

US EPA ARCHIVE DOCUMENT

1/12/89

DATA EVALUATION RECORD

- 1. Chemical: Ignite; Hoe 39866
- 2. Test Material: 95.4% (Technical ai)
- 3. Study Type: Avian Reproduction

Species Tested: Mallard duck
(Anas platyrhynchos)

- 4. Study ID: Roberts, N.L., Phillips, C.N.K., and Chanter, D.O. (1986) The Effects of Dietary Inclusion of Hoe 39866 Active Ingredient Technical (Code: Hoe 39866 OH ZC98 0002) on Reproduction in the Mallard Duck; Report No. A33113; Prepared by Huntingdon Research Centre Ltd. for Hoechst Celanese Corporation, Route 202-206 North, Somerville, New Jersey 08876.

5. Reviewed By:

Curtis E. Laird
Fishery Biologist
EEB/HED

Signature: Curtis E. Laird
Date: _____

6. Approved B.:

Norman J. Cook
Supervisory Biologist
EEB/HED

Signature: Norman J. Cook
Date: 1.12.89

7. Conclusions:

Based on the submitted data, it appears that Ignite does not cause reproduction impairment for the number of eggs laid, eggs cracked, eggs set, early embryonic deaths, 21-day embryonic deaths, number hatched, 14-day survival, egg shell thickness, food consumption, and body weight. This test showed no significant difference between control and treatment, except a reduction in female body weight for Groups C (100 ppm) and D (400 ppm), which were significantly lower ($p < 0.05$ and < 0.01 , respectively) than Group A (control) ^{du}the pre-egg production period (days 0 to 70). There was a reduction in food consumption in group D (400 ppm). The NOEL was > 400 ppm. EEB needs clarification of the residue analysis data for the avian feed (e.g., when were the samples taken, were samples taken for each dose level during weeks 1, 12, and 22, etc.), and for the diet preparation techniques (i.e., a better description, including quantities, of how the pre-mix was used.

8. Recommendations:

None, providing the registrant submits the residue analysis data for diet used in the reproduction study.

9. Background:

This study was submitted to support Ignite registration for use as a nonselective postemergence weed control in noncrop areas.

10. Discussion of Individual Test: N/A.

11. Material and Methods

- A. Test Animals - The test animals were mallard ducks from Mr. Coles Country Game Farm, Ashford, Kent, and were young adults approaching their first breeding season. Birds were 20 weeks old on arrival and 23 weeks old when the test started. All birds were in good health prior to test initiation.
- B. Test Design - Birds were housed in 1.2 x 1.5 m pens constructed from galvanized steel, with solid sides and wire mesh floors. Each pen contained an automatic cup drinker and a food hopper. During the egg production period, the floors were covered with plastic padding matting to minimize the risk of cracked eggs. The birds were maintained under 7 hours light and 17 hours darkness from the time of arrival at HRC until week 8 of the study. At the beginning of week 9, the photoperiod was increased and maintained at 16 hours.
- C. Dose - Birds were dosed using nominal dietary concentrations plus control (0, 25, 100, and 400 ppm). The adult birds were given basic diet only or basic diet with test compound incorporated, depending on treatment group, throughout the 22-week test period. The basic diet used was quail layer diet manufactured by Special Diets Services Limited, Witham, Essex. The diet contained no antibiotic or growth promoters.
- D. Diet Preparation - A weighed amount of test compound was added to untreated diet to give a premix of 20,000 ppm (3000 ppm in preliminary study), which was mixed by being shaken in an inflated polythene bag for a minimum of 3 minutes prior to incorporation in the diets. Aliquots of premix were used to prepare the final inclusion levels. The diets were prepared weekly in batches of 30 to 40 kg (12 mg in preliminary study) and were blended in a double-cone blender for a minimum of 7 minutes.

Diet samples were taken at the time of week 1 mix of the preliminary study as follows:

- 2 x 200 g from the first kg discharged;
- 2 x 200 g from the approximate center of the discharge; and
- 2 x 200 g from the final kg discharged.

The above samples were sent to the sponsor for analysis of homogeneity and stability. Full details of methods and results are given in Appendix 2.

Representative samples of approximately 200 g were also taken from each dose level mix during weeks 1, 12, and 22 of the main study and sent to the sponsor for analysis of inclusion levels. Full details of methods and results are given in Appendix 2. Appendix 2 is attached.

- E. Egg Collection, Storage, and Incubation - All eggs laid were collected over a 12-week period from the beginning of week 11 until the end of week 22. The eggs were labeled with the study schedule number, treatment and replicate number, and the date collected, and were then stored on plastic egg trays according to replicate at approximately 16 °C. Eggs were allowed to stand at room temperature (20 °C) for at least 12 hours prior to incubation. At the end of each 7-day period the eggs were weighed and replicate group mean weights recorded. Each egg was then candled and any broken or cracked eggs were recorded and discarded. The remaining eggs, with the exception of those taken for shell thickness determination, were placed on setting trays in an incubator.
- F. Egg Shell Thickness - All eggs laid in each replicate on the first day of weeks 11, 13, 15, 17, 19, and 21 of the egg production period were taken to be examined for shell thickness. The eggs were cracked open at the widest point and the contents washed out with tap water. The shells were then left to dry out at room temperature for at least 48 hours. The shell thickness of each egg was measured at four points around the circumference of the shell using a micrometer calibrated to 0.01 mm.
- G. Incubation - Eggs were placed in a Western incubator at weekly intervals. The incubator was set to run at a temperature of 37.7 °C and a humidity of 57 percent. The eggs were turned automatically once every 43 minutes through an angle of 90° (45° each side of the horizontal) throughout the incubation period. After 23 days the eggs were transferred to hatchers, where hatching

occurred within a few days.

1. Candling - In addition to being candled prior to incubation for cracks, all eggs were candled on days 14 and 21 of the incubation period. At day 14 all infertile eggs and eggs showing early embryonic death were recorded and removed. At day 21 late embryonic deaths were recorded and removed. Early and late embryonic deaths were determined on the basis of candling only and the eggs were not cracked open unless the candling result was difficult to assess.
2. Hatching - On day 23 of the incubation period the eggs were transferred from the incubator to the hatcher. Each hatcher tray was divided into sections using hardboard partitions so that the chicks could be kept separate according to replicate on hatching. The temperature of the hatcher was checked daily. The hatcher used were still-air Bristol incubator models PH 90 and PH 150 and were designed to run at a temperature of approximately 37.5 °C (99.5 °F). All chicks were removed from the hatcher within 24 hours of hatching and were weighed, tagged, and placed in floor pens.

H. Chicks

Identification - After hatching, the chicks were individually identified by means of colored plastic leg bands. The following color coding system was used:

Group A	Control	White
Group B	Hoe 39866	Yellow
Group C	Hoe 39866	Green
Group D	Hoe 39866	Red

- I. Accommodation - The chicks were housed in floor pens with concrete floors. Each pen contained two automatic drinkers and one food hopper. An additional drinking fount was also provided. Wood shavings supplied by the Sawdust Marketing Company Limited were used as bedding. Each pen contained one 300-watt infrared lamp placed at bird level to supply additional heat to the chicks. Maximum and minimum temperatures and relative humidity were recorded once daily throughout the study with the following values:

	<u>Mean</u>	<u>Standard Deviation</u>
Maximum temperature	27 °C	± 3 °C
Minimum temperature	24 °C	± 3 °C

examination.

4. Infertile Eggs - Eggs were candled on day 14 of the incubation period and infertile eggs removed.
5. Early Embryonic Deaths - Eggs were candled on day 14 of the incubation period and eggs showing early embryonic death were removed.
6. Late Embryonic Deaths - Eggs were candled on day 21 of the incubation period and eggs showing late embryonic death were removed.

Chicks

The following observations were recorded:

1. Number of Chicks Hatched Alive - Weekly.
2. Chick Health - Assessed daily.
3. Bodyweights - Individual bodyweights were recorded within 24 hours of hatching and on day 14 after hatching.
4. Mortalities - Daily.
5. Macroscopic Postmortem Examination - All chicks which died during the 14-day observation period were examined for gross abnormalities.

Summary of Study Duration

Adults - Ten weeks pre-egg production period; 12 weeks egg production period.

Incubation - Eggs collected over the 12-week egg production period were incubated weekly. The incubation period was 23 days.

Ducklings - The weekly hatches of ducklings from 12-week egg production periods were reared until they were 14 days old.

Statistical Analysis

1. Adult food consumption;
2. Adult bodyweight;
3. Number of eggs laid and mean egg weight;

4. Proportion of eggs damaged;
5. Egg shell thickness;
6. Numbers of infertilities, embryonic deaths, and hatchings;
7. Numbers of 14-day-old surviving chicks; and
8. Chick bodyweights at hatching and 14 days later.

12. Reported Results

- A. Mortalities and Bird Health - One bird died and one was sacrificed during the pretreatment period. Bird No. 351 (male, 8B) was found dead on day -1 and was replaced by bird No. 499 (Male). Bird 397 (female, 14C) was sacrificed on day -1 as it had trapped its foot in the wire mesh floor and appeared to have broken its leg. The bird was replaced by bird No. 485 (female).

The following mortalities occurred during the treatment period (weeks 1 to 22):

<u>Replicate/Group</u>	<u>Bird No.</u>	<u>Day of Death</u>
3A (control)	315 (male)	78
8B (25 ppm)	350 (male)	74
13C (100 ppm)	385 (male)	68
14C (100 ppm)	393 (male)	67
14C (100 ppm)	481 (male*)	71
21D (400 ppm)	442 (male)	107

*Replacement bird.

These mortalities were considered not to be from Hoe 39866 but from bullying between male birds.

All birds appeared to be in good health throughout the test.

- B. Bodyweight - A summary of bodyweight is shown in attached Table 3.
- C. Food Consumption - A summary of food consumption is shown in attached Table 4. The food consumption was variable, but there was no evidence of any treatment-related effects based on the statistical analysis.
- D. Postmortem Examination - The postmortem examination showed evidence of bullying. Missing feathers on head, back, neck, blood on beak, skin was raw, areas around

eyes and back of head and neck had been pecked were noted in the control and treatment groups (25, 100, and 400 ppm). All birds surviving until termination of the study at the end of week 22 were also examined. Bird No. 340 (female, 6A) was found to have a white lesion (approximately 10 mm) on the left kidney. Otherwise, no abnormalities were detected in any of the birds.

E. Eggs

Number of Eggs Laid, Cracked, Weight, and Thickness - The number of eggs laid, cracked, weight, and egg shell thickness can be found in attached Tables 5, 6, 7, and 8, respectively.

None of the above observations was considered to be related to treatment.

1. Number of Eggs Laid - Egg production was first recorded for week 9 and 10. Eggs were not collected for incubation until week 11. The number of eggs recorded for week 9 and 10 were as follows:

	<u>Week 9</u>	<u>Week 10</u>
Group A	2	14
Group B	6	14
Group C	0	25
Group D	0	16

The greatest total number of eggs was laid in Group A (Control), but there was no evidence of any dose-related response in Groups B, C, and D. Furthermore, the number of eggs laid in these groups was well within the normal range of variation for the species. Statistical analysis of the results showed no significant differences between treatments. Also see attached Table 5.

