APPENDIX 11

SAMPLE STATION 11

MONITORING WELL R3

PA STATE GAME LANDS #95

PROJECT SL-110-7-101.5

SAMPLE 11 PROJECT SL110-7-101.5:BTG 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 #
021783	1500	.00	5.56	37	281	981	195.0	179.0	16.0	1
022883	1500	.00	6.06	33	281	935	163.0	145.0	18.0	2
030783	1400	.00	5.64	15	192	789	143.0	139.0	4.0	3
031483	1600	.00	6.10	40	187	498	136.0	132.0	4.0	4
032583	1400	.00	5.87	17	171	781	141.0	127.0	14.0	5
033183	1400	.00	5.96	65	113	513	106.0	93.0	13.0	6
040783	1400	.00	5.87	53	80	618	102.0	99.0	3.0	7
041383	1400	.00	6.00	61	75	495	103.0	98.0	5.0	8
042083	1400	.00	5.98	27	20	430	86.0	80.0	6.0	9
042683	1350	.00	5.90	16	53	500	17.0	16.7	.3	10

2. Pre Closure Analysis (Monitoring Point 11)

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 30 - which shows the sample data plotted using a ti Lm reference basis.

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

c. Appendix 11 - which contains the raw sample data during pre closure which was utilized to develop the weans, ranges, and regression analysis results.

1. pH Relationship

The pH at this monitoring point varied from 5.56 - 6.10; the mean value being 5.89. An weak relationship exists.

2. Specific Conductance Relationship

The specific conductance at this monitoring point varied from 1350 - 1600; the mean value calculated as 1435.

3. Acidity/Alkalinity Balance (mg/l)
The alkalinity varied from 15 – 65 ; the mean value was 36. Regression analysis of the alkalinity values showed: An extremely weak relationship exists where alkalinity concentration increases as conductance increases. The acidity varied from 20- 281 ; the roman value was 145. Regression analysis of the sulphate values showed: A strong relationship exists where acidity concentration increases as conductance increases.

4. Sulphate Relationship (mg/l)

The sulphates varied from 430 - 981; the mean value was 654. Regression analysis of the sulphate values showed: A weak relationship exists where sulphate concentration increases as conductance increases.

5. Total Iron Relationship (mg/l)

The total iron varied from 17- 195 ; the mean value was 119. Regression analysis of the ferrous iron values showed: A strong relationship exists where total iron concentration increases as conductance increases.

6. Ferrous Iron Relationship (mg/l)
The ferrous iron varied from 16 - 179 ; the mean value was 111. Regression analysis of the ferrous iron values showed: A strong correlation exists where ferrous iron concentration increases as conductance increases.

7. Ferric Iron Relationship (mg/l)

The ferric iron varied from 0.3 - 18.0 ; the mean value was 8. Regression analysis of the ferric iron values showed: A weak relationship exists where ferric iron concentration increases as conductance increases.

SAMPLE.ELEVEN SPECIFIC CONDUCTANCE VS. PH

COEFFICIENT MATRIX AND AUGMENTED MATRIX

1	1435	58.9400
1435	2064250	84603.0000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

5.205771144279
0.000479601990

ORIGINAL X - Y PAIRS		PREDICTED VALUES	DEVIATION
1500.0000	5.5600	5.9252	0.3652
1500.0000	6.0600	5.9252	0.1348
1400.0000	5.6400	5.8772	0.2372
1600.0000	6.1000	5.9731	0.1269
1400.0000	5.8700	5.8772	0.0072
1400.0000	5.9600	5.8772	0.0828
1400.0000	5.8700	5.8772	0.0072
1400.0000	6.0000	5.8772	0.1228
1400.0000	5.9800	5.8772	0.1028
1350.0000	5.9000	5.8532	0.0468

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1
NUMBER OF X - Y PAIRS= 10
TOTAL SUMS OF SQUARE= .27024
SUMS OF SQUARES DUE TO REGRESSION= .011558
SUMS OF SQUARES DUE TO DEVIATION= .258682
GOODNESS OF FIT= .042771
MULTIPLE CORRELATION COEFFICIENT 0.20681
STANDARD DEVIATION .169536

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	.01	1	.01
DEVIATION	.26	8	.03
TOTAL VARIATION	.27	9	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE
F TEST - SIGNIFICANCE OF REGRESSION = 0.36
LEVEL .05% - CRITICAL VALUE = 5.32

SAMPLE.ELEVEN SPECIFIC CONDUCTANCE VS. ALKALINITY

COEFFICIENT MATRIX AND AUGMENTED MATRIX

1	1435	364.0000
1435	2064250	523800.0000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

