

#### WEIR NO. 11

# **Description**

The discharging air seal on an abandoned main heading on the east central edge of SMC generally accounts for less than 20% of the total AMD input to the Casselman, but in low flows it contributes about one-third of the acid load. Weir 11 has been sampled and measured since April 1972, with a total of 39 observations.

The complete statistical descriptions of acidity, iron and sulfate concentrations, loads and log-transformed loads were developed with program BMDP-2D, including histograms (see "Descriptive BMDP-2D"). Concentrations are named: "ACID," "TOTFE," and "SULF," with corresponding loads called: "ACIDL," "TOTFEL," and "SULFL." Log-transformed loads are: "LACID," "LTOTFE," and "LSULF."

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4 BMDP2D STATION 11 DESCRIPTIVE STATISTICS

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PAGE 3 BMDP2D STATION 11 DESCRIPTIVE STATISTICS

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PAGE 5 BMDP2D STATION 11 DESCRIPTIVE STATISTICS

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PAGE 7 BHDP2D STATION 11 DESCRIPTIVE STATISTICS

PAGE 8 BMDP2D STATION 11 DESCRIPTIVE STATISTICS

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PROBLEM

NUMBER OF INTEGER WORDS OF STORAGE USED IN PRECEDING CPU TIME USED 0.724 SECONDS

PAGE 10 BMDP2D STATION 11 DESCRIPTIVE STATISTICS

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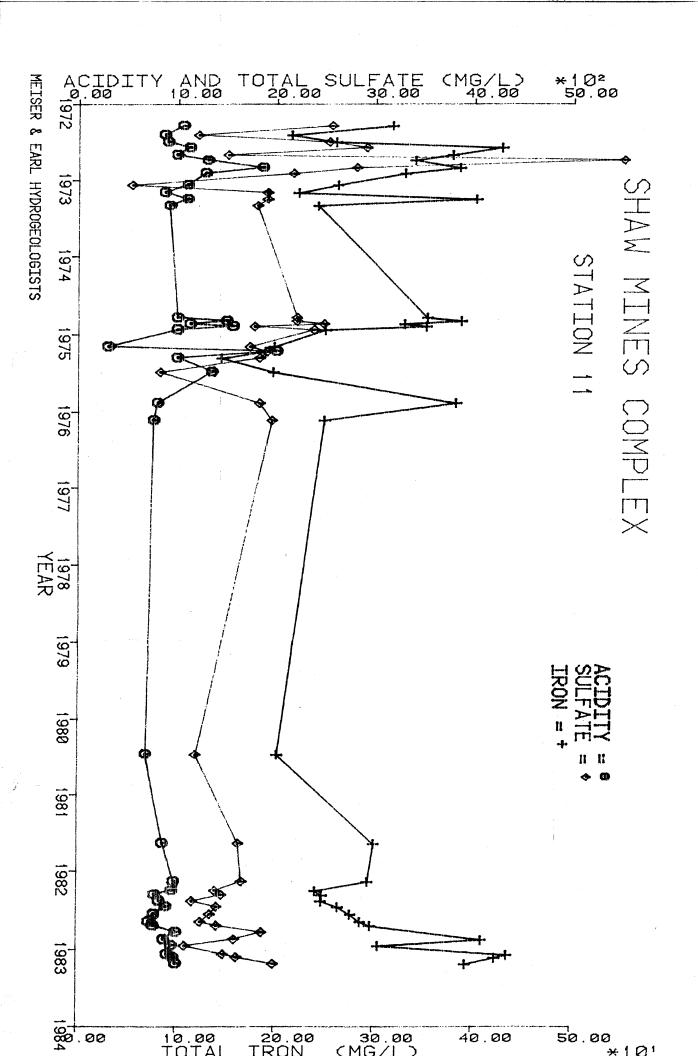
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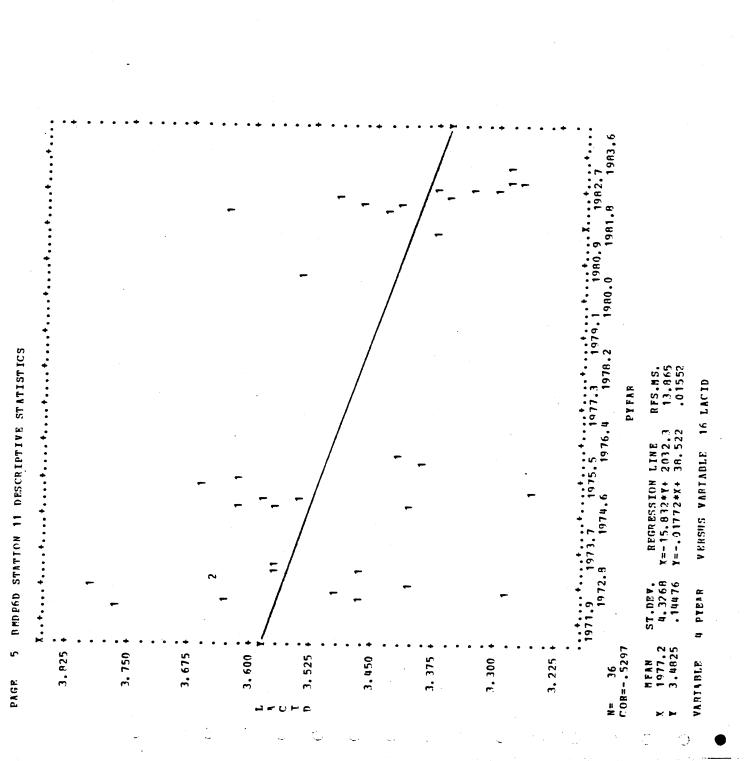
# **Graphical Trends of Observations**