2. Broken and Cracked Eggs - The number of eggs recorded as broken was too small to warrant analysis. These were, therefore, added to the numbers of eggs cracked and the totals were analyzed. The percentages of eggs laid which were found to be cracked or broken varied from week to week, but there did not appear to be any treatment-related effects. Statistical analysis of the results confirmed that there were no significant differences between treatments. See attached Table 6 for details.
3. Egg Weights - The total egg weight (mass) was directly related to the number of eggs laid and

there did not appear to be any treatment-related effect. Mean egg weights were similar in all groups and statistical analysis of the results confirmed that there were no significant differences between treatments. Also see attached Table 7.

4. Egg Shell Thickness - Egg shell thickness was similar in all groups and statistical analysis of the results showed no significant differences between treatments. See attached Table 8 for additional information.
5. Incubation and Hatching Results - The day 14 and day 21 candlings are summarized in the attached Table 9.
 - a. Infertile eggs - The proportions of infertile eggs varied considerably from week to week within treatment groups, tending to increase towards the end of the egg production period in Groups A, B, and C. Infertility appeared to be greater overall in Groups B and C, but statistical analysis of the results showed no significant differences between the control and treated groups.
 - b. Early embryonic deaths - The proportions of fertile eggs which showed early embryonic death at day 14 candling were generally low and there did not appear to be any differences between treatments. This was confirmed by statistical analysis of the results.
 - c. Late embryonic deaths - The proportions of fertile eggs which showed late embryonic death at day 21 candling were also generally low and there did not appear to be any differences between treatments. This was not confirmed by statistical analysis of the results. See attached Table 10 for results.
6. Hatching - Fertile eggs which subsequently hatched were similar overall in all groups and there did not appear to be any treatment-related differences. Statistical analysis confirmed no significant differences between treatment groups. These results are summarized in attached Table 11.

13. Chicks

Chick Health and Mortalities - The majority of the chicks were in good health at the time of hatching and remained so

for the duration of the 14-day observation period. Also, see attached table (above Table 12) for additional information.

Body Weight - The body weight at hatching and 14 days after hatching were within normal limits and no significant differences were noted between treatment. These results are summarized in attached Table 12.

Number of 14-Day Survivors - The percentage of ducklings surviving to 14 days was relatively high and no statistical difference between treatments was found. These results are summarized in attached Table 13.

14. Study Author's Conclusion/QA Measures

Under the conditions of this test, taking the results as a whole, there was no evidence that dietary administration of Hoe 39866 technical at dose levels of 25, 100, and 400 ppm had any adverse effects on the reproduction of mallard ducks.

To the best of their knowledge and belief the study described in this report was conducted in compliance with the following Good Laboratory Practice Standard (United States Environmental Protection Agency, Part 160 of Title 40 of the Code of Federal Regulations, FEDERAL REGISTER, November 29, 1983).

15. Reviewer's Discussion and Interpretation of the Study:

A. Test Procedures - The test procedure complied with the recommended EPA protocol of October 1982 except for the following:

- (1) No mention was made of food ad libitum for the test duration;
- (2) Temperature was 17 ± 3 °C instead of 21 °C;
- (3) Relative humidity was 77 ± 8 percent instead of 55 percent; and
- (4) Neither corn oil nor any other diluents were used for the test compound during diet preparation.

B. Statistical Analysis - The statistics were verified with Duncan's Multiple Range Test for the following reproduction parameters: Number of eggs laid, eggs set, eggs cracked or broken, early and late embryonic death, number hatched, duckling body weights, number of 14-day survivors, and egg shell thickness. This test showed no

significant difference between control and treatment groups, except for those listed below.

The statistical analysis of the results showed a significant difference in the female birds, where the mean body weights for Groups C (100 ppm) and D (400 ppm) were significantly lower ($p < 0.05$ and < 0.01 , respectively) than Group A (control) during the pre-egg production period (days 0 to 70). There was a reduction in food consumption in Group D (400 ppm).

The greatest number of eggs laid was in Group A (control), but there was no evidence of any dose-related response in Group B (25 ppm), Group C (100 ppm), and Group D (400 ppm). The number of eggs laid in these groups was well within the normal range of variation.

Summary of Statistical Analysis (ANOVA):

Eggs laid: NOEL = > 400 ppm

Eggs cracked: NOEL = > 400 ppm

Eggs set = NOEL: > 400 ppm

Viable embryos: NOEL = > 400 ppm

Live embryos: NOEL = > 400 ppm

Normal hatches: NOEL = > 400 ppm

Number of 14-Day Survivors -- *No significant different from control*
See the attached ANOVA results.

- C. Discussion/Results - Currently there was enough raw data to run all the required reproduction parameters. Based on the reported results, mortalities that occurred during the 22 weeks of testing appeared to be due to bullying by the male birds. There was one bird (No. 340 female, 6A) found that had a white lesion (approximately 10 mm) on the left kidney during the postmortem examination, but this was one of the control birds and, therefore, the lesions should not have been pesticide-related. All birds surviving the study were also examined postmortem and no abnormalities were noted.

One area of the study needs clarification--the residue analysis data for the avian feed. It is unclear, as presented in Appendix 2, what is being shown in the tables. Are these analyses of avian premix? Or are they representative samples taken from test diets during the test? When were these samples taken? Also, where are the analyses of samples taken for each dose level

during weeks 1, 12, and 22 of the main study?

D. Adequacy of the Study

1. Category - Supplemental
2. Rationale - The residue analysis and diet preparation issues presented under the Discussion/Results section above need to be clarified.
3. Reparability - With adequate clarification of the residue analysis and diet preparation issues, this study could be upgraded to Core. However, said study--since it produced only a marginal effect in adult females (bodyweight reduction during pre-egg production period at 100 ppm and 400 ppm) and not a more typical reproductive effect (e.g., reduction in number of 14-day survivors per hen)--can only be used to support label uses resulting in EECs in/or on avian food items of 400 ppm or less.

ROUTING AND TRANSMITTAL SLIP

Date

TO: (Name, office symbol, room number, building, agency/post)

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SUMMARY

HST/246

In order to investigate the dietary effects of Hoe 039866 technical on reproduction in the Mallard duck, 3 groups of 6 replicates were given the test substance at dose levels of 25 ppm, 100 ppm and 400 ppm. A further group of 6 replicates received untreated diet throughout the same period for control purposes. The diets were given over a 22-week period - 10 weeks prior to the start of egg production and 12 weeks during egg production.

The findings in the study can be summarised as follows:

At all dietary concentrations general behaviour, health condition and food consumption remained unaffected and were not impaired by treatment with Hoe 039866. Mean bodyweights of female birds at 100 ppm and 400 ppm were marginally lower than those of control birds during the pre-egg production period. No other differences in bodyweights occurred. None of the mortalities was considered to be associated with treatment and post mortem examination of birds which died during the study, and of those sacrificed at termination, indicated no treatment-related effect.

After feeding at 25 ppm, 100 ppm and 400 ppm the results of all reproductive parameters, including number of eggs laid, broken and cracked eggs, egg weights, egg shell thickness, number of infertile eggs, early and late embryonic death, hatching, chick health, chick bodyweights and number of 14-day survivors, gave no indication of any reproductive impairment.

The reproductive data are summarised below:

	Control	Hoe 039866 - Substance Technical		
		25 ppm	100 ppm	400 ppm
Eggs laid	1009	847	891	806
Eggs cracked or broken	72	38	61	75
Eggs set	859	750	761	677
Viable embryos	762	574	520	637
Live 21-day embryos	719	535	487	581
Normal hatchlings	551	373	374	398
14-day survivors	520	351	355	374
Eggs laid per hen in 12 weeks	34	28	30	27
Eggs cracked or broken of eggs laid (%)	7	4	7	9
Viable embryos of eggs set (%)	89	77	68	94
Live 21-day embryos of viable embryos (%)	94	93	94	91
Normal hatchlings of live 21-day embryos (%)	77	70	77	69
14-day survivors of normal hatchlings (%)	94	94	95	94
14-day survivors per hen	17	12	12	12

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Conclusion

Under the conditions of this test, and taking the results as a whole, there was no evidence that dietary administration of Hoe 039866 technical at dose levels of 25 ppm, 100 ppm and 400 ppm had any adverse effects on the reproduction of the Mallard duck. The high dose level of 400 ppm of

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	OBS	TRT	EL	EC	ES	VE	LE	NH
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355								
356	1	A	91	2	81	60	57	36
357	2	A	210	13	180	172	168	119
358	3	A	209	17	180	151	148	108
359	4	A	158	6	140	134	130	114
360	5	A	154	19	126	114	105	73
361	6	A	197	15	166	131	129	101
362	7	B	97	7	82	79	73	45
363	8	B	147	12	126	39	35	11
364	9	B	139	3	127	124	121	87
365	10	B	214	12	186	133	126	83
366	11	B	82	2	73	62	61	35
367	12	B	168	2	156	137	136	112
368	13	C	209	18	175	1	1	1
369	14	C	72	5	61	54	51	38
370	15	C	126	8	110	108	105	81
371	16	C	174	12	146	138	136	94
372	17	C	160	14	135	103	98	82
373	18	C	150	4	134	117	110	78
374	19	D	76	7	62	60	59	43
375	20	D	179	10	157	154	139	87
376	21	D	258	41	200	188	179	108
377	22	D	139	10	121	119	117	95
378	23	D	81	1	75	58	52	35
379	24	D	73	7	62	58	54	30

should be 1019

847 ok

891 ok

806 ok

1. ANALYSIS OF EL DATA

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GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 24

1. ANALYSIS OF EL DATA

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GENERAL LINEAR MODELS PROCEDURE

398 DEPENDENT VARIABLE: RESP

	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.	
400 SOURCE								
401								
402 MODEL	3	4257.45833333	1419.15277778	0.47	0.7052	0.066124	36.9335	
403								
404 ERROR	20	60128.50000000	3006.42500000		ROOT MSE		RESP MEAN	
405								
406 CORRECTED TOTAL	23	64385.95833333			54.83087634		148.45833333	
407								
408								
409 SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F

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 411 TRT 3 4257.4583333 0.47 0.7052 3 4257.4583333 0.47 0.7052
 412 1. ANALYSIS OF EL DATA 8:09 THURSDAY, NOVEMBER 17, 1988 4
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GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
 NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=20 MSE=3006.43

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	65.9461	69.2542	71.5411

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	169.83	6	A
	A	148.50	6	C
	A	141.17	6	B
	A	134.33	6	D

437 2. ANALYSIS OF EC DATA 8:09 THURSDAY, NOVEMBER 17, 1988 5
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GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 24

450 2. ANALYSIS OF EC DATA 8:09 THURSDAY, NOVEMBER 17, 1988 6
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GENERAL LINEAR MODELS PROCEDURE

455 DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	145.45833333	48.48611111	0.65	0.5941	0.088427	84.1342
ERROR	20	1499.50000000	74.97500000		ROOT MSE		RESP MEAN
CORRECTED TOTAL	23	1644.95833333			8.65881054		10.29166667

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	145.45833333	0.65	0.5941	3	145.45833333	0.65	0.5941

469 2. ANALYSIS OF EC DATA 8:09 THURSDAY, NOVEMBER 17, 1988 7

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GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=20 MSE=74.975

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	10.4141	10.9365	11.2977

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	12.667	6	D
	A			
	A	12.000	6	A
	A			
	A	10.167	6	C
	A			
	A	6.333	6	B

3. ANALYSIS OF ES DATA

8:09 THURSDAY, NOVEMBER 17, 1988 8

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 24

3. ANALYSIS OF ES DATA

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GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	3274.79166667	1091.59722222	0.54	0.6588	0.075241	35.1732
ERROR	20	40249.16666667	2012.45833333		ROOT MSE		RESP MEAN
CORRECTED TOTAL	23	43523.95833333			44.86043171		127.54166667