- 5.293532338309
0.029054726368

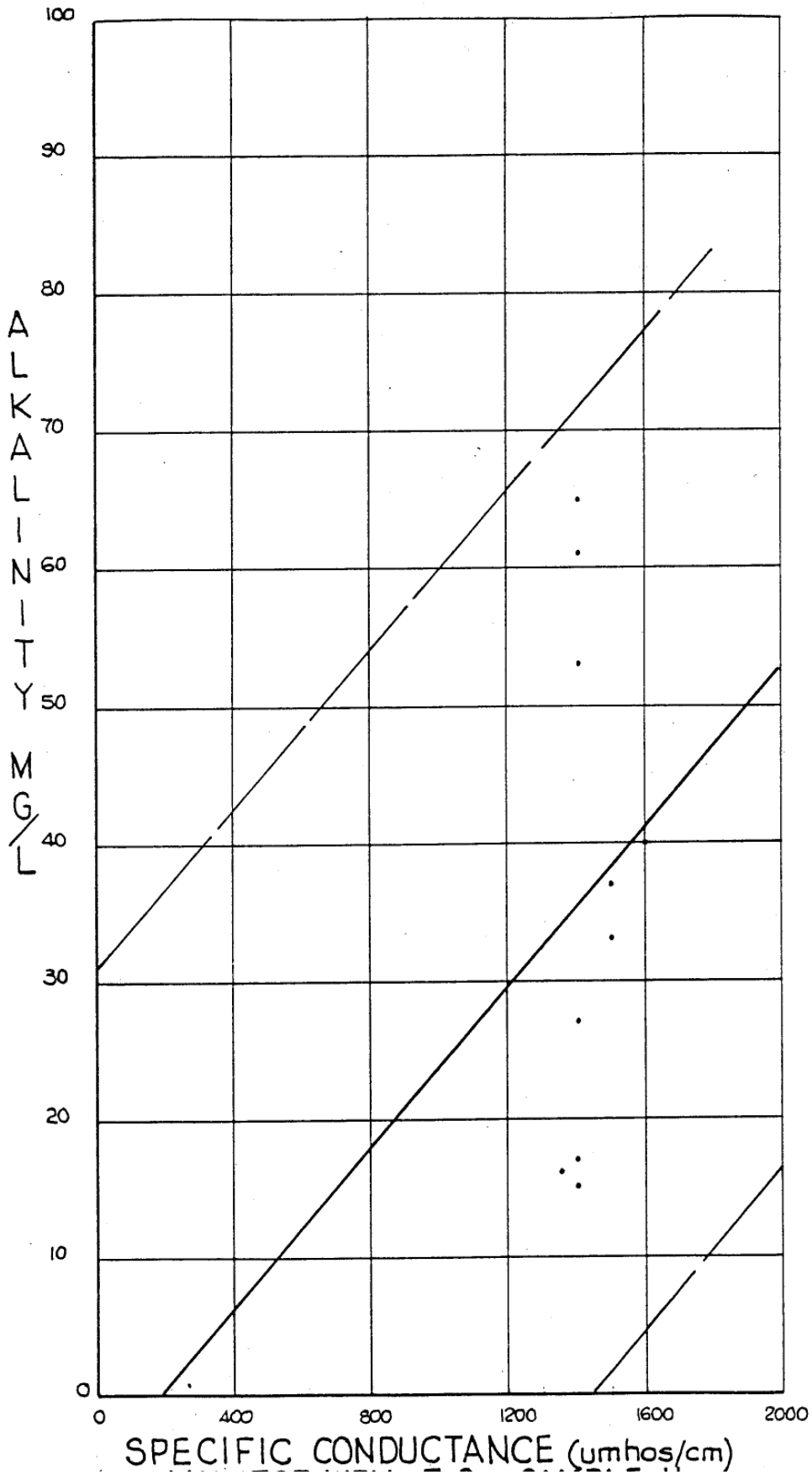
ORIGINAL X - Y PAIRS		PREDICTED VALUES	DEVIATION
1500.0000	37.0000	38.2886	1.2886
1500.0000	33.0000	38.2886	5.2886
1400.0000	15.0000	35.3831	20.3831
1600.0000	40.0000	41.1940	1.1940
1400.0000	17.0000	35.3831	18.3831
1400.0000	65.0000	35.3831	29.6169
1400.0000	53.0000	35.3831	17.6169
1400.0000	61.0000	35.3831	25.6169
1400.0000	27.0000	35.3831	8.3831
1350.0000	16.0000	33.9303	17.9303

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1
NUMBER OF X - Y PAIRS= 10
TOTAL SUMS OF SQUARE= 3062.4
SUMS OF SQUARES DUE TO REGRESSION= 42.4199
SUMS OF SQUARES DUE TO DEVIATION= 3019.9801
GOODNESS OF FIT= .013852
MULTIPLE CORRELATION COEFFICIENT 0.11769
STANDARD DEVIATION 18.318115

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	42.42	1	42.42
DEVIATION	3019.98	8	377.50
TOTAL VARIATION	3062.40	9	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE
F TEST - SIGNIFICANCE OF REGRESSION = 0.11
LEVEL .05% - CRITICAL VALUE = 5.32


ALKALINITY MG/L
100
90
80
70
60
50
40
30
20
10
0
0
400
800
1200
1600
2000
SPECIFIC CONDUCTANCE (umhos/cm)

