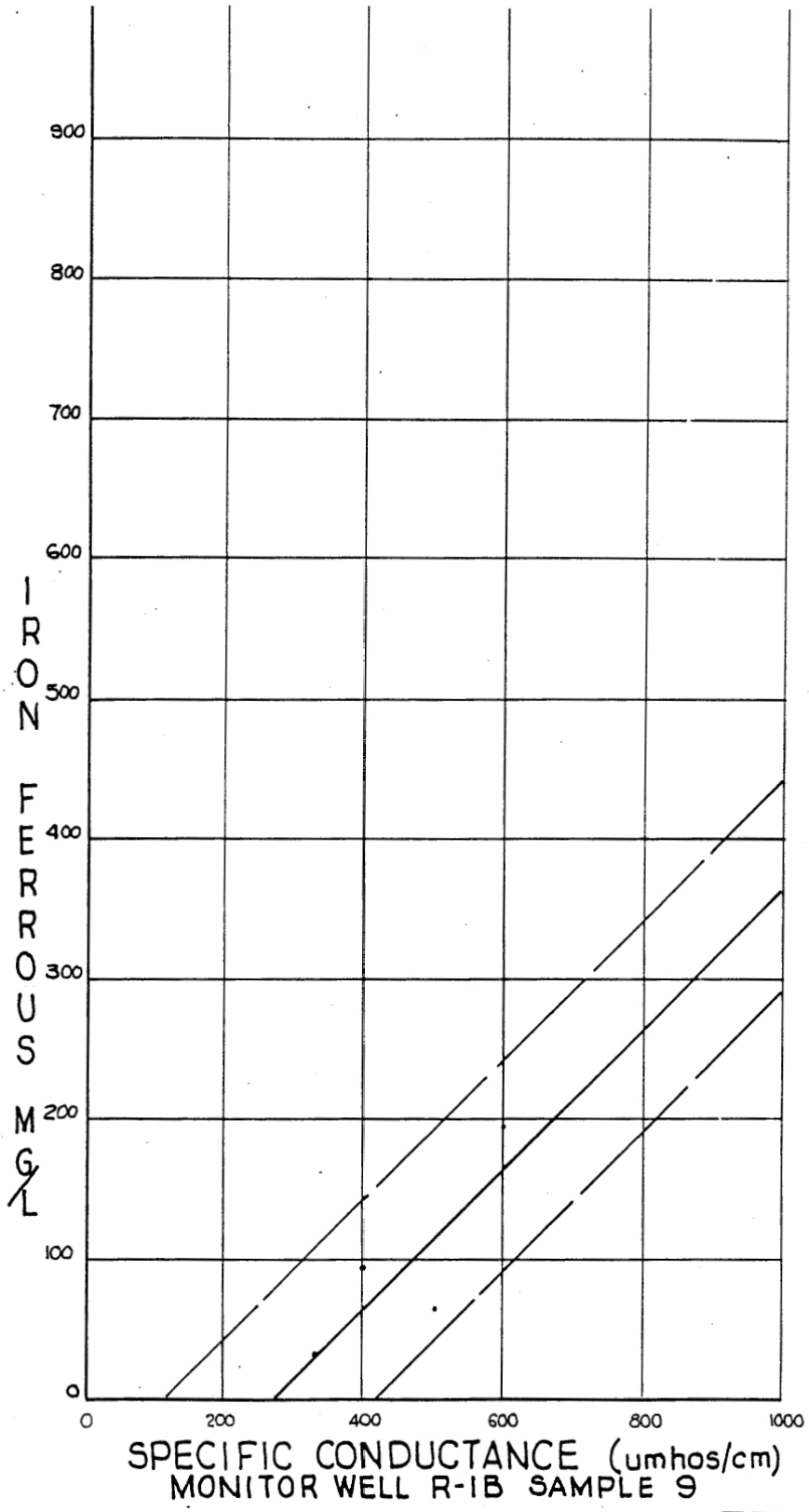
ORIGINAL X - Y PAIRS		PREDICTED VALUES	DEVIATION
600.0000	195.0000	168.1209	26.8791
400.0000	94.0000	66.7232	27.2768
500.0000	63.5000	117.4220	53.9220
330.0000	31.0000	31.2340	0.2340

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1
NUMBER OF X - Y PAIRS= 4
TOTAL SUMS OF SQUARE= 15086.1875
SUMS OF SQUARES DUE TO REGRESSION= 10712.03543
SUMS OF SQUARES DUE TO DEVIATION= 4374.15207
GOODNESS OF FIT= .710056
MULTIPLE CORRELATION COEFFICIENT 0.84265
STANDARD DEVIATION 38.18443

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	10712.04	1	10712.04
DEVIATION	4374.15	2	2187.08
TOTAL VARIATION	15086.19	3	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE
F TEST - SIGNIFICANCE OF REGRESSION = 4.90
LEVEL .05% - CRITICAL VALUE =10.13


900
800
700
600
500
400
300
200
100
0
IRON FERROUS MG/L
0
200
400
600
800
1000
SPECIFIC CONDUCTANCE (umhos/cm)
MONITOR WELL R-1B SAMPLE 9

SAMPLE.NINE SPECIFIC CONDUCTANCE VS. FERRIC IRON

COEFFICIENT MATRIX AND AUGMENTED MATRIX

		183	51.0000
183		87890	25300.0000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