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	3274.79166667	0.54	0.6588	3	3274.79166667	0.54	0.6588

3. ANALYSIS OF ES DATA

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GENERAL LINEAR MODELS PROCEDURE

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DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=20 MSE=2012.46

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	53.9545	56.661	58.5321

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	145.50	6	A
	A			
	A	126.83	6	C
	A			
	A	125.00	6	B
	A			
	A	112.83	6	D

4. ANALYSIS OF VE DATA

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GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 24

4. ANALYSIS OF VE DATA

8:09 THURSDAY, NOVEMBER 17, 1988 12

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	5386.83333333	1795.61111111	0.81	0.5043	0.108079	45.3691
ERROR	20	44455.00000000	2222.75000000		ROOT MSE		RESP MEAN
CORRECTED TOTAL	23	49841.83333333			47.14604968		103.91666667

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	5386.83333333	0.81	0.5043	3	5386.83333333	0.81	0.5043

4. ANALYSIS OF VE DATA

8:09 THURSDAY, NOVEMBER 17, 1988 13

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,

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NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=20 MSE=2222.75

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	56.7034	59.5478	61.5143

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	127.00	6	A
	A			
	A	106.17	6	D
	A			
	A	95.67	6	B
	A			
	A	86.83	6	C

5. ANALYSIS OF LE DATA

8:09 THURSDAY, NOVEMBER 17, 1988 14

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 24

5. ANALYSIS OF LE DATA

8:09 THURSDAY, NOVEMBER 17, 1988 15

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	5141.50000000	1713.83333333	0.81	0.5007	0.108917	46.0527
ERROR	20	42064.33333333	2103.21666667			ROOT MSE	RESP MEAN
CORRECTED TOTAL	23	47205.83333333			45.86084023		99.58333333

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	5141.50000000	0.81	0.5007	3	5141.50000000	0.81	0.5007

5. ANALYSIS OF LE DATA

8:09 THURSDAY, NOVEMBER 17, 1988 16

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP

NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=20 MSE=2103.22

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NUMBER OF MEANS 2 3 4
CRITICAL RANGE 55.1577 57.9245 59.8374

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	122.83	6	A
	A			
	A	100.00	6	D
	A			
	A	92.00	6	B
	A			
	A	83.50	6	C

8:09 THURSDAY, NOVEMBER 17, 1988 17

6. ANALYSIS OF NH DATA

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 24

6. ANALYSIS OF NH DATA

8:09 THURSDAY, NOVEMBER 17, 1988 18

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	3651.00000000	1217.00000000	1.00	0.4143	0.130154	49.4275
ERROR	20	2440.35333333	1220.01666667		ROOT MSE		RESP MEAN
CORRECTED TOTAL	23	28051.33333333			34.92873697		70.66666667

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	3651.00000000	1.00	0.4143	3	3651.00000000	1.00	0.4143

6. ANALYSIS OF NH DATA

8:09 THURSDAY, NOVEMBER 17, 1988 19

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP

NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=20 MSE=1220.02

NUMBER OF MEANS 2 3 4
CRITICAL RANGE 42.0094 44.1167 45.5736

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MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	91.83	6	A
	A			
	A	66.33	6	D
	A			
	A	62.33	6	C
	A			
	A	62.17	6	B

8:09 THURSDAY, NOVEMBER 17, 1988 20

7. ANALYSIS OF ES/EL DATA

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 24

7. ANALYSIS OF ES/EL DATA

8:09 THURSDAY, NOVEMBER 17, 1988 21

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESPONSE

WEIGHT: WT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	6313.75350261	2104.58450087	1.61	0.2180	0.194756	53.0585
ERROR	20	26105.08185478	1305.25409274			ROOT MSE	RESPONSE MEAN
CORRECTED TOTAL	23	32418.83535739			36.12830044		68.09144269

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	6313.75350261	1.61	0.2180	3	6313.75350261	1.61	0.2180

7. ANALYSIS OF ES/EL DATA

8:09 THURSDAY, NOVEMBER 17, 1988 22

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE
NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=20 MSE=1305.25

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	43.4522	45.6319	47.1388

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

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DUNCAN	GROUPING	MEAN	N	TRT
	A	70.22	6	B
	A			
	A	68.01	6	A
	A			
	A	67.69	6	C
	A			
	A	67.64	6	D

7. ANALYSIS OF ES/EL DATA

8:09 THURSDAY, NOVEMBER 17, 1988 23

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V.
----- TRT=A -----									
EL	6	169.83333333	45.80574928	91.00000000	210.00000000	18.70011884	1019.00000000	2098.16666667	26.971
ES	6	145.50000000	38.39661443	81.00000000	180.00000000	15.67535220	873.00000000	1474.30000000	26.389
WT	6	169.83333333	45.80574928	91.00000000	210.00000000	18.70011884	1019.00000000	2098.16666667	26.971
Z	6	0.85923235	0.02699215	0.81818182	0.89010989	0.01101950	5.1553941	0.0007286	3.141
ARS	6	1.18748124	0.03868726	1.13028566	1.23290672	0.01579401	7.1248875	0.0014967	3.258
RESPONSE	6	68.01028941	2.21572494	64.73454256	70.61193008	0.90456592	408.0617365	4.9094370	3.258
----- TRT=B -----									
EL	6	141.16666667	47.98923490	82.00000000	214.00000000	19.59152311	847.00000000	2302.96666667	33.995
ES	6	125.00000000	42.98837052	73.00000000	186.00000000	17.54992877	750.00000000	1848.00000000	34.391
WT	6	141.16666667	47.98923490	82.00000000	214.00000000	19.59152311	847.00000000	2302.96666667	33.995
Z	6	0.88402449	0.03268149	0.84536082	0.92857143	0.01334216	5.30414696	0.0010681	3.697
ARS	6	1.22607790	0.05239955	1.16664143	1.30024656	0.02139203	7.35646739	0.0027457	4.274
RESPONSE	6	70.22082504	3.00106527	66.81673673	74.46866684	1.22517977	421.32495026	9.0063928	4.274
----- TRT=C -----									
EL	6	148.50000000	46.48333035	72.00000000	209.00000000	18.97674015	891.00000000	2160.70000000	31.302
ES	6	126.83333333	38.53007483	61.00000000	175.00000000	15.72983718	761.00000000	1484.56666667	30.379
WT	6	148.50000000	46.48333035	72.00000000	209.00000000	18.97674015	891.00000000	2160.70000000	31.302
Z	6	0.85562041	0.02255995	0.83732057	0.89300000	0.00921006	5.13372246	0.0005090	2.637
ARS	6	1.18197300	0.03312365	1.15563738	1.23809371	0.01352267	7.09183797	0.0010972	2.802
RESPONSE	6	67.69481702	1.89708198	66.18650472	70.90900336	0.77448047	406.16890215	3.5989200	2.802
----- TRT=D -----									
EL	6	134.33333333	73.91797256	73.00000000	258.00000000	30.17688593	806.00000000	5463.86666667	55.026
ES	6	112.83333333	56.94705143	62.00000000	200.00000000	23.24853639	677.00000000	3242.96666667	50.470
WT	6	134.33333333	73.91797256	73.00000000	258.00000000	30.17688593	806.00000000	5463.86666667	55.026
Z	6	0.85230381	0.05225750	0.77519380	0.92592593	0.02133404	5.11382284	0.0027308	6.131
ARS	6	1.18109791	0.07527156	1.07681237	1.29515353	0.03072949	7.08658747	0.0056658	6.373
RESPONSE	6	67.64469856	4.31100757	61.67198096	74.17697476	1.75996147	405.86819138	18.5847862	6.373

8. ANALYSIS OF VE/ES DATA

8:09 THURSDAY, NOVEMBER 17, 1988 24

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS LEVELS VALUES

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NUMBER OF OBSERVATIONS IN DATA SET = 24

8. ANALYSIS OF VE/ES DATA

8:09 THURSDAY, NOVEMBER 17, 1988 25

GENERAL LINEAR MODELS PROCEDURE

839 DEPENDENT VARIABLE: RESPONSE

840 WEIGHT: WT

841	842 SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
843	844 MODEL	3	177251.35229217	59083.78409739	1.32	0.2946	0.165646	317.6193
845	846 ERROR	20	892811.76668789	44640.58833439		ROOT MSE		RESPONSE MEAN
847	848 CORRECTED TOTAL	23	1070063.11898006			211.28319463		66.52090091

851 SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F	
852	853 TRT	3	177251.35229217	1.32	0.2946	3	177251.35229217	1.32	0.2946

8. ANALYSIS OF VE/ES DATA

8:09 THURSDAY, NOVEMBER 17, 1988 26

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE

NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=20 MSE=44640.6

865	NUMBER OF MEANS	2	3	4
866	CRITICAL RANGE	254.114	266.861	275.674

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

870	DUNCAN	GROUPING	MEAN	N	TRT
871					
872		A	76.14	6	D
873		A			
874		A	69.36	6	A
875		A			
876		A	64.71	6	B
877		A			
878		A	60.52	6	C

8. ANALYSIS OF VE/ES DATA

8:09 THURSDAY, NOVEMBER 17, 1988 27

882 VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V.
883									
884									
885	----- TRT=A -----								
886									
887 ES	6	145.50000000	38.39661443	81.00000000	180.00000000	15.67535220	873.00000000	1474.30000000	26.389
888 VE	6	127.00000000	38.27270568	60.00000000	172.00000000	15.62476666	762.00000000	1464.80000000	30.136
889 WT	6	145.50000000	38.39661443	81.00000000	180.00000000	15.67535220	873.00000000	1474.30000000	26.389