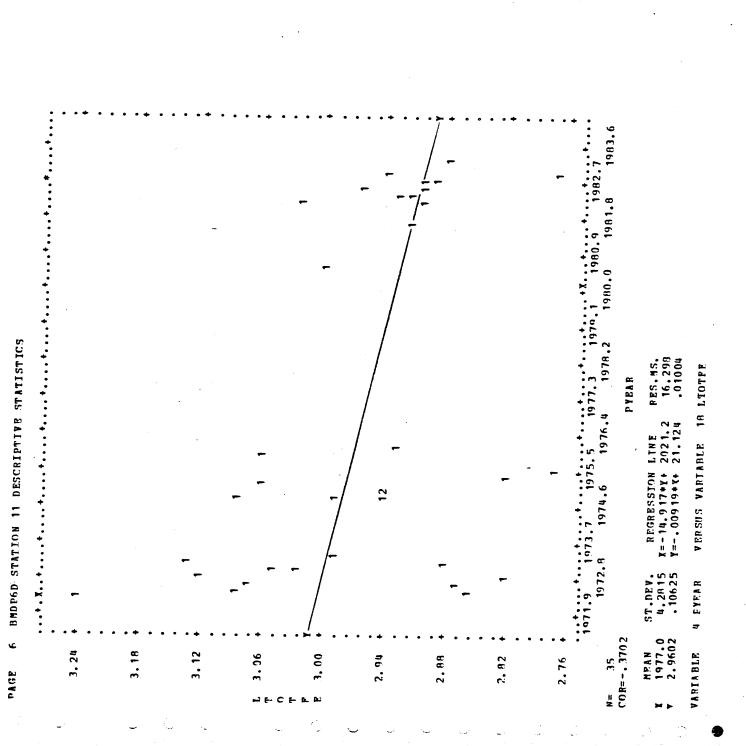
The CalComp plots (three-color) of acidity, iron and sulfate concentrations through time show no obvious trends except for an apparent decrease in sulfate levels.

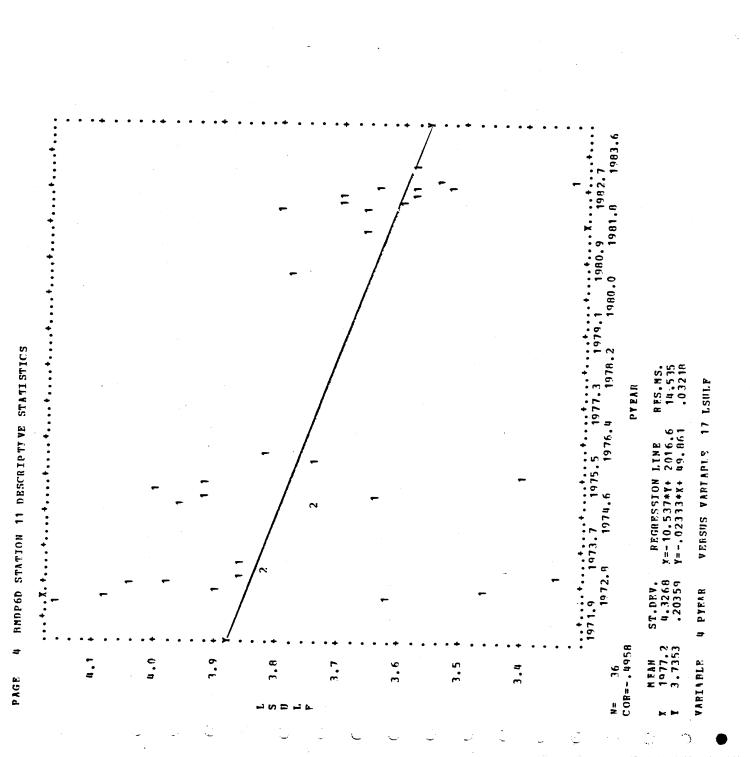
Bivariate scatter plots (BMDP-6D) of the individual log-transformed loads of acid, iron and sulfate through time all show a <u>decrease</u> as indicated by the slope of the regression lines.

The scatter plot of combined log-transformed loads ("S, F and A diagram") clearly shows a pattern of decreasing loads for all three, acid, iron and sulfate.









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## **Statistical Comparisons**

Station 11 data was grouped into three time groups: 1972-73, 1974-76 and 1980-83. The BMDP-7D multiple comparisons for concentrations, loads, log-transformed loads and flows are included and a summary interpretation follows.

### A. Concentrations

- 1. Acidity Earliest period (1972-73) is significantly greater than most recent period (1980-83). Decrease of approximately 20%.
- 2. Iron Nearly identical iron levels for all three periods.
- 3. Sulfate Most significant change between early and recent data. Decrease of 35%.
- Comments Iron shows no change, but acidity and sulfate both show reductions.
   Significant statistical differences at only 0.05 probability for these acidity and sulfate.

#### B. Loads

- Acid Load Very significant (0.01 level) reduction from 1972-73 to 1980-83 of roughly 30%.
- 2. Iron Load Slight but significant (0.05 level) reduction from 1972-73 to 1980-83 of about 20%.
- 3. Sulfate Very significant (0.01 level) reduction from 1972-73 to 1980-83 of over 40%.
- 4. Comments Although rigorous statistical testing requires log-transformation of the load data, <u>all</u> loads show <u>reductions</u> from 1972-73 to most recent data on order of 20-40%.

### C. <u>Log Loads</u>

Log Acid Load - Early data (1972-73) is significantly greater than 1980-83.
 Decrease of roughly 30%.

- 2. Log Iron Load No significant difference between time periods.
- 3. Log Sulfate Load Same as log acid load. Decrease is nearly 40%.
- 4. Comments The improvements in acid and sulfate loads in recent years are statistically significant, and range about 30-40%. No improvements in iron loads can be statistically justified using log-transformed data.

## D. Flows

- 1. Flows ("AMGPD") No differences exist between time groups; curiously small range in flows and low standard deviations.
- 2. Log Flows ("LMGPD") Same as flows.
- Comments Average flows in 1980-83 are no different than in earlier periods,
   1972-73 and 1974-76. Therefore, decreases in <u>loads</u> are due to reduced concentrations, <u>not</u> changes in flow.

## E. Acid Concentrations vs. Flows - BMDP-1R Scatter Diagrams

- 1. All Data
- 2. 1972-73 No correlation between acid concentrations
- 3. 1982-83 and flows.
- 4. Comments Plots indicate "Type 1" discharge with observed acidities uniformly distributed about the mean over the range of flows. No testing was done on the intermediate time period 1974-76 since no correlation was seen between acidity and flow.