8.848830233953
0.047210557888

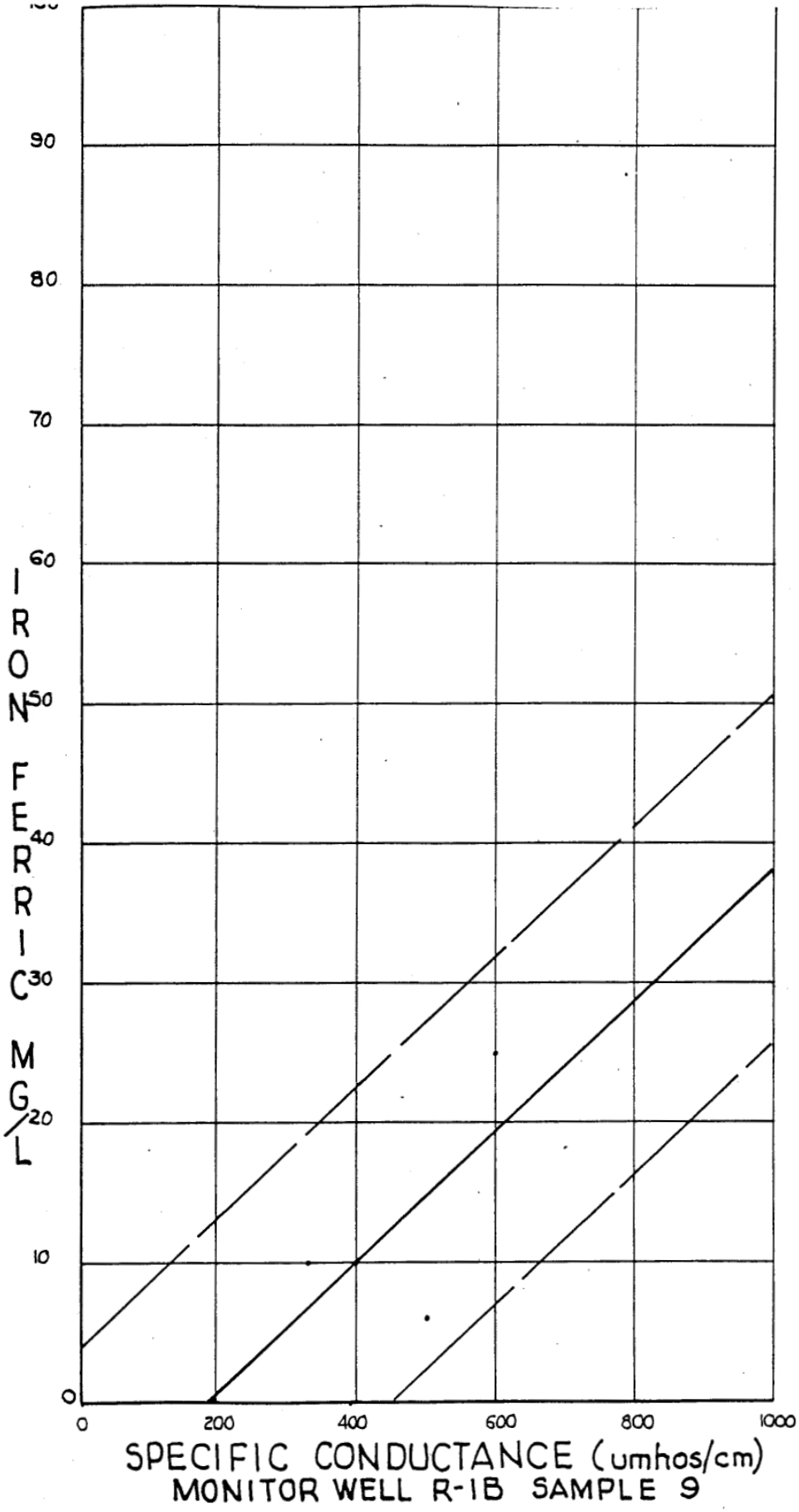
ORIGINAL X - Y PAIRS		PREDICTED VALUES	DEVIATION
600.0000	25.0000	19.4775	5.5225
400.0000	10.0000	10.0354	0.0354
500.0000	6.0000	14.7564	8.7564
330.0000	10.0000	6.7307	3.2693

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1
NUMBER OF X - Y PAIRS= 4
TOTAL SUMS OF SQUARE= 210.75
SUMS OF SQUARES DUE TO REGRESSION= 92.886773
SUMS OF SQUARES DUE TO DEVIATION= 117.863227
GOODNESS OF FIT= .440744
MULTIPLE CORRELATION COEFFICIENT 0.66389
STANDARD DEVIATION 6.267993

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	92.89	1	92.89
DEVIATION	117.86	2	58.93
TOTAL VARIATION	210.75	3	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE
F TEST - SIGNIFICANCE OF REGRESSION = 1.58
LEVEL .05% - CRITICAL VALUE =10.13


90
80
70
60
50
40
30
20
10
0
IRON FERRIC MG/L
0
200
400
600
800
1000
SPECIFIC CONDUCTANCE (umhos/cm)
MONITOR WELL R-1B SAMPLE 9

CLOSURE DATA LISTING *

SAMPLE NINE

DATE	SPEC. COND.	DISCHARGE	pH	ALKALINITY	ACIDITY	SULPHATES	TOTAL IRON	FERROUS IRON	FERRIC IRON
5/11	100	-	5.99	6	6	58	19.5	17.5	2.0
5/19	180	-	5.46	3	25	90	12.0	11.7	0.3
5/25	170	-	5.70	4	15	62	9.5	7.1	2.4
6/1	170	-	5.64	4	16	76	9.7	7.8	1.9
6/7	200	-	5.36	4	21	82	17.2	13.3	3.9
6/12	220	-	5.10	2	17	91	8.9	7.5	1.4

* Units are as follows:

Specific conductance	-	umhos/cm
discharge	-	c.f.s.
pH	-	standard units
all others	-	mg/l