22

890 Z	6	0.86437443	0.08960318	0.74074074	0.95714286	0.03658034	5.18624657	0.0080287	10.366
891 ARS	6	1.21096428	0.13692252	1.03657028	1.36226868	0.05589838	7.26578568	0.0187478	11.307
892 RESPONSE	6	69.35522699	7.84192592	59.36720707	78.02084256	3.20145285	416.13136191	61.4958021	11.307
893									
894	----- TRT=B -----								
895									
896 ES	6	125.00000000	42.98837052	73.00000000	186.00000000	17.54992877	750.00000000	1848.0000000	34.391
897 VE	6	95.66666667	41.29729612	39.00000000	137.00000000	16.85955054	574.00000000	1705.4666667	43.168
898 WT	6	125.00000000	42.98837052	73.00000000	186.00000000	17.54992877	750.00000000	1848.0000000	34.391
899 Z	6	0.78198173	0.24987851	0.30952381	0.97637795	0.10201247	4.69189036	0.0624393	31.955
900 ARS	6	1.2982621	0.30305204	0.58998510	1.41649005	0.12372048	6.77895725	0.0918405	26.823
901 RESPONSE	6	64.70822830	17.35661667	33.79005562	81.12624831	7.08580908	388.24936982	301.2521422	26.823
902									
903	----- TRT=C -----								
904									
905 ES	6	126.83333333	38.53007483	61.00000000	175.00000000	15.72983718	761.00000000	1484.5666667	30.379
906 VE	6	86.83333333	50.36433924	1.00000000	138.00000000	20.56115539	521.00000000	2536.5666667	58.001
907 WT	6	126.83333333	38.53007483	61.00000000	175.00000000	15.72983718	761.00000000	1484.5666667	30.379
908 Z	6	0.74234686	0.36853119	0.00571429	0.98181818	0.15045223	4.45408114	0.1358152	49.644
909 ARS	6	1.05664216	0.49679731	0.07566507	1.43554437	0.20281665	6.33985294	0.2468076	47.017
910 RESPONSE	6	60.51677805	28.45293689	4.33354512	82.21754111	11.61586285	363.10066830	809.5696178	47.017
911									
912	----- TRT=D -----								
913									
914 ES	6	112.83333333	56.94705143	62.00000000	200.00000000	23.24853639	677.00000000	3242.9666667	50.470
915 VE	6	106.16666667	56.42842074	58.00000000	188.00000000	23.03680630	637.00000000	3184.1666667	53.151
916 WT	6	112.83333333	56.94705143	62.00000000	200.00000000	23.24853639	677.00000000	3242.9666667	50.470
917 Z	6	0.93015366	0.07943293	0.77333333	0.98347107	0.03242836	5.58092193	0.0063096	8.540
918 ARS	6	1.32935071	0.13572318	1.07458728	1.44187462	0.05540876	7.97610425	0.0184208	10.210
919 RESPONSE	6	76.13554057	7.77323657	61.54454413	82.58009209	3.17341054	456.81324345	60.4232067	10.210
920				9. ANALYSIS OF LE/VE DATA			8:09 THURSDAY, NOVEMBER 17, 1988 28		
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922									
923				GENERAL LINEAR MODELS PROCEDURE					
924									
925				CLASS LEVEL INFORMATION					
926									
927				CLASS	LEVELS	VALUES			
928									
929				TRT	4	A B C D			
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932				NUMBER OF OBSERVATIONS IN DATA SET = 24					
933				9. ANALYSIS OF LE/VE DATA			8:09 THURSDAY, NOVEMBER 17, 1988 29		
934				*****					
935									
936				GENERAL LINEAR MODELS PROCEDURE					
937									
938	DEPENDENT VARIABLE: RESPONSE								
939	WEIGHT: WT								
940									
941	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.	
942									
943	MODEL	3	4274.05763862	1424.68587954	0.83	0.4953	0.110180	52.7044	
944									
945	ERROR	20	34517.66739218	1725.88336961		ROOT MSE		RESPONSE MEAN	
946									
947	CORRECTED TOTAL	23	38791.72503080			41.54375247		78.82403982	
948									
949									

950 SOURCE DF TYPE I SS F VALUE PR > F DF TYPE III SS F VALUE PR > F
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 952 TRT 3 4274.05763862 0.83 0.4953 3 4274.05763862 0.83 0.4953
 953 9. ANALYSIS OF LE/VE DATA 8:09 THURSDAY, NOVEMBER 17, 1988 30
 954 *****
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GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE

NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
 NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=20 MSE=1725.88

NUMBER OF MEANS 2 3 4
 CRITICAL RANGE 49.9654 52.4718 54.2046

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	80.46	6	C
	A			
	A	79.44	6	A
	A			
	A	78.45	6	B
	A			
	A	76.69	6	D

9. ANALYSIS OF LE/VE DATA

8:09 THURSDAY, NOVEMBER 17, 1988 31

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V.
----- TRT=A -----									
981	6	127.00000000	38.27270568	60.00000000	172.00000000	15.62476666	762.00000000	1464.80000000	30.136
982	6	122.83333333	38.50930623	57.00000000	168.00000000	15.72135844	737.00000000	1482.96666667	31.351
983	6	127.00000000	38.27270568	60.00000000	172.00000000	15.62476666	762.00000000	1464.80000000	30.136
984	6	0.96380189	0.02420981	0.92105263	0.98473282	0.00988361	5.78281135	0.0005861	2.512
985	6	1.38706879	0.06062269	1.28598567	1.44691933	0.02474911	8.32241272	0.0036751	4.371
986	6	79.44121230	3.47202651	73.65190640	82.86901624	1.41744889	476.64727382	12.0549681	4.371
----- TRT=B -----									
987	6	95.66666667	41.29729612	39.00000000	137.00000000	16.85955054	574.00000000	1705.46666667	43.168
988	6	92.00000000	41.24075654	35.00000000	136.00000000	16.83646835	552.00000000	1700.80000000	44.827
989	6	95.66666667	41.29729612	39.00000000	137.00000000	16.85955054	574.00000000	1705.46666667	43.168
990	6	0.95353885	0.03742915	0.89743590	0.99270073	0.01528039	5.72123310	0.0014009	3.925
991	6	1.36983952	0.09320388	1.24479629	1.48525628	0.03805032	8.21903711	0.0086870	6.804
992	6	78.45444516	5.33804035	71.29287867	85.06467795	2.17924585	470.72667098	28.4946748	6.804
----- TRT=C -----									
993	6	86.83333333	50.36433924	1.00000000	138.00000000	20.56115539	521.00000000	2536.56666667	58.001
994	6	83.50000000	48.97652499	1.00000000	136.00000000	19.99458260	501.00000000	2398.70000000	58.655
995	6	86.83333333	50.36433924	1.00000000	138.00000000	20.56115539	521.00000000	2536.56666667	58.001
996	6	0.96563353	0.02415676	0.94017094	1.00000000	0.00986195	5.79380116	0.0005835	2.502
997	6	1.40490905	0.09435955	1.32368940	1.57079633	0.03852213	8.42945427	0.0089037	6.716
998	6	80.46297259	5.40422882	75.81130188	89.96378963	2.20626718	482.77783553	29.2056892	6.716