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DIVIDED INTO GROUPS BASED ON VALUES OF	1980-3	• • • • • • • • • • • • • • • • • • •	#### ##### ##### ##### ##### #####	10 10 102,205 04 78 78 25,551 1008,000 00 688,000 11	SUM OF SQUARES N GROUPS 535463, 2500 GROUPS 3111508, 5133 3646971, 0000	DIAL VARIANCES ************************************
6). CASES	1974-6	* * * *	** THEY COINCIDE WITH	1127.091 459.610 454.704 138.578 2000.000 300.000 11	* SOURCE * RETWEEN GROUPS * VITHIN GROUPS * TOTAL ************************************	* 1.P VRNE'S TEST FOR EC ************************************
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BONFERRONI	TEST 0.01667 0.00333 0.000333	POOLED VARIANCE T LUE DP P-VALUE .11 36 0.9114 .06 36 0.0466 .13 36 0.0402
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PAGE 5 BHDP7D STATION 11 (FILL DATA SET) DESCRIPTIVE STAT	
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	***	A******		VARIANCE TABLE ****	**************	****	***
FOR PYPAR )	* SOURCE	SUM OF SQUARES	90	MEAN SQUARE	F VALUE	TAIL PR	PROBARTLITE
AN D.P.EV. F.S.D.	* BETWEEN GROUPS * HITHIN GROUPS	10429,4023 210276,3955	2 35	5214.6992 6007.8970	0.87		0.4286
	* TOTAL ***************	223705.7590 37	37				
MINIMUM 143,000 SAMPLE SISE 38	* LEVENGOS TEST POP	ROUAL VARIANCES	2, 35	***	0.98	* * * * * * * * * * * * * * * * * * *	**********
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BONFERRONJ TEST 0.016667 0.003333	POOLED VARIANCE T LUE DP P-VALUE .22 35 0.2309 .20 35 0.8423 .09 35 0.2847
SIGNIPICANCE LEVEL .05 .01	T-VAI
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PAGE 6 BMDP7D STATION 11 (FULL DATA SET) DESCRIPTIVE STATISTICS PAIRVISE COMPARTSONS AMONG HONEMPTY CFLL (GROUP) HEANS. ASTERISKS DENOTE THE LEVELS OF SIGNIFICANCE OF THE PONFERRONI THE VALUE GIVEN FOR THE BONFERRONI TEST IS THE SIMILTANEOUS SIGNIFICANT P VALUE OF CCMPARISONS OF ALL PAIRS OF MEANS. THAT IS, AFTER ADJUSTMENT FOR THE MULTIPLE COMPARISON OF ALL PAIRS OF MEANS. PAIRS OF MEANS, TO BE SIGNIFICANT AT THE .05 LEVEL THE P	GROUP GROUP GROUP GROUP GROUP GROUP GROUP GROUP GROUP HEAN DIFF T-VALUE 11972-3 313.08 2 1974-6 273.64 19.45 1.16 1 1972-3 313.08 3 1980-3 307.07 6.02 0.21 2 1774-6 273.64 3 1980-3 307.07 -33.43 -1.03

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_		, .	247.971				
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r.S	VALUES *		******* ANALYSIS OF	VARIANCE TABLE	*****	*****	*****
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				2, 15	3,65	0.0512	12

7 BMDP7D STATION 11 (FILL DATA SET) DESCRIPTIVE STATISTICS

<b>6</b> 3		THE STATISTICS OF THE SET SET SET STATISTICS			
* * *	Ter isk Ter isk STS.	FPRONI	SYMBOL	SIGNIFICANCE LEVEL	B0
	GNI FTCA	GIVEN FOR THE BONFERPONI TEST IS THE SIMULTANEOUS NT P VALUE OF COMPARISONS OF ALL PATES OF HEARS. AFTER ADJUGTMENT POD THE MINISTER.	* * * *	.05	

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THE LEVELS OF SIGNIFICANCE OF THE EONFFRONI  EN FOR THE RONFERDONI TEST IS THE SIMULTANEOUS  VALUE OF COMPARISONS OF ALL PATRS OF MEANS.  R ADJUSTMENT FOR THE MULTIPLE COMPARISON OF ALL  S, TO RE SIGNIFICANT AT THE .OS LEVEL THE P  LESS THAN 0.016667  CROUP GROUP  GROUP GROUP  MEAN  MEAN  MEAN  MEAN  MEAN  SEPARATE VARIANC  22271.67  21974-6 1915.36  31990-3 1474.19  797.44  2.22 11.68 0.01  1915.36  3 1970-3 1474.19  441.18  3.00 14.33  0.744 SECONDS	IGNIFICANCE LEVEL . 05 . 01	FI N	
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EN POR THE BONFERPONI VALUE OF COMPARISONS B ADJUSTMENT POR THE MCS, TO RE SIGNIFICANT A LESS THAN 0.016667  CROUP GROUP GROUP MAN NO. NAME 2271.67  1915.36  1915.36  3 1930-1915.36  1015.36  10744 SECONS	FLL(GROUP) MEAN TICANCE OF THE IN OF ALL PATES TIPLE COMPARISC	MEAN 1915.36 1474.19 1474.19	ED IN PRECEDING
ASTERISKS DENOTE THE LETESTS.  THE VALUE GIVEN POE THE SIGNIFICANT E VALUE OF THAT IS, AFTER ADJUSTWE PAIRS OF MEANS, TO RE SVALUE NUST RE LESS THAN GROUP GROUP AND STATES THAN 11972-3 2271.67 11972-3 2271.67 2 1974-6 1915.36	TYPES OF SIGNIF STANFERPONI OF COMPARISONS THE MUI	GROUP GROUP  2 1974-6 3 1990-3 3 1990-3	OF STORAGE US
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7). CASES DIVIDED INTO GROUPS B	1974-6				4 4		*	=	***		COLNCIDE WITH * 1S, N'S OTHERWISE		6.923	1051,936	1.000	1.799		*****	1	SURCE SUR OF SQUARES	REEN GROUPS	WITHIN GROUPS *******			*	ONE-WAY ANALYSIS OF VARIANCE TEST STATISTICS FOR WITHIN-GROUP VARIANCES NOT ASSUMED TO BE EQUAL	WELCH BROWN-PORSYTHE
**************************************		6300.000)*		4550,000) *	4200,000) **	3850, 000) N#	3150, 000) *	2800, 000) **	*	2103.000)*	MEANS ARE DENOTED BY N'S IP THEY	3856.487 1205.050	1310,188	374, 109	6339,488	1946,999		ALL GROUPS COMBINED *******		• •	3208,543 *	1148,412	185,186 *	# # #	4**	* * * *	