SAMPLE.ELEVEN SPECIFIC CONDUCTANCE VS. ACIDITY

COEFFICIENT MATRIX AND AUGMENTED MATRIX

1	1435	1453.0000
1435	2064250	2125150.0000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

999.701492537320

0.797910447761

ORIGINAL X	Y PAIRS	PREDICTED VALUES	DEVIATION
1500.0000	281.0000	197.1642	83.8358
1500.0000	281.0000	197.1642	83.8358
1400.0000	192.0000	117.3731	74.6269
1600.0000	187.0000	276.9552	89.9552
1400.0000	171.0000	117.3731	53.6269
1400.0000	113.0000	117.3731	4.3731
1400.0000	80.0000	117.3731	37.3731
1400.0000	75.0000	117.3731	42.3731
1400.0000	20.0000	117.3731	97.3731
1350.0000	53.0000	77.4776	24.4776

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1

NUMBER OF X - Y PAIRS= 10

TOTAL SUMS OF SQUARE= 75878.1

SUMS OF SQUARES DUE TO REGRESSION= 31992.219403

SUMS OF SQUARES DUE TO DEVIATION= 43885.880597

GOODNESS OF FIT= .421627

MULTIPLE CORRELATION COEFFICIENT 0.64933

STANDARD DEVIATION 69.829857

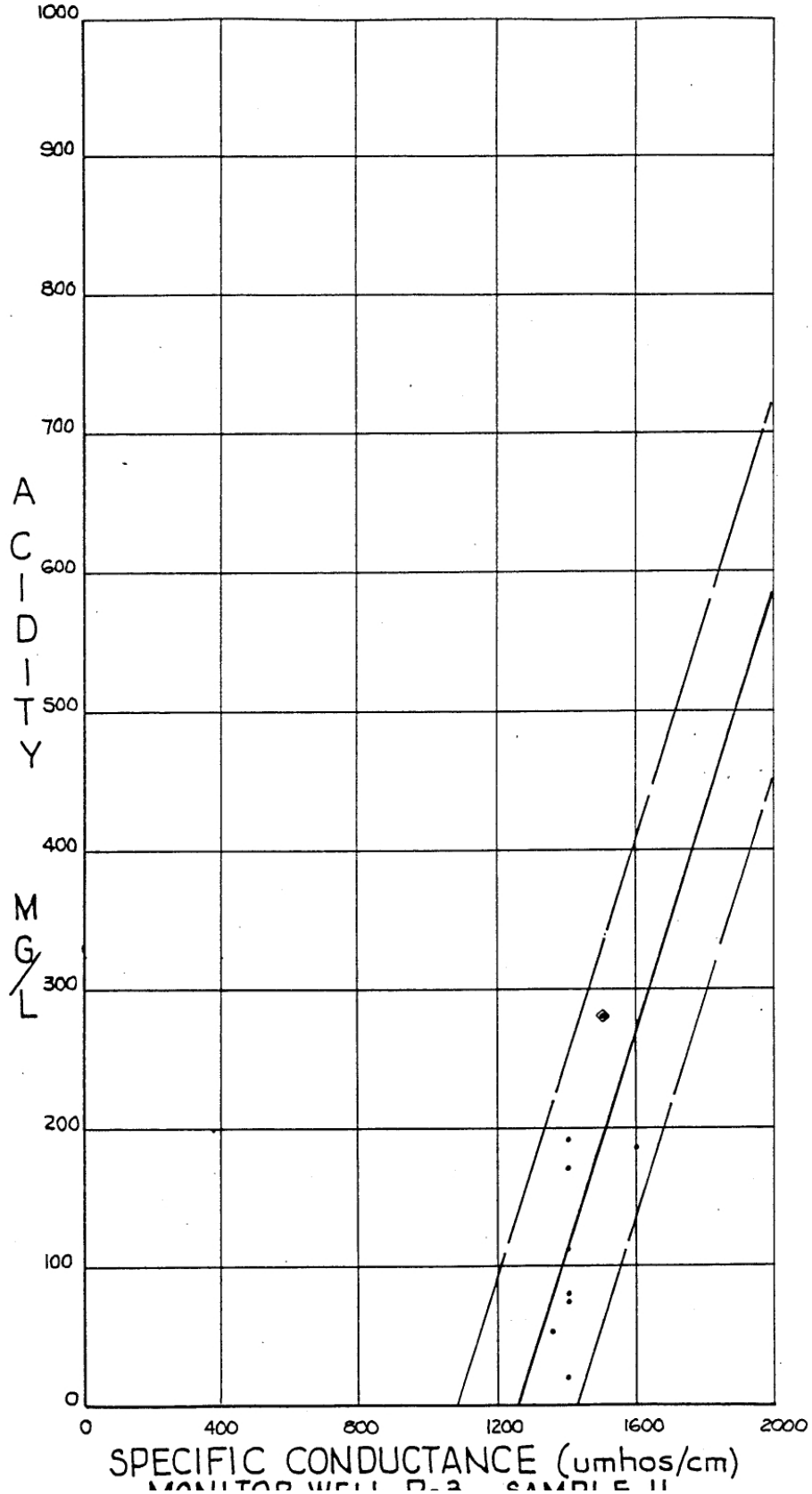
ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	31992.22	1	31992.22
DEVIATION	43885.88	8	5485.74
TOTAL VARIATION	75878.10	9	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE