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1010
1011 ----- TRT=D -----
1012
1013 VE      6 106.16666667  56.42842074  58.00000000  188.00000000  23.03680630  637.00000000  3184.16666667  53.151
1014 LE      6 100.00000000  53.20150374  52.00000000  179.00000000  21.71942295  600.00000000  2830.40000000  53.202
1015 WT      6 106.16666667  56.42842074  58.00000000  188.00000000  23.03680630  637.00000000  3184.16666667  53.151
1016 Z      6  0.94147298  0.03806465  0.89655172  0.98333333  0.01553983  5.64883788  0.0014489  4.043
1017 ARS    6  1.33902481  0.08785068  1.24334190  1.44133556  0.03586489  8.03414884  0.0077177  6.561
1018 RESPONSE 6  76.68960261  5.03144797  71.20958158  82.54921820  2.05408003  460.13761564  25.3154687  6.561
1019
1020          10 ANALYSIS OF NH/LE DATA          8:09 THURSDAY, NOVEMBER 17, 1988  32
1021          ** *****
1022          GENERAL LINEAR MODELS PROCEDURE
1023
1024          CLASS LEVEL INFORMATION
1025
1026          CLASS      LEVELS      VALUES
1027
1028          TRT          4      A B C D
1029
1030
1031          NUMBER OF OBSERVATIONS IN DATA SET = 24
1032          10 ANALYSIS OF NH/LE DATA          8:09 THURSDAY, NOVEMBER 17, 1988  33
1033          *****
1034
1035          GENERAL LINEAR MODELS PROCEDURE
1036
1037 DEPENDENT VARIABLE: RESPONSE
1038 WEIGHT:      WT
1039
1040 SOURCE      DF      SUM OF SQUARES      MEAN SQUARE      F VALUE      PR > F      R-SQUARE      C.V.
1041
1042 MODEL      3      14491.55768306      4830.51922769      1.27      0.3112      0.160155      106.9074
1043
1044 ERROR      20      75992.85948656      3799.64297433      ROOT MSE      RESPONSE MEAN
1045
1046 CORRECTED TOTAL 23      90484.41716962      61.64124410      57.65852490
1047
1048
1049 SOURCE      DF      TYPE I SS      F VALUE      PR > F      DF      TYPE III SS      F VALUE      PR > F
1050
1051 TRT      3      14491.55768306      1.27      0.3112      3      14491.55768306      1.27      0.3112
1052
1053          10 ANALYSIS OF NH/LE DATA          8:09 THURSDAY, NOVEMBER 17, 1988  34
1054          *****
1055          GENERAL LINEAR MODELS PROCEDURE
1056
1057          DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE
1058          NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
1059          NOT THE EXPERIMENTWISE ERROR RATE
1060
1061          ALPHA=0.05  DF=20  MSE=3799.64
1062
1063          NUMBER OF MEANS      2      3      4
1064          CRITICAL RANGE      74.1371      77.856      80.427
1065
1066          MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.
1067
1068          DUNCAN GROUPING      MEAN      N TRT
1069

```

1070 A 65.12 6 C
 1071 A
 1072 A 59.44 6 A
 1073 A
 1074 A 54.89 6 D
 1075 A
 1076 A 52.06 6 B

10 ANALYSIS OF NH/LE DATA

8:09 THURSDAY, NOVEMBER 17, 1988 35

1080 VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V.
----- TRT=A -----									
1085 LE	6	122.83333333	38.50930623	57.00000000	168.00000000	15.72135844	737.00000000	1482.9666667	31.351
1086 NH	6	91.83333333	31.77053142	36.00000000	119.00000000	12.97026514	551.00000000	1009.3666667	34.596
1087 WT	6	122.83333333	38.50930623	57.00000000	168.00000000	15.72135844	737.00000000	1482.9666667	31.351
1088 Z	6	0.73745815	0.08416711	0.63157895	0.87692308	0.03436108	4.42474892	0.0070841	11.413
1089 ARS	6	1.03789942	0.10129917	0.91854517	1.21234629	0.04135521	6.22739654	0.0102615	9.760
1090 RESPONSE	6	59.44333059	5.80167956	52.60758712	69.43437826	2.36852576	356.65998355	33.6594857	9.760

----- TRT=B -----									
1094 LE	6	92.00000000	41.24075654	35.00000000	136.00000000	16.83646835	552.00000000	1700.8000000	44.827
1095 NH	6	62.16666667	37.90734318	11.00000000	112.00000000	15.47560805	373.00000000	1436.9666667	60.977
1096 WT	6	92.00000000	41.24075654	35.00000000	136.00000000	16.83646835	552.00000000	1700.8000000	44.827
1097 Z	6	0.61762707	0.17222321	0.31428571	0.82352941	0.07030983	3.70576240	0.0296608	27.885
1098 ARS	6	0.90895906	0.18175780	0.59512457	1.13725842	0.07420231	5.45375435	0.0330359	19.996
1099 RESPONSE	6	52.05856423	10.40976469	34.08440705	65.13389118	4.24976864	312.35138536	108.3632008	19.996

----- TRT=C -----									
1103 LE	6	83.50000000	48.97652499	1.00000000	136.00000000	19.99458260	501.00000000	2398.7000000	58.655
1104 NH	6	62.33333333	35.60149810	1.00000000	94.00000000	14.53425074	374.00000000	1267.4666667	57.115
1105 WT	6	83.50000000	48.97652499	1.00000000	136.00000000	19.99458260	501.00000000	2398.7000000	58.655
1106 Z	6	0.79225478	0.11395357	0.69117647	1.00000000	0.04652135	4.75352868	0.0129854	14.383
1107 ARS	6	1.13703340	0.22109441	0.98156886	1.57079633	0.09026141	6.82220039	0.0488827	19.445
1108 RESPONSE	6	65.12100369	12.66267961	56.21712544	89.96378963	5.16951730	390.72602214	160.3434550	19.445

----- TRT=D -----									
1112 LE	6	100.00000000	53.20150374	52.00000000	179.00000000	21.71942295	600.00000000	2830.4000000	53.202
1113 NH	6	66.33333333	34.15064665	30.00000000	108.00000000	13.94194311	398.00000000	1166.2666667	51.483
1114 WT	6	100.00000000	53.20150374	52.00000000	179.00000000	21.71942295	600.00000000	2830.4000000	53.202
1115 Z	6	0.66644385	0.09276991	0.55555556	0.81196581	0.03787316	3.99866309	0.0086063	13.920
1116 ARS	6	0.95845157	0.10164329	0.84106867	1.12228000	0.04149570	5.75070941	0.0103314	10.605
1117 RESPONSE	6	54.89313527	5.82138843	48.17029659	64.27603612	2.37657187	329.35881162	33.8885633	10.605

11 ANALYSIS OF NH/EL DATA

8:09 THURSDAY, NOVEMBER 17, 1988 36

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

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1130 NUMBER OF OBSERVATIONS IN DATA SET = 24
1131 11 ANALYSIS OF NH/EL DATA 8:09 THURSDAY, NOVEMBER 17, 1988 37
1132 *****
1133
1134 GENERAL LINEAR MODELS PROCEDURE
1135
1136 DEPENDENT VARIABLE: RESPONSE
1137 WEIGHT: WT
1138
1139 SOURCE DF SUM OF SQUARES MEAN SQUARE F VALUE PR > F R-SQUARE C.V.
1140
1141 MODEL 3 53292.57230512 17764.19076837 0.70 0.5643 0.094757 373.5765
1142
1143 ERROR 20 509119.68303783 25455.98415189 ROOT MSE RESPONSE MEAN
1144
1145 CORRECTED TOTAL 23 562412.25534295 159.54931574 42.70861017
1146
1147
1148 SOURCE DF TYPE I SS F VALUE PR > F DF TYPE III SS F VALUE PR > F
1149
1150 TRT 3 53292.57230512 0.70 0.5643 3 53292.57230512 0.70 0.5643
1151 11 ANALYSIS OF NH/EL DATA 8:09 THURSDAY, NOVEMBER 17, 1988 38
1152 *****
1153
1154 GENERAL LINEAR MODELS PROCEDURE
1155
1156 DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE
1157 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
1158 NOT THE EXPERIMENTWISE ERROR RATE
1159
1160 ALPHA=0.05 DF=20 MSE=25456
1161
1162 NUMBER OF MEANS 2 3 4
1163 CRITICAL RANGE 191.893 201.519 208.174
1164
1165 MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.
1166
1167 DUNCAN GROUPING MEAN N TRT
1168
1169 A 46.84 6 A
1170 A
1171 A 44.99 6 D
1172 A
1173 A 40.84 6 B
1174 A
1175 A 40.49 6 C
1176 11 ANALYSIS OF NH/EL DATA 8:09 THURSDAY, NOVEMBER 17, 1988 39
1177 *****
1178
1179 VARIABLE N MEAN STANDARD MINIMUM MAXIMUM STD ERROR SUM VARIANCE C.V.
1180 DEVIATION VALUE VALUE OF MEAN
1181
1182 ----- TRT=A -----
1183
1184 EL 6 169.83333333 45.80574928 91.00000000 210.00000000 18.70011884 1019.00000000 2098.1666667 26.971
1185 NH 6 91.83333333 31.77053142 36.00000000 119.00000000 12.97026514 551.00000000 1009.3666667 34.596
1186 WT 6 169.83333333 45.80574928 91.00000000 210.00000000 18.70011884 1019.00000000 2098.1666667 26.971
1187 Z 6 0.53120880 0.10925727 0.39560440 0.72151899 0.04460409 3.1872528 0.0119372 20.568
1188 ARS 6 0.81783887 0.11225046 0.68022878 1.01489043 0.04582606 4.9070332 0.0126002 13.725
1189 RESPONSE 6 46.83986240 6.42888978 38.95855750 58.12554307 2.62458326 281.0391744 41.3306238 13.725

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1190

1191

TRT=B

1192

1193 EL	6	141.16666667	47.98923490	82.00000000	214.00000000	19.59152311	847.00000000	2302.96666667	33.995
1194 NH	6	62.16666667	37.90734318	11.00000000	112.00000000	15.47560805	373.00000000	1436.96666667	60.977
1195 WT	6	141.16666667	47.98923490	82.00000000	214.00000000	19.59152311	847.00000000	2302.96666667	33.995
1196 Z	6	0.44099886	0.21106615	0.07482993	0.66666667	0.08616740	2.64599314	0.0445489	47.861
1197 ARS	6	0.71310012	0.24148855	0.27708251	0.95531662	0.09858729	4.27860073	0.0583167	33.865
1198 RESPONSE	6	40.84118876	13.83070789	15.25927076	54.71358813	5.64636285	245.04713256	191.2884808	33.865

1199

1200

TRT=C

1201

1202 EL	6	148.50000000	46.48333035	72.00000000	209.00000000	18.97674015	891.00000000	2160.70000000	31.302
1203 NH	6	62.33333333	35.60149810	1.00000000	94.00000000	14.53425074	374.00000000	1267.46666667	57.115
1204 WT	6	148.50000000	46.48333035	72.00000000	209.00000000	18.97674015	891.00000000	2160.70000000	31.302
1205 Z	6	0.45802492	0.22716568	0.00478469	0.64285714	0.09274000	2.74814949	0.0516042	49.597
1206 ARS	6	0.70694426	0.31619971	0.06922673	0.93027401	0.12908799	4.24166554	0.0999823	44.728
1207 RESPONSE	6	40.48862560	18.10961990	3.96480341	53.27932990	7.39322136	242.93175358	327.9583329	44.728

1208

1209

TRT=D

1210

1211 EL	6	134.33333333	73.91797256	73.00000000	258.00000000	30.17688593	806.00000000	5463.86666667	55.026
1212 NH	6	66.33333333	34.15064665	30.00000000	108.00000000	13.94194311	398.00000000	1166.26666667	51.483
1213 WT	6	134.33333333	73.91797256	73.00000000	258.00000000	30.17688593	806.00000000	5463.86666667	55.026
1214 Z	6	0.49948976	0.10708963	0.41095890	0.68345324	0.04371916	2.99693855	0.0114682	21.440
1215 ARS	6	0.78547545	0.10878420	0.69587959	0.97323885	0.04441097	4.71285270	0.0118340	13.849
1216 RESPONSE	6	44.98632121	6.23036807	39.85492202	55.74004347	2.54353712	269.91792725	38.8174863	13.849

QUEUE

end

QED

end nosave

READY

logoffji

RMH :PHED LOGGED OFF 11/17/88 AT 8:23:04

00:42:55 CONNECT TIME, 0:01.49 TCB, 0:00.36 SRB

EXCPS: 126 DA,0 MT,971 TERM,0 OTHER,1097 TOTAL

CHARGES: \$6.44 CONNECT, \$.40 CPU, \$.49 EXCPS

\$7.33 TOTAL CHARGE FOR SESSION

CHEMICAL: Ignite

TOTAL NUMBER OF LEVELS 4

NUMBER OF CONTROL REPLICATES: 6

CONTROL MEAN: 169.83

TOTAL NUMBER OF REPLICATES: 24

MEAN SQUARE ERROR: 3006.43

ERROR DEGREES OF FREEDOM: 20

V1 used for this calculation: 3

V2 used for this calculation: 20

PHI value used for calculation of D 1.81

MEAN 1

169.83

NUMBER OF REPLICATES: 6

MEAN 2

141.17

NUMBER OF REPLICATES: 6

MEAN 3

148.5

NUMBER OF REPLICATES: 6

MEAN 4

134.33

NUMBER OF REPLICATES: 6

GRAND MEAN: 148.4575

Calculated PHI value for the Power Test .5949631

< .35

PERCENT CHANGE DETECTION LIMIT = 19.73215

CHEMICAL: *IGNITE

TOTAL NUMBER OF LEVELS 4

NUMBER OF CONTROL REPLICATES: 6

CONTROL MEAN: 169.83

TOTAL NUMBER OF REPLICATES: 24

MEAN SQUARE ERROR: 3006.43

ERROR DEGREES OF FREEDOM: 20

V1 used for this calculation: 3

V2 used for this calculation: 20

PHI value used for calculation of D 1.81

MEAN 1
169.83
NUMBER OF REPLICATES: 6

MEAN 2
141.17
NUMBER OF REPLICATES: 6

MEAN 3
148.50
NUMBER OF REPLICATES: 6

MEAN 4
134.33
NUMBER OF REPLICATES: 6

GRAND MEAN: 148.4575

=====

Calculated PHI value for the Power Test .5949631

PERCENT CHANGE DETECTION LIMIT = 19.73215

CHEMICAL:

IGNITE

TOTAL NUMBER OF LEVELS 4
 NUMBER OF CONTROL REPLICATES: 6
 CONTROL MEAN: 12
 TOTAL NUMBER OF REPLICATES: 24
 MEAN SQUARE ERROR: 74.975
 ERROR DEGREES OF FREEDOM: 20
 V1 used for this calculation: 3
 V2 used for this calculation: 20
 PHI value used for calculation of D 1.81

MEAN 1
 12.00
 NUMBER OF REPLICATES: 6

MEAN 2
 6.33
 NUMBER OF REPLICATES: 6

MEAN 3
 10.17
 NUMBER OF REPLICATES: 6

MEAN 4
 12.67
 NUMBER OF REPLICATES: 6

GRAND MEAN: 10.2925

=====

Calculated PHI value for the Power Test .6970305

PERCENT CHANGE DETECTION LIMIT = 148.7583

CHEMICAL:

IGNITE

TOTAL NUMBER OF LEVELS 4
 NUMBER OF CONTROL REPLICATES: 6
 CONTROL MEAN: 127
 TOTAL NUMBER OF REPLICATES: 24
 MEAN SQUARE ERROR: 2222.75
 ERROR DEGREES OF FREEDOM: 20
 V1 used for this calculation: 3
 V2 used for this calculation: 20
 PHI value used for calculation of D 1.81

MEAN 1
 127.00
 NUMBER OF REPLICATES: 6

MEAN 2
 95.67
 NUMBER OF REPLICATES: 6

MEAN 3
 86.83
 NUMBER OF REPLICATES: 6

MEAN 4
 106.17
 NUMBER OF REPLICATES: 6

GRAND MEAN: 103.9175

=====

Calculated PHI value for the Power Test .7784116

PERCENT CHANGE DETECTION LIMIT = 27.89562

CHEMICAL:

IGNITE

TOTAL NUMBER OF LEVELS 4
 NUMBER OF CONTROL REPLICATES: 6
 CONTROL MEAN: 122.83
 TOTAL NUMBER OF REPLICATES: 24
 MEAN SQUARE ERROR: 2103.22
 ERROR DEGREES OF FREEDOM: 20
 V1 used for this calculation: 3
 V2 used for this calculation: 20
 PHI value used for calculation of D 1.81

MEAN 1
 122.83
 NUMBER OF REPLICATES: 6

MEAN 2
 92.00
 NUMBER OF REPLICATES: 6

MEAN 3
 83.50
 NUMBER OF REPLICATES: 6

MEAN 4
 100.00
 NUMBER OF REPLICATES: 6

GRAND MEAN: 99.58251

=====