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LEVEL BONFERRONI LEVEL 0.01667 0.01667 0.00333	POOLED VARIANCE T T-VALUE DF P-VALUE 1,26 33 0,2162 3,30 33 0,0024 1,83 33 0,0767
SIGNIFICANCE SYMBOL LEVEL * .05 ** .01 *** .01	SEPARATE VARIANCE T LUE DF P-VALUE 1.13 19.62 0.2741 1.08 16.17 0.0071 *
MEANS. HE BONPPRRONI SIMILTANEOUS IRS OF MEANS. RISON OF ALL	NEAN SEPAR DIFF T-VALUE 534.78 1.13 1284.15 3.08 749.37 2.16
PAJENISE COMPARISONS ANONG NONRMPTY CELL (GROUP) MEANS. ASTEPISKS DENOTE THE LEVELS OF SIGNIFICANCE OF THE BONFPRONI TESTS. THE VALUE GIVEN FOR THE BONFPRONI TEST IS THE SIMULTANEOUS SIGNIFICANT P VALUE OF COMPARISONS OF ALL PAIRS OF HEANS. THAT IS, AFTER ADJUSTMENT FOR THE MULTIPLE COMPARISON OF ALL PAIRS OF MEANS, TO BE SIGNIFICANT AT THE .05 LEVEL THE P	GROUP NAME HEAN 1974-6 3321,71 1980-3 2572,34
PAIGNTISE COMPARISONS AMONG NONFASTERISKS DENOTE THE LEVELS OF THE VALUE GIVEN FOR THE BONFRRSIGNIFICANT P VALUE OF COMPARITHAT IS, APTER ADJUSTMENT FOR THAT IS, APTER ADJUSTMENT FOR TAIRS OF MEANS, TO BE SIGNIFICANT	GROUP G 3856.49 2 19 3856.49 3 19
PAJENISE COMPASTERISES DEN TESTS. THE VALUE GIV SIGNIPICANT P THAT IS, AFTE PAIRS OF MEN	GROUP GROUP NO. NAME 1 1972-3 1 1972-3 2 1974-6

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GROUPS BASED ON VALUES OF * PTEAR * (VARIABLE 4)  **********  1980-3	* S LISTED ABOVE				***	*****	# SI In:		115,980	32.16/ 1059.840 587.328	13 ANALYSIS OP VARIANCE TABLE ************************************	5	2 173003.0625 3.28 32 52756.0483	15	32 5.02 0.0127	· 使使用的 化二甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基
980-	WHICH FOLLOW EXCLUDE VALUES			***	***	*****	* * COINCIDE WITH *'S, N'S OTHERWISE		2.099 5.568	32, 1059, 587,	*************** ANALYSI	SOURCE SUN OF SQUARES	RETWEEN GROUPS 346006, 1250 WITHIN GROUPS 1688193, 5460	AL ********	LEVENE'S TEST FOR POIGHL VARIANCES 2,	ONE-WAY ANALYSIS OF VARIANCE TEST STATISTICS FOR WITHIN-GROUP VARTANCES NOT ASSIMED TO BE DOILS
1972-3 VAR 10	 TABULATIONS AND COMPUTATIONS MIDPOINTS	1900, 000) 1800, 030) 1700, 000) * 1600, 000)	1500,000) 1400,000) * 1309,000) *	1209,000)** 1100,000)#* 1003,000)*	000	700,000) **** 500,000) ****	500.000) GROUP MEANS ARE DENOTED BY M'S IP THEY	_		MAXTMUM 1745.624 MINIMUM 664.733 SAMPLE SIZE 12	ALL GROUPS COMBINED ***		MPAN 940.169 * STD.DEV, 244.600 * R.E.S.D. 242,239 *	* * 1	\$£ 321!	* * *

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LEVEL BONFERRONI .05 0.016667 .01 0.003333	POOLED WARIANCE T T-WALUE DF P-WALUF 1.55 32 0.1318 2.54 32 0.0163 * 0.84 32 0.4078
SIGNIFICANCE * .05 ** .05 ** .01	SEPARATE VAPIANCE T T-VALUE DP P-VALUE 1.34 18.94 0.1969 2.37 13.61 0.0331 1.11 13.28 0.2869
PAIRWISE COMPARISONS AMONG NONEMPTY CELL (GROUP) MEANS. ASTPRISKS DENOTE THE LEVELS OF SIGNIPICANCE OF THE BONFERRONI TESTS. THE VALUE GIVEN FOR THE BONFPRONI TEST IS THE SIMULTANFOUS SIGNIFICANT P VALUE OF COMPARISONS OF ALL PAIRS OF MEANS. THAT IS, AFTER ADJUSTMENT FOR THE MULTIPLE COMPARISON OF ALL PAIRS OF MEANS, TO BE SIGNIFICANT AT THE .05 LEVEL THE P	GROUP GROUP GROUP GROUP REAN DIER T-VAIR NO. NAME MEAN DIER T-VAIR 1972-3 1373-23 2 1974-6 918.11 152.12 1. 1972-3 1070.23 3 1980-3 837.08 233.15 2. 2 1974-6 918.11 3 1980-3 837.38 81.03 1.

F VALUE TAJL PROBABIL:  6.03 0.0059  **********************************	1972-3				•	
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1039,713	30.000)*	*	*			
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1518   1518   102 05	OPV.	6604.148	4285.727			
1039,713		2543,646	016.5401			
172		749.748	278.569			
17.2	_	10205.094	6173,559			-
ALL GROUPS COMBINED	21:	2466,827 10	2109.743			
# SOURCE SIM OF SOURES DF MEAN SOUR  6036,922  # BETWEEN GROUPS ********  2850,354  # WITHIN GROUPS ********  33 6285053.7779  474,050  # TOTAL  ***********************************		****	ANALVSTS	arate a Surtan		•
# SOURCE SUM OF SQUARES DF MEAN SQUARE FVALUE TAJI.  6036.922  # BETWEEN GROUPS ********** 2 37872208.0000 6.03  2844.294  * WITHIN GROUPS ************************************		*		AND TARGET TABLE	***	***
60.36.922	SH PERR )	* SOURCE		MEAN	VALUE	
** FITHIN GROUPS ************************************	Ad	2	******	1787220B		
+ TOTAL ++++++++++++++++++++++++++++++++++++			***	. ~	60.0	0.0059
2109.743 * LEVENE'S TEST FOR EQUIAL VARIANCES 36 ************************************		- 4		35		
ANALYSIS OF VARIANCE ATISTICS FOR WITHIN-GROUP PS NOT ASSUMED TO BE EQUAL H N-FORSTIRE 2, 16	2109. SIZE		EQUAL VARIANCES	·*************************************	******* 5.80	**************************************
-PORSYTHE 2, 21 5,66			P VARIANCE IR WITHIN-GROUP MED TO BE EQUAL		·	**
		# BROWN-FORSTILE			7.89 5.66	0.0041

PAGE 13 BADP7D STATION 11 DESCRIPTIVE STATISTICS

SYMBOL	***
PAIBWISE COMPARISONS AMONG NONEMPTY CELL (GROUP) MEANS. ASTERISKS DENOTE THE LEVELS OF SIGNIFICANCE OF THE BONFERRONI TESTS.	THE VALUE GIVEN FOR THE BONFERRONI TEST IS THE SIMULTANEOUS SIGNIFICANT P VALUE OF COMPARISONS OF ALL PAIRS OF HEANS. THAT IS, AFTER ADJUSTHENT FOR THE MILTIPLE COMPARISON OF ALL PAIRS OF MEANS, TO BE SIGNIFICANT AT THE .05 LEVEL THE P VALUE MIST HE LESS THAN 0.016667