F TEST - SIGNIFICANCE OF REGRESSION = 5.83

LEVEL .05% - CRITICAL VALUE = 5.32


1000
900
800
700
600
500
400
300
200
100
0
ACIDITY MG/L
0
400
800
1200
1600
2000
SPECIFIC CONDUCTANCE (umhos/cm)

SAMPLE.ELEVEN SPECIFIC CONDUCTANCE VS. SULPHATES

COEFFICIENT MATRIX AND AUGMENTED MATRIX

1	1435	6540.0000
1435	2064250	9422200.0000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

411.184079601990

0.742288557214

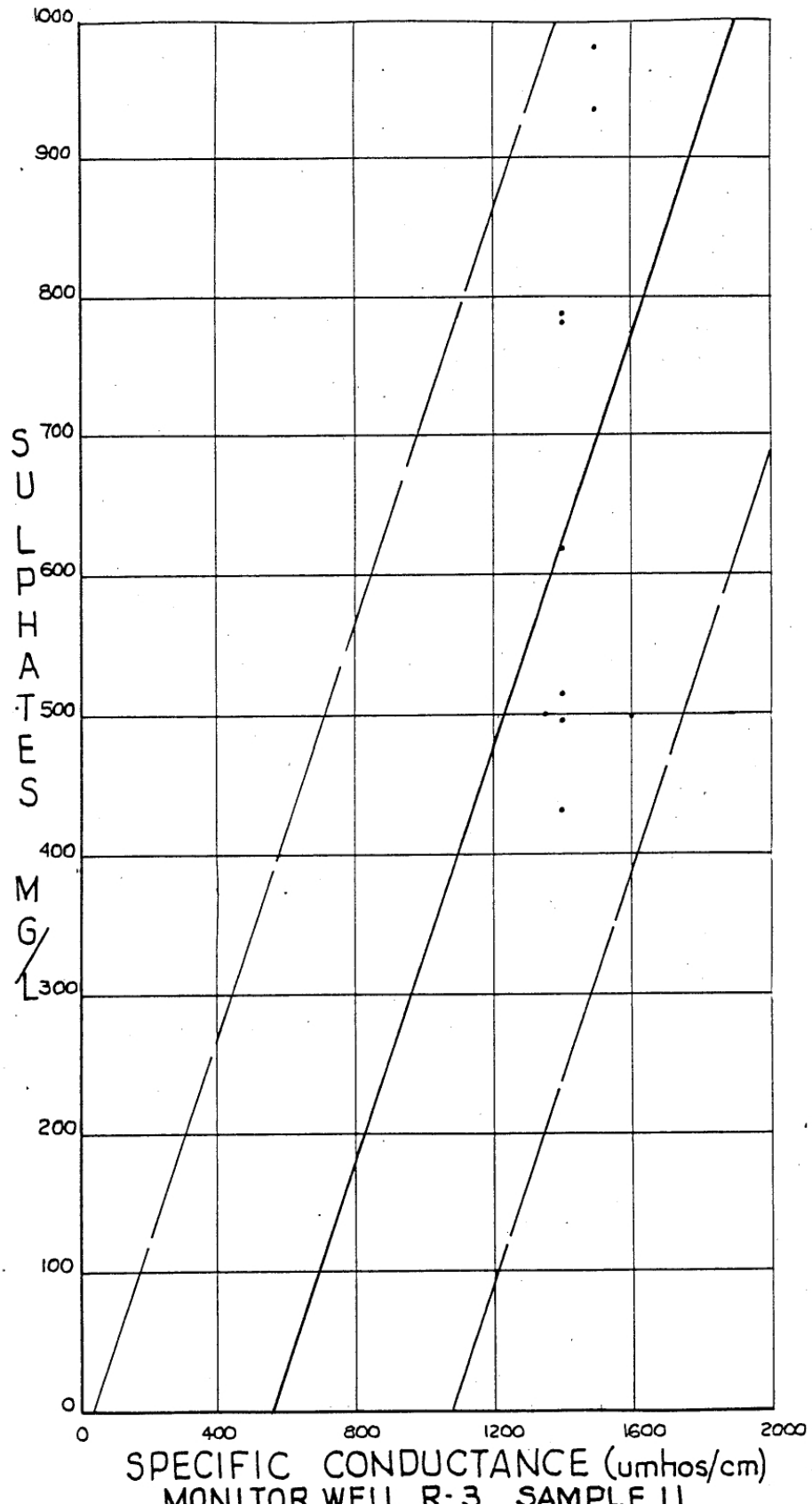
ORIGINAL X - Y PAIRS		PREDICTED VALUES	DEVIATION
1500.0000	981.0000	702.2488	278.7512
1500.0000	935.0000	702.2488	232.7512
1400.0000	789.0000	628.0199	160.9801
1600.0000	498.0000	776.4776	278.4776
1400.0000	781.0000	628.0199	152.9801
1400.0000	513.0000	628.0199	115.0199
1400.0000	618.0000	628.0199	10.0199
1400.0000	495.0000	628.0199	133.0199
1400.0000	430.0000	628.0199	198.0199
1350.0000	500.0000	590.9055	90.9055