Calculated PHI value for the Power Test .7816878

PERCENT CHANGE DETECTION LIMIT = 28.5736

MB

QUEUE
 1 464 999

SAS

15:31 TUESDAY, NOVEMBER 15, 1988 1

	OBS	TRT	EL	EC	ES	VE	LE	NH
464								
465								
466								
467								
468	1	A	91	2	81	1	3	36
469	2	A	210	13	170	4	4	119
470	3	A	209	17	176	6	3	108
471	4	A	158	6	140	3	4	
472	5	A	154	19	126	1	9	73
473	6	A	197	15	166	3	2	101
474	7	B	97	7	82	2	6	45
475	8	B	147	12	126	5	4	11
476	9	B	139	3	127	2	3	87
477	10	B	214	12	186	4	7	83
478	11	B	82	2	73	3	1	35
479	12	B	168	2	156	1	1	112
480	13	C	209	18	175	0	0	1
481	14	C	72	5	61	2	3	38
482	15	C	126	8	110	6	3	94
483	16	C	174	12	146	4	2	82
484	17	C	160	14	135	1	5	78
485	18	C	150	4	134	0	7	43
486	19	D	76	7	62	3	1	87
487	20	D	179	10	157	6	15	108
488	21	D	258	41	200	5	9	95
489	22	D	139	10	121	2	2	35
490	23	D	81	1	75	0	6	

should be 1019
 1009

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300150 81 81

1. ANALYSIS OF EL DATA

15:31 TUESDAY, NOVEMBER 15, 1988 2

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

138

NUMBER OF OBSERVATIONS IN DATA SET = 23

1. ANALYSIS OF EL DATA

15:31 TUESDAY, NOVEMBER 15, 1988 3

GENERAL LINEAR MODELS PROCEDURE

509 DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	2830.06811594	943.35603865	0.32	0.8092	0.048423	35.6549
ERROR	19	55614.36666667	2927.07192982			ROOT MSE	RESP MEAN
CORRECTED TOTAL	22	58444.43478261				54.10242074	151.73913043

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	2830.06811594	0.32	0.8092	3	2830.06811594	0.32	0.8092

446 36

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
 NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=19 MSE=2927.07

WARNING: CELL SIZES ARE NOT EQUAL.
 HARMONIC MEAN OF CELL SIZES=5.71429

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	66.8965	70.2413	72.5536

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	169.83	6	A
	A			
	A	148.50	6	C
	A			
	A	146.60	5	D
	A			
	A	141.17	6	B

2. ANALYSIS OF EC DATA

15:31 TUESDAY, NOVEMBER 15, 1988 5

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 23

2. ANALYSIS OF EC DATA

15:31 TUESDAY, NOVEMBER 15, 1988 6

GENERAL LINEAR MODELS PROCEDURE

569 DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
573 MODEL	3	172.68550725	57.56183575	+.75	0.5365	0.105705	84.0350
575 ERROR	19	1460.96666667	76.89298246		ROOT MSE		RESP MEAN
577 CORRECTED TOTAL	22	1633.65217391			8.76886438		10.43478261

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
582 TRT	3	172.68550725	0.75	0.5365	3	172.68550725	0.75	0.5365

2. ANALYSIS OF EC DATA

15:31 TUESDAY, NOVEMBER 15, 1988 7

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP

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ALPHA=0.05 DF=19 MSE=76.893

WARNING: CELL SIZES ARE NOT EQUAL.
HARMONIC MEAN OF CELL SIZES=5.71429

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	10.8425	11.3846	11.7594

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	17.800	5	D
	A			
	A	12.000	6	A
	A			
	A	10.167	6	C
	A			
	A	6.333	6	B

3. ANALYSIS OF ES DATA

15:31 TUESDAY, NOVEMBER 15, 1988 8

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 23

3. ANALYSIS OF ES DATA

15:31 TUESDAY, NOVEMBER 15, 1988 9

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	1494.24637681	498.08212560	0.26	0.8526	0.039572	33.6631
ERROR	19	36265.66666667	1908.71929825		ROOT MSE		RESP MEAN
CORRECTED TOTAL	22	37759.91304348			43.68889216		129.78260870

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	1494.24637681	0.26	0.8526	3	1494.24637681	0.26	0.8526

3. ANALYSIS OF ES DATA

15:31 TUESDAY, NOVEMBER 15, 1988 10

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=19 MSE=1908.72

WARNING: CELL SIZES ARE NOT EQUAL.

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CRITICAL RANGE 54.0204 56.7214 58.5886

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	143.17	6	A
	A			
	A	126.83	6	C
	A			
	A	125.00	6	B
	A			
	A	123.00	5	D

4. ANALYSIS OF VE DATA

15:31 TUESDAY, NOVEMBER 15, 1988 11

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 23

4. ANALYSIS OF VE DATA

15:31 TUESDAY, NOVEMBER 15, 1988 12

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	3.44637681	1.14879227	0.27	0.8453	0.041071	73.9570
ERROR	19	80.46666667	4.23508772				
CORRECTED TOTAL	22	83.91304348			2.05793288		2.78260870

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	3.44637681	0.27	0.8453	3	3.44637681	0.27	0.8453

4. ANALYSIS OF VE DATA

15:31 TUESDAY, NOVEMBER 15, 1988 13

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP

NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=19 MSE=4.23509

WARNING: CELL SIZES ARE NOT EQUAL.

HARMONIC MEAN OF CELL SIZES=5.71429

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	2.54459	2.67182	2.75977

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

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A 3.200 5 D
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A 3.000 6 A
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A 2.833 6 B
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A 2.167 6 C

5. ANALYSIS OF LE DATA

15:31 TUESDAY, NOVEMBER 15, 1988 14

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 23

5. ANALYSIS OF LE DATA

15:31 TUESDAY, NOVEMBER 15, 1988 15

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	34.51739130	11.50579710	0.99	0.4184	0.135247	78.3885
ERROR	19	220.70000000	11.61578947		ROOT MSE		RESP MEAN
CORRECTED TOTAL	22	255.21739130			3.40819446		4.34782609

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	34.51739130	0.99	0.4184	3	34.51739130	0.99	0.4184

5. ANALYSIS OF LE DATA

15:31 TUESDAY, NOVEMBER 15, 1988 16

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=19 MSE=11.6158

WARNING: CELL SIZES ARE NOT EQUAL.
HARMONIC MEAN OF CELL SIZES=5.71429

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	4.21416	4.42487	4.57053

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	6.600	5	D
	A			
	A	4.167	6	A

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GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 23

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 22 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	10909183554.8879000	3636394518.2959600	0.87	0.4737	0.126918	470.9641
ERROR	18	75045728770.0667000	4169207153.8925900		ROOT MSE		RESP MEAN
CORRECTED TOTAL	21	85954912324.9545000			64569.3979676		13710.04545455

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	10909183554.8879000	0.87	0.4737	3	10909183554.8879000	0.87	0.4737

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=18 MSE=4.2E+09

WARNING: CELL SIZES ARE NOT EQUAL.
HARMONIC MEAN OF CELL SIZES=5.45455

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	82018.3	86103.8	88926.1

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	50074	6	C
	A			
	A	87	5	A
	A			
	A	74	5	D

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GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 23

7. ANALYSIS OF ES/EL DATA

15:31 TUESDAY, NOVEMBER 15, 1988 21

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESPONSE

WEIGHT: WT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	7793.94458795	2597.98152932	1.76	0.1893	0.217286	56.6981
ERROR	19	28075.62988625	1477.66473086		ROOT MSE		RESPONSE MEAN
CORRECTED TOTAL	22	35869.57447420			38.44040493		67.79844809

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	7793.94458795	1.76	0.1893	3	7793.94458795	1.76	0.1893

7. ANALYSIS OF ES/EL DATA

15:31 TUESDAY, NOVEMBER 15, 1988 22

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE

NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=19 MSE=1477.66

WARNING: CELL SIZES ARE NOT EQUAL.

HARMONIC MEAN OF CELL SIZES=5.71429

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	47.5307	49.9073	51.5502

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	70.22	6	B
	A			
	A	67.75	5	D
	A			
	A	67.69	6	C
	A			
	A	67.14	6	A

7. ANALYSIS OF ES/EL DATA

15:31 TUESDAY, NOVEMBER 15, 1988 23

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922 ----- TRT=A -----

923									
924 EL	6	169.83333333	45.80574928	91.00000000	210.00000000	18.70011884	1019.00000000	2098.16666667	26.971
925 ES	6	143.16666667	36.02452868	81.00000000	176.00000000	14.70695225	859.00000000	1297.76666667	25.163
926 WT	6	169.83333333	45.80574928	91.00000000	210.00000000	18.70011884	1019.00000000	2098.16666667	26.971
927 Z	6	0.84810605	0.03363325	0.80952381	0.89010989	0.01373072	5.0886363	0.0011312	3.966
928 ARS	6	1.17231898	0.04773229	1.11916289	1.23290672	0.01948663	7.0339139	0.0022784	4.072
929 RESPONSE	6	67.14190545	2.73375868	64.09751073	70.61193008	1.11605231	402.8514327	7.4734365	4.072

931 ----- TRT=B -----

932									
933 EL	6	141.16666667	47.98923490	82.00000000	214.00000000	19.59152311	847.00000000	2302.96666667	33.995
934 ES	6	125.00000000	42.98837052	73.00000000	186.00000000	17.54992877	750.00000000	1848.00000000	34.391
935 WT	6	141.16666667	47.98923490	82.00000000	214.00000000	19.59152311	847.00000000	2302.96666667	33.995
936 Z	6	0.88402449	0.03268149	0.84536082	0.92857143	0.01334216	5.30414696	0.0010681	3.697
937 ARS	6	1.22607790	0.05239955	1.16664143	1.30024656	0.02139203	7.35646739	0.0027457	4.274
938 RESPONSE	6	70.22082504	3.00106527	66.81673673	74.46866684	1.22517977	421.32495026	9.0063928	4.274

940 ----- TRT=C -----

941									
942 EL	6	148.50000000	46.48333035	72.00000000	209.00000000	18.97674015	891.00000000	2160.70000000	31.302
943 ES	6	126.83333333	38.53007483	61.00000000	175.00000000	15.72983718	761.00000000	1484.56666667	30.379
944 WT	6	148.50000000	46.48333035	72.00000000	209.00000000	18.97674015	891.00000000	2160.70000000	31.302
945 Z	6	0.85562041	0.02255995	0.83732057	0.89333333	0.00921006	5.13372246	0.0005090	2.637
946 ARS	6	1.18197300	0.03312365	1.15563738	1.23809371	0.01352267	7.09183797	0.0010972	2.802
947 RESPONSE	6	67.69481702	1.89708198	66.18650472	70.90900336	0.77448047	406.16890215	3.5989200	2.802

949 ----- TRT=D -----

950									
951 EL	5	146.60000000	75.50695332	76.00000000	258.00000000	33.76773608	733.00000000	5701.30000000	51.505
952 ES	5	123.00000000	57.25818719	62.00000000	200.00000000	25.60663976	615.00000000	3278.50000000	46.551
953 WT	5	146.60000000	75.50695332	76.00000000	258.00000000	33.76773608	733.00000000	5701.30000000	51.505
954 Z	5	0.85290155	0.05840273	0.77519380	0.92592593	0.01611849	4.26450777	0.0034109	6.848
955 ARS	5	1.18288975	0.08401297	1.07681237	1.29515353	0.03757174	5.91444875	0.0070582	7.102
956 RESPONSE	5	67.74732208	4.81165210	61.67198096	74.17697476	2.15183623	338.73661042	23.1519959	7.102

8. ANALYSIS OF VE/ES DATA
 15:31 TUESDAY, NOVEMBER 15, 1988 24

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 23

8. ANALYSIS OF VE/ES DATA
 15:31 TUESDAY, NOVEMBER 15, 1988 25

GENERAL LINEAR MODELS PROCEDURE

975 DEPENDENT VARIABLE: RESPONSE

976 WEIGHT: WT

978 SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
980 MODEL	3	4596.55191389	1532.18397130	0.82	0.4964	0.115229	567.3853
982 ERROR	19	35294.06999491	1857.58263131		ROOT MSE	RESPONSE MEAN	
984 CORRECTED TOTAL	22	39890.62190880			43.09968250		7.59619317

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE
 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
 NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=19 MSE=1857.58

WARNING: CELL SIZES ARE NOT EQUAL.
 HARMONIC MEAN OF CELL SIZES=5.71429

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	53.2918	55.9564	57.7985

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	8.731	6	B
	A			
	A	8.090	5	D
	A			
	A	7.846	6	A
	A			
	A	6.398	6	C

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V.
----- TRT=A -----									
ES	6	143.16666667	36.02452868	81.00000000	176.00000000	14.70695225	859.00000000	1297.76666667	25.163
VE	6	3.00000000	1.89736660	1.00000000	6.00000000	0.77459667	18.00000000	3.60000000	63.246
WT	6	143.16666667	36.02452868	81.00000000	176.00000000	14.70695225	859.00000000	1297.76666667	25.163
Z	6	0.01956723	0.00916253	0.00703651	0.03409091	0.00374059	0.11740337	0.0000840	46.826
ARS	6	0.13700075	0.03378351	0.08920534	0.18570274	0.01379206	0.82200448	0.0011413	24.659
RESPONSE	6	7.84640640	1.93487394	5.10903331	10.63570237	0.78990898	47.07843842	3.7437372	24.659
----- TRT=B -----									
ES	6	125.00000000	42.98837052	73.00000000	186.00000000	17.54992877	750.00000000	1848.00000000	34.391
VE	6	2.83333333	1.47196014	1.00000000	5.00000000	0.60092521	17.00000000	2.16666667	51.952
WT	6	125.00000000	42.98837052	73.00000000	186.00000000	17.54992877	750.00000000	1848.00000000	34.391
Z	6	0.02480539	0.01355130	0.00641026	0.04109589	0.00553230	0.14883234	0.0001836	54.630
ARS	6	0.15244145	0.04683561	0.08014986	0.20413604	0.01912056	0.91464872	0.0021936	30.724
RESPONSE	6	8.73073779	2.68240326	4.59040125	11.69142769	1.09508655	52.38442671	7.1952873	30.724
----- TRT=C -----									