E BONFERONI TRST 0.016667 0.003333 0.0003333	POOLED WARIANCE T 0.93 33 0.3568 3.37 33 0.0019 ** 2.23 33 0.0324
SIGNIFICANCE LEVEL . 05 . 01	•
SYMBOL ***	MEAN SEPARATE VARIANCE T DIPP T-VALUE DP P-VALUE 1003.16 0.78 19.10 0.4435 3321.58 0.0090 ***
ISKS DENOTE THE LEVELS OF SIGNIFICANCE OF THE BONFERRONI LUE GIVEN FOR THE BONFERRONI TEST IS THE SIMULTANEOUS S. AFTER ADJUSTMENT FOR THE MULTIPLE COMPARISON OF MEANS. OF MEANS, TO BE SIGNIFICANT AT THE . OS LEVEL THE P	MEAN DIPP 1003, 16 3321,58 2318,42
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EVELS OF COMPANIENT FOR	GROUP NO. 2 1 3 1
OTE THE LE EN FOR THE VALUE OF R ADJUSTHE S, TO BE S LESS THAN	HEAN 7607.31 7607.31 6604.15
ISKS DEN LUE GIV TCANT P S, AFTE OF MEAN	GROUP NAME 1972-3 1972-3

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16). CASES DIVIDED INTO GROUPS BASED ON VALUES	1974-6	· · · · · · · · · · · · · · · · · · ·				•	**************************************	* 22	. \$	***	* * *		***	THEY COINCIDE WITH 4'S, N'S OTHERWISE	3.	150	042	3,660	249 10		ANALYSIS OF	SOURCE SUM OF SQUARES DE	BETWEEN GROUPS 0.1852 2 WITHIN GROUPS 0.5483 33	35	E'S TEST FOR BOURL VARIABLE ARREST ARE SERVE ARREST AND THE STATE OF THE STATE ARREST ARE SERVED ARREST AND THE STATE ARREST ARREST ARE SERVED ARREST ARREST ARE SERVED ARREST AR	ONB-WAY NAITSIS CF VARIANCE TEST STATISTICS FOR WITHIN-GROUP VARIANCES NOT ASSUMED TO RE PRODUCT	WELCH 2	
**************************************	1972-3	MIDPOINTS	3, 800) *	3,720)	3, 680)	3.640)*** 3.600	3.560) 2.	3.520)	3, 440)	3, 400) *	3, 320)	3,280)*	240)	SHOW HEANS ARE DENOTED BY N'S IP THEY				NINIM 3.289	SAMPLE SIZE 12	UPS COMBINED **	VALUES *	n ne i i	3.482 + STD.DEV. 0.145 + P.E.S.D. 0.154 +	0.024 3.802		* * *	* *	

PAGE 15 MADP7D STATION 11 DESCRIPTIVE STATISTICS

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BONFERFONI TEST 0.016667 0.003333	POOLED VARIANCE T LUE DF P-VALUE .08 33 0.2879 .28 33 0.0025 **
SIGNIPICANCE SYMBOL LEVEL  . 05  ** .01  ***	SEPABATE VARIANCE T POO T-VALUE DP P-VALUE T-VALUE 1.00 19.82 0.3317 1.08 7 3.25 19.83 0.0041 * 3.28 1 2.09 16.74 0.0523 2.30
PAIRNISE COMPARISONS AMONG NONEMPTY CELL (GROUP) MEANS. ASTERTSKS DENOTE THE LEVELS OF SIGNIFICANCE OF THE BONFERRONI THE VALUE GIVEN FOR THE BONFERRONI TEST IS THE SIMULTANEOUS SIGNIFICANT P VALUE OF CCMPARISONS OF ALL PAIRS OF MEANS. THAT IS, AFTER ADJUSTMENT FOR THE MULTIPLE COMPARISON OF ALL PAIRS OF MEANS, TO BE SIGNIFICANT AT THE .05 LEVEL THE P	GROUP GROUP GROUP GROUP HEAN DIFF T 1972-3 3.56 2 1974-6 3.50 0.06 1 1972-3 3.56 3 1980-3 3.40 0.17 2 1974-6 3.50 3 1980-3 3.40 0.11

HISTOGPAM OF 4  VAR 18  EXCLIDED VALUES  A 225) * 3.25	TABULATIONS AND COMPUTATIONS  3.012 0.131 0.140 0.038 3.242 2.823 1.2 GROUPS COMBINED ES WITH UNUSED VALUES  2.960 0.108 0.018 0.018 3.242 2.960 0.108 0.018 3.242 2.960 0.108 3.242 2.960 0.108 3.242 2.960 0.108 3.242 2.960 0.108 3.242 2.960 0.108 0.018 3.242 2.960 0.108 0.108 0.108 0.2169 1.2	######################################	# 1980-3  1980-3  1980-3  **  **  **  **  **  **  **  **  **	#######  "UES OF * PYEAF  "******  "ITANCE TABLE  HEAN SQUA  "***********************************	**************************************	******  (VARIABLE 4) +  *******************************
		* WELCH ASSURED * BROWN-PORSYTHE	TO BE EQUAL 2	18 25	2,53	0.1079
			, ,	6.7	2,57	0.0962

PAGE 19 BHDP7D STATION 11 DESCRIPTIVE STATISTICS

STATISTICS
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A G E

	ZA H BOL	SIGNIFICANCE LEVEL	BONPER
THE VALUE GIVEN FOR THE BONPERRONI TEST IS THE SIMULTANEOUS  SIGNIFICANT P VALUE OF COMPARISONS OF ALL PAIRS OF MEANS.  THAT IS, AFTER ADJUSTMENT FOR THE MULTIPLE COMPARISON OF ALL PAIRS OF MEANS, TO BE SIGNIFICANT AT THE .05 LEVEL THE P	* * * * * *	.001	0.00