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1
NUMBER OF X - Y PAIRS= 10
TOTAL SUMS OF SQUARE= 364930
SUMS OF SQUARES DUE TO REGRESSION= 27687.363184
SUMS OF SQUARES DUE TO DEVIATION= 337242.636816
GOODNESS OF FIT= .07587
MULTIPLE CORRELATION COEFFICIENT 0.27545
STANDARD DEVIATION 193.575319

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	27687.36	1	27687.36
DEVIATION	337242.64	8	42155.33
TOTAL VARIATION	364930.00	9	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE
F TEST - SIGNIFICANCE OF REGRESSION = 0.66
LEVEL .05% - CRITICAL VALUE = 5.32


1000
900
800
700
600
500
400
300
200
100
0
SULPHATES MG/L
0
400
800
1200
1600
2000
SPECIFIC CONDUCTANCE (umhos/cm)
MONITOR WELL R-3 SAMPLE 11

SAMPLE.ELEVEN SPECIFIC CONDUCTANCE VS. TOTAL IRON

COEFFICIENT MATRIX AND AUGMENTED MATRIX

1	1435	1192.0000
1435	2064250	1730950.0000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

-464.223880597021

0.406567164179

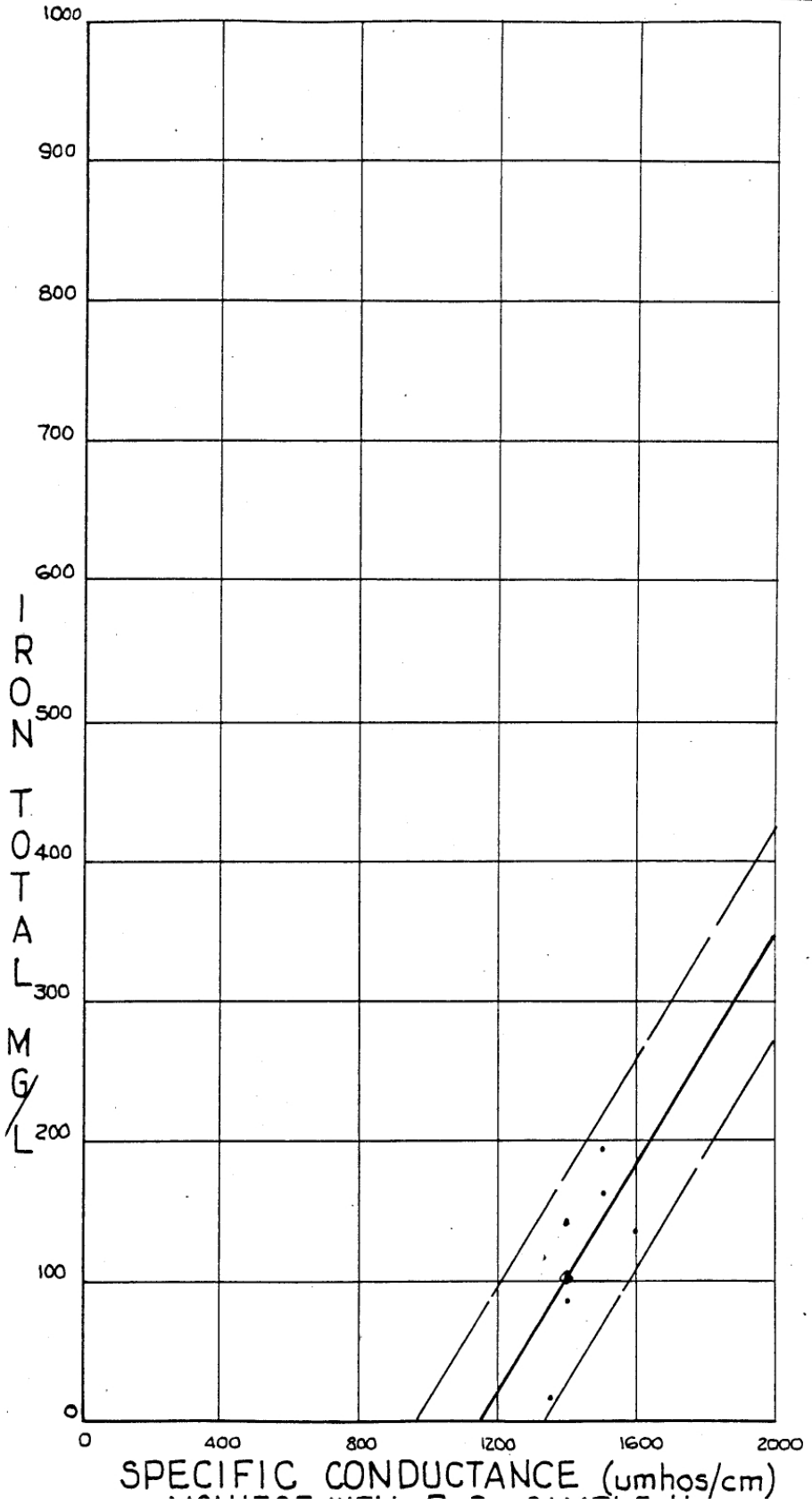
ORIGINAL X - Y PAIRS		PREDICTED VALUES	DEVIATION
1500.0000	195.0000	145.6269	49.3731
1500.0000	163.0000	145.6269	17.3731
1400.0000	143.0000	104.9701	38.0299
1600.0000	136.0000	186.2836	50.2836
1400.0000	141.0000	104.9701	36.0299
1400.0000	106.0000	104.9701	1.0299
1400.0000	102.0000	104.9701	2.9701
1400.0000	103.0000	104.9701	1.9701
1400.0000	86.0000	104.9701	18.9701
1350.0000	17.0000	84.6418	67.6418