ES	6	126.83333333	38.53007483	61.00000000	175.00000000	15.72983718	761.00000000	1484.56666667	30.379
VE	6	2.16666667	2.40138849	0.00000000	6.00000000	0.98036274	13.00000000	5.76666667	110.833
WT	6	126.83333333	38.53007483	61.00000000	175.00000000	15.72983718	761.00000000	1484.56666667	30.379
Z	6	0.02035617	0.02176890	0.00000000	0.05454545	0.00888712	0.12213701	0.0004739	106.940
ARS	6	0.11171032	0.09891459	0.00000000	0.23572673	0.04038171	0.67026194	0.0097841	88.546
RESPONSE	6	6.39795488	5.66510848	0.00000000	13.50071295	2.31277085	38.38772929	32.0934541	88.546

1054 VE	5	3.20000000	2.38746728	0.00000000	6.00000000	1.06770783	16.00000000	5.70000000	74.608
1055 WT	5	123.00000000	57.25818719	62.00000000	200.00000000	25.60663976	615.00000000	3278.50000000	46.551
1056 Z	5	0.02562652	0.01881775	0.00000000	0.04838710	0.00841555	0.12813258	0.0003541	73.431
1057 ARS	5	0.14124879	0.08657041	0.00000000	0.22178441	0.03871547	0.70624396	0.0074944	61.289
1058 RESPONSE	5	8.08970359	4.95812373	0.00000000	12.70219783	2.21734034	40.44851797	24.5829910	61.289

9. ANALYSIS OF LE/VE DATA
 15:31 TUESDAY, NOVEMBER 15, 1988 28

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 23

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 10 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

9. ANALYSIS OF LE/VE DATA
 15:31 TUESDAY, NOVEMBER 15, 1988 29

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESPONSE

WEIGHT: WT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	1538.80940072	512.93646691	0.27	0.8437	0.1197	78.6875
ERROR	6	11317.04109079	1886.17351513		ROOT MSE		RESPONSE MEAN
CORRECTED TOTAL	9	12855.85049150			43.43009918		55.19313380

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	1538.80940072	0.27	0.8437	3	1538.80940072	0.27	0.8437

9. ANALYSIS OF LE/VE DATA
 15:31 TUESDAY, NOVEMBER 15, 1988 30

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE
 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
 NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=6 MSE=1886.17

WARNING: CELL SIZES ARE NOT EQUAL.
 HARMONIC MEAN OF CELL SIZES=2.4

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	97.0119	100.549	102.19

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN GROUPING	MEAN	N	TRT
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1120 A
 1121 A 62.61 2 D
 1122 A
 1123 A 44.98 2 C
 1124
 1125 9. ANALYSIS OF LE/VE DATA 15:31 TUESDAY, NOVEMBER 15, 1988 31
 1126 *****

1127 VARIABLE N MEAN STANDARD DEVIATION MINIMUM VALUE MAXIMUM VALUE STD ERROR OF MEAN SUM VARIANCE C.V.

1130 ----- TRT=A -----

1131										
1132 VE	6	3.0000000	1.8973666	1.0000000	6.0000000	0.77459667	18.0000000	3.6000000	63.246	
1133 LE	6	4.1666667	2.4832774	2.0000000	9.0000000	1.01379376	25.0000000	6.1666667	59.599	
1134 WT	6	3.0000000	1.8973666	1.0000000	6.0000000	0.77459667	18.0000000	3.6000000	63.246	
1135 Z	6	2.5833333	3.2689617	0.5000000	9.0000000	1.33454806	15.5000000	10.6861111	126.540	
1136 ARS	3	1.10383704	0.41322670	0.78539816	1.57079633	0.23857655	3.31151111	0.17075630	37.435	
1137 RESPONSE	3	63.21975752	23.66662003	44.98189481	89.96378963	13.66392944	189.65927257	560.10890355	37.435	

1139 ----- TRT=B -----

1140									
1141 VE	6	2.8333333	1.47196014	1.0000000	5.0000000	0.60092521	17.0000000	2.1666667	51.952
1142 LE	6	3.6666667	2.50333111	1.0000000	7.0000000	1.02198065	22.0000000	6.2666667	68.273
1143 WT	6	2.8333333	1.47196014	1.0000000	5.0000000	0.60092521	17.0000000	2.1666667	51.952
1144 Z	6	1.3972222	0.93276272	0.3333333	3.0000000	0.38079879	8.3833333	0.87004630	66.758
1145 ARS	3	1.09780825	0.47772680	0.61547971	1.57079633	0.27581570	3.29342475	0.22822289	43.516
1146 RESPONSE	3	62.87447256	27.36071661	35.25020150	89.96378963	15.79671710	188.62341769	748.60881332	43.516

1148 ----- TRT=C -----

1149									
1150 VE	6	2.1666667	2.40138849	0.0000000	6.0000000	0.98036274	13.0000000	5.7666667	110.833
1151 LE	6	3.3333333	2.42212028	0.0000000	7.0000000	0.98882646	20.0000000	5.8666667	72.664
1152 WT	6	2.1666667	2.40138849	0.0000000	6.0000000	0.98036274	13.0000000	5.7666667	110.833
1153 Z	4	1.8750000	2.13600094	0.5000000	5.0000000	1.06800047	7.5000000	4.5625000	113.920
1154 ARS	2	0.78539816	0.00000000	0.78539816	0.78539816	0.00000000	1.57079633	0.00000000	0.000
1155 RESPONSE	2	44.98189481	0.00000000	44.98189481	44.98189481	0.00000000	89.96378963	0.00000000	0.000

1157 ----- TRT=D -----

1158									
1159 VE	5	3.2000000	2.38746728	0.0000000	6.0000000	1.06770783	16.0000000	5.7000000	74.608
1160 LE	5	6.6000000	5.68330890	1.0000000	15.0000000	2.54165301	33.0000000	32.3000000	86.111
1161 WT	5	3.2000000	2.38746728	0.0000000	6.0000000	1.06770783	16.0000000	5.7000000	74.608
1162 Z	4	1.4083333	0.94295634	0.3333333	2.5000000	0.47147817	5.6333333	0.8891667	66.955
1163 ARS	2	1.09313802	0.67551086	0.61547971	1.57079633	0.47765831	2.18627604	0.4563149	61.796
1164 RESPONSE	2	62.60699556	38.68834919	35.25020150	89.96378963	27.35679406	125.21399112	1496.7883630	61.796

1165 10 ANALYSIS OF NH/LE DATA 15:31 TUESDAY, NOVEMBER 15, 1988 32
 1166 *****

1167
 1168 VARIABLE N MEAN STANDARD DEVIATION MINIMUM VALUE MAXIMUM VALUE STD ERROR OF MEAN SUM VARIANCE C.V.

1171 ----- TRT=A -----

1172									
1173 LE	6	4.1666667	2.4832774	2.0000000	9.0000000	1.01379376	25.0000000	6.1666667	59.599
1174 NH	5	87.4000000	33.38113240	36.0000000	119.0000000	14.92849624	437.0000000	1114.3000000	38.194
1175 WT	6	4.1666667	2.4832774	2.0000000	9.0000000	1.01379376	25.0000000	6.1666667	59.599
1176 Z	5	27.2722222	17.48021810	8.11111111	50.5000000	7.81739118	136.36111111	305.5580247	64.095
1177 ARS	0	.	.	.	.	.	.	.	.
1178 RESPONSE	0	.	.	.	.	.	.	.	.

1180 ----- TRT=B -----

1181									
1182 LE	6	3.6666667	2.50333111	1.0000000	7.0000000	1.02198065	22.0000000	6.2666667	68.273

1186	ARS	0								
1187	RESPONSE	0								
1188										
1189	----- TRT=C -----									
1190										
1191	LE	6	3.333333	2.42212	0.0000000	7.00000	0.988826	20.00000	6	72.664
1192	NH	6	50073.833333	122511.80586	1.0000000	300150.00000	50015.235306	300443.00000	15009142576	244.662
1193	WT	6	3.333333	2.42212	0.0000000	7.00000	0.988826	20.00000	6	72.664
1194	Z	5	20027.441905	44733.97232	11.14285714	100050.00000	20005.640600	100137.20952	2001128279	223.363
1195	ARS	0								
1196	RESPONSE	0								

1197										
1198	----- TRT=D -----									
1199										
1200	LE	5	6.6000000	5.68330890	1.0000000	15.0000000	2.54165301	33.0000000	32.3000000	86.111
1201	NH	5	73.6000000	32.58527275	35.0000000	108.0000000	14.57257699	368.0000000	1061.8000000	44.273
1202	WT	5	6.6000000	5.68330890	1.0000000	15.0000000	2.54165301	33.0000000	32.3000000	86.111
1203	Z	5	22.82666667	20.68595068	5.8000000	47.5000000	9.25103838	114.13333333	427.9085556	90.622
1204	ARS	0								
1205	RESPONSE	0								

1206 11 ANALYSIS OF NH/EL DATA 15:31 TUESDAY, NOVEMBER 15, 1988 33
 1207 *****

1208
 1209 GENERAL LINEAR MODELS PROCEDURE

1210 CLASS LEVEL INFORMATION

1211										
1212										
1213	CLASS	LEVELS	VALUES							
1214										
1215	TRT	4	A B C D							

1216
 1217
 1218 NUMBER OF OBSERVATIONS IN DATA SET = 23

1219
 1220
 1221 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
 1222 ONLY 21 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

1223 11 ANALYSIS OF NH/EL DATA 15:31 TUESDAY, NOVEMBER 15, 1988 34
 1224 *****

1225
 1226 GENERAL LINEAR MODELS PROCEDURE

1227
 1228 DEPENDENT VARIABLE: RESPONSE

1229 WEIGHT: WT

1230										
1231	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE		C.V.	
1232										
1233	MODEL	3	57387.94361581	19129.31453860	0.72	0.5512	0.113363		390.6137	
1234										
1235	ERROR	17	448844.94744949	26402.64396762		ROOT MSE			RESPONSE MEAN	
1236										
1237	CORRECTED TOTAL	20	506232.89106530			162.48890414			41.59835850	
1238										

1239										
1240	SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F	
1241										
1242	TRT	3	57387.94361581	0.72	0.5512	3	57387.94361581	0.72	0.5512	

1243 11 ANALYSIS OF NH/EL DATA 15:31 TUESDAY, NOVEMBER 15, 1988 35
 1244 *****

1245
 1246 GENERAL LINEAR MODELS PROCEDURE

1247
 1248 DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESPONSE

WARNING: CELL SIZES ARE NOT EQUAL.

HARMONIC MEAN OF CELL SIZES=5.21739

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	211.912	222.42	229.67

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	46.01	5	D
	A			
	A	44.58	5	A
	A			
	A	40.84	6	B
	A			
	A	37.93	5	C

11 ANALYSIS OF NH/EL DATA

15:31 TUESDAY, NOVEMBER 15, 1988 36

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V.
----- TRT=A -----									
1279 EL	6	169.83333333	45.80574928	91.00000000	210.00000000	18.70011884	1019.00000000	2098.16666667	26.971
1280 NH	5	87.40000000	33.38113240	36.00000000	119.00000000	14.92849624	437.00000000	1114.30000000	38.194
1281 WT	6	169.83333333	45.80574928	91.00000000	210.00000000	18.70011884	1019.00000000	2098.16666667	26.971
1282 Z	5	0.49314676	0.06368711	0.39560440	0.56666667	0.02848174	2.4657338	0.0040560	12.914
1283 ARS	5	0.77842855	0.06404225	0.68022878	0.85226396	0.02864057	3.8921428	0.0041014	8.227
1284 RESPONSE	5	44.58272627	3.66787450	38.95855750	48.81148124	1.64032334	222.9136314	13.4533033	8.227
----- TRT=B -----									
1288 EL	6	141.16666667	47.98923490	82.00000000	214.00000000	19.59152311	847.00000000	2302.96666667	33.995
1289 NH	6	62.16666667	37.90734318	11.00000000	112.00000000	15.47560805	373.00000000	1436.96666667	60.977
1290 WT	6	141.16666667	47.98923490	82.00000000	214.00000000	19.59152311	847.00000000	2302.96666667	33.995
1291 Z	6	0.44099886	0.21106615	0.07482993	0.66666667	0.08616740	2.64599314	0.0445489	47.861
1292 ARS	6	0.71310012	0.24148855	0.27708251	0.95531662	0.09858729	4.27860073	0.0583167	33.865
1293 RESPONSE	6	40.84118876	13.83070789	15.86927076	54.71358813	5.64636285	245.04713256	191.2884808	33.865
----- TRT=C -----									
1297 EL	6	148.500000	46.48333	72.00000000	209.00000	18.976740	891.00000	2161	31.302
1298 NH	6	50073.833333	122511.80586	1.00000000	300150.00000	50015.235306	300443.00000	15009142576	244.662
1299 WT	6	148.500000	46.48333	72.00000000	209.00000	18.976740	891.00000	2161	31.302
1300 Z	6	397.374692	972.33387	0.00478469	2382.14286	396.953642	2384.24815	945433	244.689
1301 ARS	5	0.662278	0.33169	0.06922673	0.82567	0.148334	3.31139	0	50.082
1302 RESPONSE	5	37.930485	18.99651	3.96480341	47.28846	8.495496	189.65242	361	50.082
----- TRT=D -----									
1306 EL	5	146.60000000	75.50695332	76.00000000	258.00000000	33.76773608	733.00000000	5701.30000000	51.505
1307 NH	5	73.60000000	32.58527275	35.00000000	108.00000000	14.57257699	368.00000000	1061.80000000	44.273
1308 WT	5	146.60000000	75.50695332	76.00000000	258.00000000	33.76773608	733.00000000	5701.30000000	51.505
1309 Z	5	0.51719593	0.10947110	0.41860465	0.68345324	0.04895696	2.58597965	0.0119839	21.166
1310 ARS	5	0.80339462	0.11128467	0.70363895	0.97323885	0.04976802	4.01697311	0.0123843	13.852
1311 RESPONSE	5	46.01260104	6.37357675	40.29932176	55.74004347	2.85035018	230.06300522	40.6224806	13.852

QUEUE

END

QED

Mallard Eggs Laid

344 DEVIATION 1 227 999
 227 SAS 8:11 MONDAY, JUNE 20, 1988 1
 228
 229 R
 230 R
 231 E E E E E E E E E E S S S S S S S S S S S
 232 O T S S S S S S S S S S P P P P P P P P P P P
 233 B R P P P P P P P P P P 1 1 1 1 1 1 1 1 1 2
 234 S T 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0

235																						
236	1	A	91	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
237	2	A	210	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
238	3	A	209	} 969 should be 1009.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
239	4	A	148			
240	5	A	144			
241	6	A	167			
242	7	B	97	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
243	8	B	147	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
244	9	B	139	} 827 should be 847.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
245	10	B	194			
246	11	B	82		
247	12	B	168		
248	13	C	209	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
249	14	C	72	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
250	15	C	126	} 891 OK		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
251	16	C	174		
252	17	C	160		
253	18	C	150		
254	19	D	75	} 702 should be 806		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
255	20	D	159		
256	21	D	248		
257	22	D	139		
258	23	D	81		

259 SAS 8:11 MONDAY, JUNE 20, 1988 2

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 460

273 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
 274 ONLY 23 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

275 SAS 8:11 MONDAY, JUNE 20, 1988 3

GENERAL LINEAR MODELS PROCEDURE

279 DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
283 MODEL	3	1994.18405797	664.72801932	0.25	0.8569	0.038676	34.6638
285 ERROR	19	49567.03333333	2608.79122807				49 RESP MEAN