EL 0.01667 01 0.003333 01 0.000333	T-WALUE DY P-V 1.36 32 0.1 2.28 32 0.0	
.001		
*** **	SEPARATE VARIANCE T 1-VALUE DP P-VALUE 1.19 19.95 0.24483 2.24 15.45 0.0404 0.91 13.94 0.3774	1 2098
ERRONI TEST IS THE SIMULTANEOUS ARISONS OF ALL PAIRS OF MEANS. ICANT AT THE .05 LEVEL THE P	MBAN MEAN DIFF T- 2.95 0.06 2.92 0.09 2.92 0.03	PROBL
LUR GIVEN FOR THE BONF ICANT P VALUE OF COME S, AFTER ADJUSTMENT FC OP MEANS, TO BE SIGNIF HIST BE LESS THAN 9.0	GROUP GROUP GROUP GROUP NO. NAME BEAN NO. NAME 1 1972-3 3.31 2 1974-6 1 1972-3 3.01 3 1980-3 2 1974-6 2.95 3 1980-3	NUMBER OF INTEGER WORDS OF STORAGE USED IN PRECEDING CPU TIME USED 1.034 SECONDS
TESTS. THE VAI SIGNIE THAT IS PAIRS VALUE	O M D	E DA U

•						
HISTOGRAM OF	**************************************	B 17). CASES DIVIDED INTO GROUPS	TO GROUPS BASED ON	WALUES OF	* (VARIABLE	( <del>)</del>
197	1972-3	1974-6	1980-1		-	
•	•	••••••		•		
# (080 m						
4.020) *		•				
3.960) *		·				
(006		**				
3. 840) M***	*	*				
3.720)		2	*			
			**			
3.600) *			**			
3,540)			4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4			
3.480) *			•			
3.3601		*				
3.300)						-
S	APE DENOTED BY M'S IP T	THEY COINCIDE WITH #15 NIS	***************************************			
MEAN						
STD.DEV.	0.245	3.789	3,619			
	0.239	0.182	0.115			
S. E. H.	0.071	781.0	0.108			
MAXIMUM	4,150		0.031			
MUMINIM	3,333	4.004	3.791			
SAMPLE SIZE	12	10.10	3,324			
ALL GR	ALL GROUPS COMBINED		•			
(EXCRPT CASES	(EXCEPT CASES WITH UNUSED VALUES	* * *	***** ANALYSIS OF	VARIANCE TABLE	******	"不不不然不不不知 化苯基苯基苯基苯基苯基苯基苯基苯基苯基苯基苯基苯基苯基苯基苯基苯基苯基苯基苯基
FOR PYEAR	_	* SOURCE S	SUM OF SQUARES	DF MEAN SOURRE	40.4	
MEAN	3,735	200				TALL PROBABILIT
STD. DEV. R.F.S.D.	0.204	* WITHIN GROUPS	0.3181 1.1327	33 0.0343	4.63	0.0168
S. E. M.	0.034	* 10.70.	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	,		
MAXIMON		*******	1.4508	35		
SAMPLE SIZE	36	* LEVENE'S TEST FOR BOUAL VARIANCES 2 * * * * * * * * * * * * * * * * * *	AL VARIANCES	2 a 3 a c c c c c c c c c c c c c c c c c	2.37	*************************************
		* ONE-WAY ANALYSIS OF VARTANCE		*************************	*******	****
		TEST STATISTICS FOR WITHINGROUP	ITHIN-GROUP			
	7	ELCH	TO BE EQUAL	2. 18	ı	
		BROWN-FORSYTHE		2, 24	5.69 4.41	0.0121
						0.0234

PAGE 17 bioP7D STATION 11 DESCRIPTIVE STATISTICS

	SIGNIFICANCE	.00.
	SYMBOL	***
TAGE IN DIRECTOR OF DESCRIPTIVE STATISTICS	PAIRWISE COMPARTSONS AMONG NONEMPTY CELL (GROUP) MEANS. A STERISKS DENOTE THE LEVELS OF SIGNIFICANCE OF THE BOMFERRONI TESTS.	THE VALUE GIVEN FOR THE BONPERRONI TEST IS THE SIMULTANEOUS SIGNIFICANT P VALUE OF COMPARISONS OF ALL PAIRS OF MEANS. THAT IS, AFTER ADJUSTMENT FOR THE MULTIPLE COMPARISON OF ALL PAIRS OF MEANS, TO BE SIGNIFICANT AT THE .OS LEVEL THE P VALUE MUST BE LESS THAN 0.016667

LEVEL TEST .05 0.001333 .001 0.000333	POOLED VARIANCE T T-VALUE DF P-VALUE 0.46 33 0.6469 2.84 33 0.0076 *
*** **	SEPARATE VARIANCE T T-VALUE DP P-VALUE 0.40 19.78 0.6920 2.68 15.11 0.0169 2.61 14.11 0.0203
LUE GIVEN FOR THE BONPERRONI TEST IS THE SIMULTANEOUS ICANT P VALUE OF COMPARISONS OF ALL PAIRS OF MEANS.  3, AFTER ADJUSTMENT FOR THE MULTIPLE COMPARISON OF ALL PRANS, TO BE SIGNIFICANT AT THE .05 LEVEL, THE P	MEAN DIPP 3.79 0.04 3.62 0.21 3.62 0.17
LUE GIVEN FOR THE BONPERRONI TEST IS THE SIMULTANEONI ICANT P VALUE OF COMPARISONS OF ALL PAIRS OF MEANS, OF MEANS, TO BE SIGNIFICANT AT THE .05 LEVEL THE P ALL OF ALL	GROUP GROUP 3.83 2 1974-6 3.83 3 1980-3 3.79 3 1980-3
LITE GI ICANT S, AFT OF MEA	GROUP NAME 972-3 972-3

HISTOGRAM OF	**************************************	(BLR 14), CASPS	PS DIVIDED INTO GROUPS	BASED	ON VALUES	. 40	* (VARIABLE	(n
197	972-3	1974-6		6-0001		***	*	
VAR 14 EXCLIDED VALUES	•	• • • • • • • • • • • • • • • • • • •			•			
10	TARULATIONS AND CONPU	AND COMPUTATIONS WHICH	FOLLOW EXCLUDE VALUES	*** LISTED	ABOVE	÷		
0, 735) 0, 700) 0, 665) * 0, 630)	- -	*						
0.595) 0.560) * 0.525) 0.490) **		*		* *				
0, 455) 0, 420) #**** 0, 385)	*	* <b>*</b>		:				
0.350) 0.315) # 0.280)		* * *		# # # E # # #				
S S	APE DENOTED BY M'S IF	THEY COINCIDE	HITH * S, N'S	** OTHERWISE			•	
MRAN STD.DEV. R.E.S.D. S. E. M. MAXIMIM MINJUUN	0.423 0.124 0.115 0.036 0.670 1.240	0.415 0.130 0.122 0.041 0.710 0.300	•	0.00	90 to 20 to			
ALL GROUPS (EXCRPT CASES WIT)	ALL GROUPS COMPINED (EXCEPT CASES WITH UNUSED VALUES	****	*****	ANALYSIS	2.	VARIANCE TABLE ****	****	中中中中央 非常 军事 联络斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯
FOR PYEAR	-	* SOURCE	S	SUN OF SQUARES	9.0	~	P VALUE	TAIL PROBABILTMY
STD.DEV. R.E.S.D.	0.401 0.118 0.113	* BETWEEN * WITHIN *	GROUPS GROUPS	0.0211 0.4508	32	0.0105	0.75	
MAXIMUM	0.710 0.230	* TOTAL ************************************	* :	0.4719	34	1) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	***	
SAMPLE SIZE	35	* >	STEST FOR ROUAL VARIANCES ************************************	A NC R.S.	2, 32	2. 2. 0.0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.37	7.9367
		* TEST STATISTI * YARIANCES NOT * HELCH * BROWN-FORS	- L	_2	2, 20		08.0	
			,				0.73	0.4916