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1
NUMBER OF X - Y PAIRS= 10
TOTAL SUMS OF SQUARE= 21267.6
SUMS OF SQUARES DUE TO REGRESSION= 8306.167164
SUMS OF SQUARES DUE TO DEVIATION= 12961.432836
GOODNESS OF FIT= .390555
MULTIPLE CORRELATION COEFFICIENT 0.62494
STANDARD DEVIATION 37.94943

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	8306.17	1	8306.17
DEVIATION	12961.43	8	1620.18
TOTAL VARIATION	21267.60	9	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE
F TEST - SIGNIFICANCE OF REGRESSION = 5.13
LEVEL .05% - CRITICAL VALUE = 5.32


1000
900
800
700
600
500
400
300
200
100
0
IRON TOTAL MG/L
0
400
800
1200
1600
2000
SPECIFIC CONDUCTANCE (umhos/cm)

SAMPLE.ELEVEN SPECIFIC CONDUCTANCE VS. FERROUS IRON

COEFFICIENT MATRIX AND AUGMENTED MATRIX

1	1435	1108.7000
1435	2064250	1610145.0000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

436.300497512438

0.381303482587

ORIGINAL X - Y PAIRS		PREDICTED VALUES	DEVIATION
1500.0000	179.0000	135.6547	43.3453
1500.0000	145.0000	135.6547	9.3453
1400.0000	139.0000	97.5244	41.4756
1600.0000	132.0000	173.7851	41.7851
1400.0000	127.0000	97.5244	29.4756
1400.0000	93.0000	97.5244	4.5244
1400.0000	99.0000	97.5244	1.4756
1400.0000	98.0000	97.5244	0.4756
1400.0000	80.0000	97.5244	17.5244
1350.0000	16.7000	78.4592	61.7592