3 BMDP7D STATION 11 MULTIPLE COMPARISONS ON PLOW

	BONFERRONI	0.00 3333 0.00 3333	POOLED VARIANCE T ALUE DF P-VALUE 0.16 32 0.8708 1.14 32 0.2633 0.92 32 0.3651
	SIGNIFICANCE	.00.	T-VAL
	SYMBOL	* *.* * * *	SEPARATE VARIANCE TO ALUE OF 15 18.91 0.8799 1.18 21.66 0.2520 0.91 17.04 0.3751
ON FLOW	MEANS. HE BONFERRONI	I TEST IS THE SIMULTANEOUS NS OF ALL PAIRS OF BEANS. MULTIPLE COMPARISON OF ALL AT THE .05 LEVEL THE P	MEAN DIFF 0.01 0.05
COMPARISONS	ILL (GROUP) CANCE OF T	I TEST IS THE SIMULTAN NS OF ALL PAIRS OF HE NULTIPLE COMPARISON OP AT THE .OS LEVEL THE P	MEAN 0.41 0.37
11 MULTIPLE (	NG NONEMPTY CE ELS OF SIGNIFI	BONFERPONT TE COMPARISONS C T FOR THE NILT GNIPICANT AT T 0.016657	GROUP GROUP NO. NAME 2 1974-6 3 1980-3 3 1980-3
TD STAFTON	RISONS AMO TE THE LEV	VALUE OF ADJUSTMEN'S, TO BE SILES THAN	MEAN 0.42 0.42 0.41
FAGE 4 BMDP/D STAFION 11 MULTIPLE COMPARISONS ON FLOW	PAIPHISE COMPARISONS AMONG NONEMPTY CELL(GROUP) MEANS. ASTERISKS DENOTE THE LRVELS OF SIGNIFICANCE OF THE BONFERBONI TESTS.	THE VALUE GIVEN FOR THE BONFERFONI SIGNIFICANT P VALUE OF COMPARISON THAT IS, AFTER ADJUSTMENT FOR THE PAIRS OF MEANS, TO BE SIGNIFICANT VALUE MIST BE LESS THAN 0.016657	GROUP GROUP NO. HANE 1 1972-3 1 1972-3 2 1974-6

4 BMDP7D STAFION 11 MULTIPLE COMPARISONS ON FLOW

HISTOGRAM OF	F & LMG PD + (VARIABLE)	16). CASES DIVIDED INTO GROUPS	OUPS BASED ON VALUES	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	, WEDTANT	
				;		<del>-</del>
791	2-3	1974-6	1980-3			
•	•	•	•	•		
VALUES						
	TABULATIONS AND COMPUTATIONS UP					
,,		IS WILL'S FULLOW EXCLUDE VALUES	PES LISTED AROVE			
-0.140) -0.175) +		*				
			•			
-0.245) *		*	•			
-0.3151 **			*			
-0.350)		*				
-0, 335) H***	<b>*</b>	*=	• * *			
-0.455)				•		
+ (06n ·0-		* f	æ			
-0.525)		***	* * *			
-0.560)			•			
-7.630) **			*			•
S	ARE DENOTED BY M'S IF THEY	COINCIDE VITH *15. NIC	* 011880 ut ca			
	• • • • • • • • • • • • • • • • • • • •		2C TH H L			
	0.133	-0.398	-0.448			
R.E.S.D.	0.119	0.122	0.117			
	0.038	0.039	0.118		•	
MINIMUM	-0.174	-0.149	0.032			
17.F	12	-0.523	-0.638			
IS TIV	UPS CONFINED					
Ę,	WITH UNISED VALUES		ANALYSIS OF	VAPIANCE TABLE	*********	经存储存储 化环烷基 化苯基甲基 医异性性 医光光性 医有性 医有性性 医
	* *	SOURCE SUN OF	SQUARFS	DF MEAN SQUARE	F VALUE T	TAIL PROBABILITY
STD. DEV.	-0.414 + + + + + + + + + + + + + + + + + +	BETWEEN GPOUPS	0.0233	0.0116		
r. E.S.D.	0.125		(76+	32 0.0154		
"AXINDE	-0.149	TOTA!	C	ħ		
MINIMUM Sample Size	* * *		EQUAL VARIANCES 2.	*********	0.00	计分别分别 化苯甲基苯甲基苯甲基苯甲基苯甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基
	* *	AY AWALYSIS OF	**************************************	*****	*	***
		ATALISTICS FOR MITHI INCES NOT ASSUMED TO	WITHIN-GROUP 3D TO BE EQUAL			
	•	BPOWN-PORSYTHE	2,	21	0.76	479 th 0
•					) •	10.4.0