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1

NUMBER OF X - Y PAIRS= 10

TOTAL SUMS OF SQUARE= 17751.321

SUMS OF SQUARES DUE TO REGRESSION= 7305.965378

SUMS OF SQUARES DUE TO DEVIATION= 10445.355622

GOODNESS OF FIT= .411573

MULTIPLE CORRELATION COEFFICIENT 0.64154

STANDARD DEVIATION 34.067508

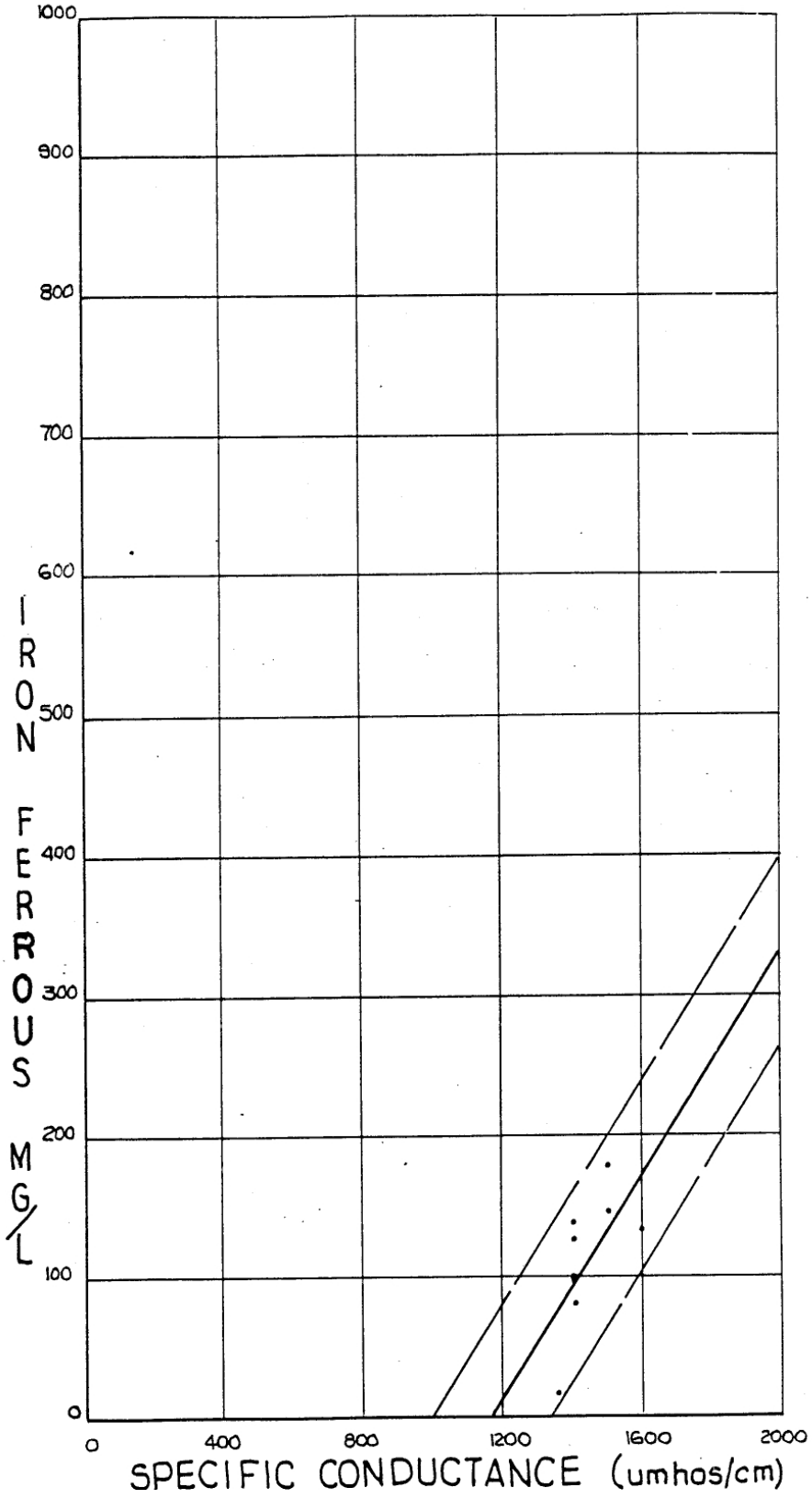
ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	7305.97	1	7305.97
DEVIATION	10445.36	8	1305.67
TOTAL VARIATION	17751.32	9	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE

F TEST - SIGNIFICANCE OF REGRESSION = 5.60

LEVEL .05% - CRITICAL VALUE = 5.32


1000
900
800
700
600
500
400
300
200
100
0
IRON FERROUS MG/L
0
400
800
1200
1600
2000
SPECIFIC CONDUCTANCE (umhos/cm)