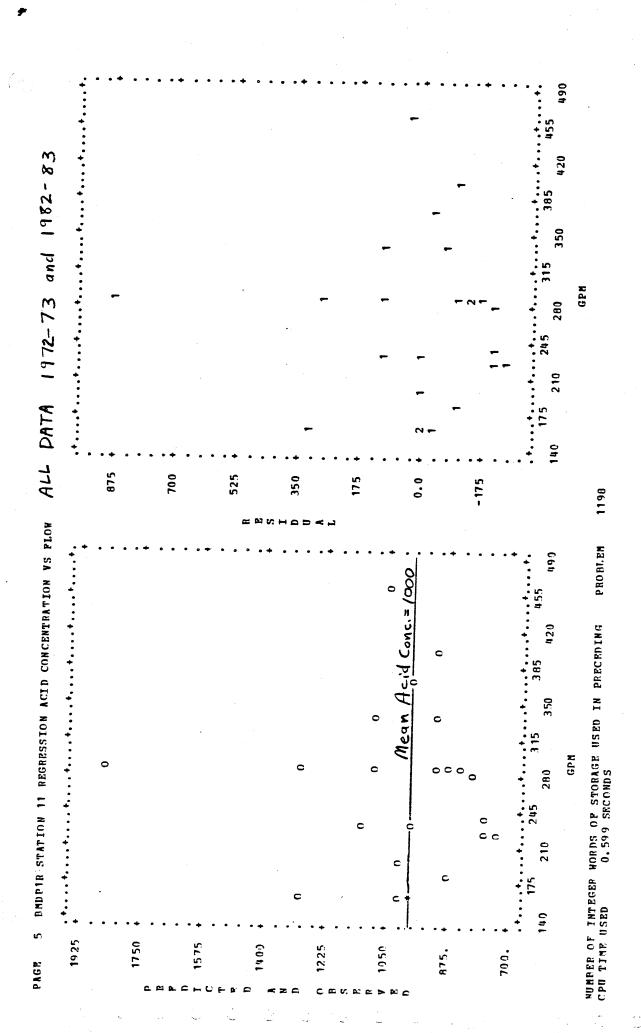
5 RUNPTO STATION 11 MULTIPLE COMPARISONS ON FLOW

PAGF

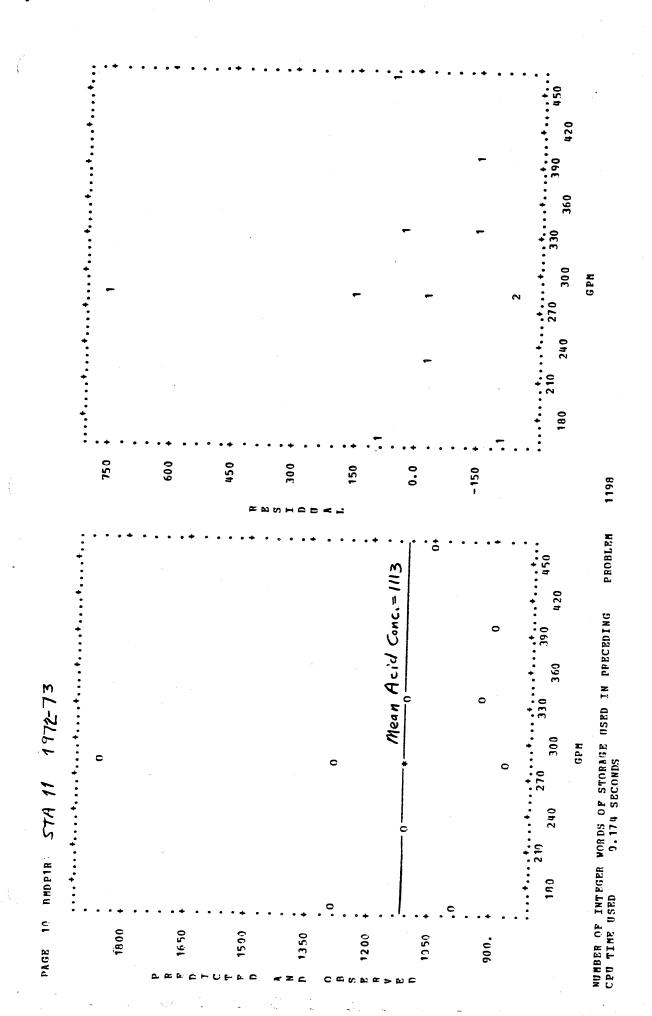
· ·	*** .055 0.0 *** .01 0.0	
PAIRVISE COMPARTSONS AMONG NONEMPTY CELL (GROUP) MRANS. A STEPISKS DRNOTE THE LEVELS OF SIGNIFICANCE OF THE BONFERRONI TESTS.	THE VALUE GIVEN FOR THE BONFERRONI. TEST IS THE SIMULTANEOUS SIGNIFICANT P VALUE OF COMPARISONS OF ALL PAIRS OF HEANS. THAT IS, APTER ADJUSTMENT FOR THE MULTIPLE COMPARISON OF ALL PAIRS OF MEANS, TO BE SIGNIFICANT AT THE .05 LEVEL THE P	GROUP GROUP

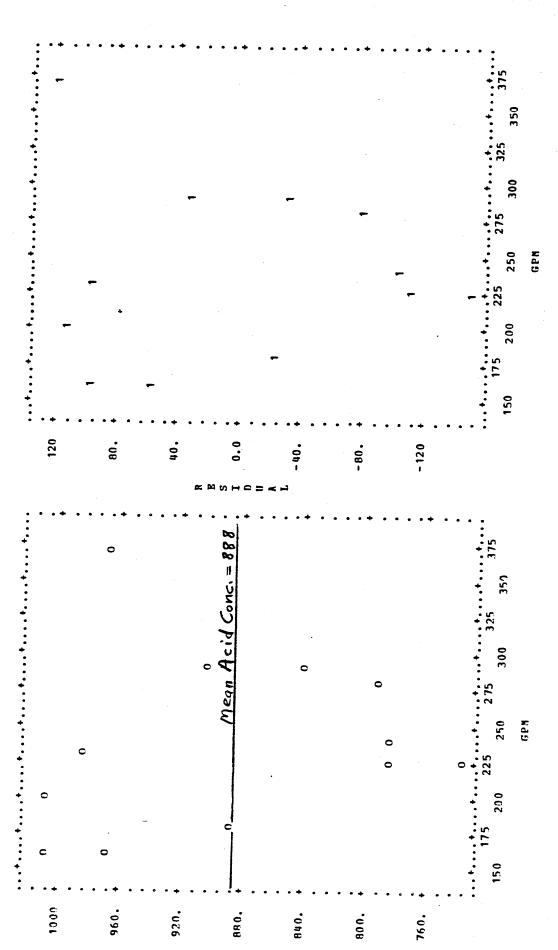
6 PHDP7D STATION 11 MULTIPLE COMPARISONS ON FLOW

POOLED VARIANCE T 0.14 32 0.4922 1.13 32 0.2650 0.94 32 0.3539	
SEPARATE VARIANCE TO ALUE O.13 19.77 0.8954 1.12 21.99 0.2740 0.97 19.02 0.3424	1680
DIFF 0.01 0.06 0.05	PROBLEM
327N -0.40 -0.45 -0.45	IN PRECEDING
GROUP GROUP NO. NAME 2 1974-6 3 1980-3 3 1980-3	ORDS OF STORAGE USED O. 666 SECONDS
-0.39 -0.39 -0.40	15.8 WOR DS
1 1972-3 1 1972-3 2 1974-6	CPU TIME USED 0.666 SECONS



.3





1982-83

Station 11

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