SAMPLE.ELEVEN SPECIFIC CONDUCTANCE VS. FERRIC IRON

COEFFICIENT MATRIX AND AUGMENTED MATRIX

1	1435	83.3000
1435	2064250	120805.0000

REGRESSION COEFFICIENTS OF NORMAL EQUATION

27.923383084577
0.025263681592

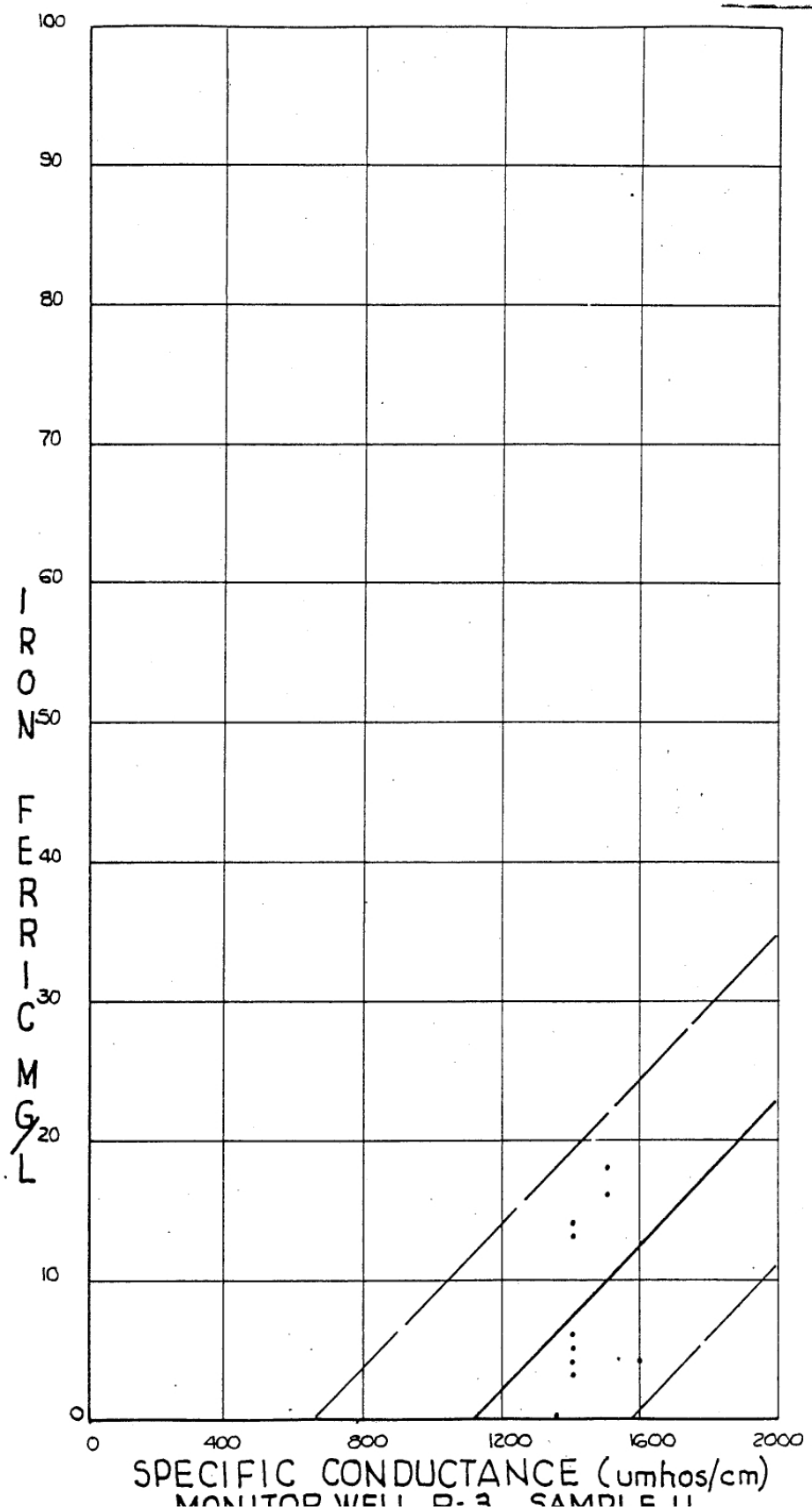
ORIGINAL X - Y PAIRS		PREDICTED VALUES	DEVIATION
1500.0000	16.0000	9.9721	6.0279
1500.0000	12.0000	9.9721	8.0279
1400.0000	4.0000	7.4458	3.4458
1600.0000	4.0000	12.4985	8.4985
1400.0000	14.0000	7.4458	6.5542
1400.0000	13.0000	7.4458	5.5542
1400.0000	3.0000	7.4458	4.4458
1400.0000	5.0000	7.4458	2.4458
1400.0000	6.0000	7.4458	1.4458
1350.0000	0.3000	6.1826	5.8826

STATISTICAL ANALYSIS WITH ORDER OF EQUATION= 1
NUMBER OF X - Y PAIRS= 10
TOTAL SUMS OF SQUARE= 353.201
SUMS OF SQUARES DUE TO REGRESSION= 32.072244
SUMS OF SQUARES DUE TO DEVIATION= 321.128756
GOODNESS OF FIT= .090805
MULTIPLE CORRELATION COEFFICIENT 0.30134
STANDARD DEVIATION 5.973355

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
LIN. REGRESSION	32.07	1	32.07
DEVIATION	321.13	8	40.14
TOTAL VARIATION	353.20	9	

F-TEST FOR EQUALITY OF SAMPLE/REGRESSION VARIANCE
F TEST - SIGNIFICANCE OF REGRESSION = 0.80
LEVEL .05% - CRITICAL VALUE = 5.32


100
90
80
70
60
50
40
30
20
10
0
IRON FERRIC MG/L
0
400
800
1200
1600
2000
SPECIFIC CONDUCTANCE (umhos/cm)

CLOSURE AND POST CLOSURE DATA LISTING *

SAMPLE ELEVEN

DATE	SPEC. COND.	DISCHARGE	pH	ALKALINITY	ACIDITY	SULPHATES	TOTAL IRON	FERROUS IRON	FERRIC IRON
5/11	1300	-	5.93	21	7	367	49.5	37.2	12.6
5/19	1500	-	6.01	71	15	458	58.5	58.0	0.5
5/25	1550	-	5.97	38	8	388	60.9	55.3	5.6
6/1	1500	-	5.96	30	3	483	52.4	44.6	7.8
6/7	1350	-	5.99	26	1	4.65	59.0	53.5	5.5
6/12	1400	-	6.01	27	0	346	45.9	42.7	3.2
6/16	1400	-	5.85	32	0	443	43.5	38.5	5.0
6/21	1200	-	6.08	32	3	434	43.5	35.0	8.5
6/29	1300	-	6.11	73	0	397	43.0	36.4	7.6
7/10	1500	-	6.37	67	0	365	40.0	36.7	3.3
7/19	1400	-	6.24	83	0	312	32.4	31.1	1.3
7/26	1500	-	6.43	93	0	268	29.8	24.4	5.4
8/6	1400	-	6.94	118	0	198	27.1	17.8	9.3
8/21	1300	-	6.81	122	0	358	21.4	17.7	3.7

* Units are as follows:

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