```

286
287 CORRECTED TOTAL      22      51561.21739130      51.07632747      147.34782609
288
289
290 SOURCE              DF          TYPE I SS      F VALUE      PR > F      DF          TYPE III SS      F VALUE      PR > F
291
292 TRT                  3          1994.18405797      0.25      0.8569      3          1994.18405797      0.25      0.8569
293
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GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=19 MSE=2608.79

WARNING: CELL SIZES ARE NOT EQUAL.
HARMONIC MEAN OF CELL SIZES=5.71429

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	63.1548	66.3125	68.4955

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	161.50	6	A
	A	148.50	6	C
	A	140.40	5	D
	A	137.83	6	B

QUEUE
end
QED
P

Mallard Eggs set

fetch 3259

JES2 JOB LOG -- SYSTEM EPA2 -- NODE NCCIBM1

1
QUEUE

f 'n.c.' all

168 NOTE: COPYRIGHT (C) 1984,1986 SAS INSTITUTE INC., CARY, N.C. 27511, U.S.A.
226 CARY, N.C. 27511-8000

QUEUE

I 1.9 999

169 NOTE: THE JOB RMHXX HAS BEEN RUN UNDER RELEASE 5.16 OF SAS AT ENVIRONMENTAL PROTECTION AGENCY (01189001).

170 NOTE: CPUID VERSION = 31 SERIAL = 072402 MODEL = 3090 .

171 CPUID VERSION = 31 SERIAL = 172402 MODEL = 3090 .

172 CPUID VERSION = 31 SERIAL = 272402 MODEL = 3090 .

173 NOTE: SAS OPTIONS SPECIFIED ARE:

174 SORT=4

175		
176 1	OPTIONS LINESIZE=130;	00000050
177 2	DATA A;	00000060
178 3	INFILE INDATA MISSEVER;	00000070
179 4	INPUT TRT \$ RESP1-RESP20;	00000080

180

181 NOTE: INFILE INDATA IS:

182 DSN=RMHPHD.CL3,

183 UNIT=DISK,VOL=SER=USR085,DISP=SHR,

184 DCB=(BLKSIZE=4240,LRECL=80,RECFM=FB)

185 NOTE: 4 LINES WERE READ FROM INFILE INDATA.

186 NOTE: DATA SET WORK.A HAS 4 OBSERVATIONS AND 21 VARIABLES. 272 OBS/TRK.

187 NOTE: THE DATA STATEMENT USED 0.05 SECONDS AND 172K.

188

189 5 PROC PRINT; 00000090

190 NOTE: THE PROCEDURE PRINT USED 0.04 SECONDS AND 224K AND PRINTED PAGE 1.

191

192 6	DATA B; SET A;	00000100
193 7	DROP RESP1-RESP20;	00000110
194 8	RESP=RESP1; OUTPUT;	00000120
195 9	RESP=RESP2; OUTPUT;	00000130
196 10	RESP=RESP3; OUTPUT;	00000140
197 11	RESP=RESP4; OUTPUT;	00000150
198 12	RESP=RESP5; OUTPUT;	00000160
199 13	RESP=RESP6; OUTPUT;	00000170
200 14	RESP=RESP7; OUTPUT;	00000180
201 15	RESP=RESP8; OUTPUT;	00000190
202 16	RESP=RESP9; OUTPUT;	00000200
203 17	RESP=RESP10; OUTPUT;	00000210
204 18	RESP=RESP11; OUTPUT;	00000220
205 19	RESP=RESP12; OUTPUT;	00000230
206 20	RESP=RESP13; OUTPUT;	00000240
207 21	RESP=RESP14; OUTPUT;	00000250
208 22	RESP=RESP15; OUTPUT;	00000260
209 23	RESP=RESP16; OUTPUT;	00000270
210 24	RESP=RESP17; OUTPUT;	00000280
211 25	RESP=RESP18; OUTPUT;	00000290
212 26	RESP=RESP19; OUTPUT;	00000300
213 27	RESP=RESP20; OUTPUT;	00000310

214

215 NOTE: DATA SET WORK.B HAS 80 OBSERVATIONS AND 2 VARIABLES. 2346 OBS/TRK.

216 NOTE: THE DATA STATEMENT USED 0.04 SECONDS AND 108K.

217

218 28 PROC GLM; CLASSES TRT; MODEL RESP=TRT; 00000320

219 29 MEANS TRT/DUNCAN; 00000330

220 NOTE: THE PROCEDURE GLM USED 0.10 SECONDS AND 424K AND PRINTED PAGES 2 TO 4.

221 NOTE: SAS USED 424K MEMORY.

222 2 SAS(R) LOG 05 SAS 5.16

MVS/XA JOB RMHXX

STEP SAS

PROC SAS

12:57 THURSDAY, JUNE 2, 1988

223 SAS INSTITUTE INC.
 224 SAS CIRCLE
 225 PO BOX 8000
 226 CARY, N.C. 27511-8000

227 SAS 12:57 THURSDAY, JUNE 2, 1988 1
 228
 229 R
 230 R R R R R R R R R R E E E E E E E E E E E E E E E E
 231 E E E E E E E E E E S S S S S S S S S S S S S S S S
 232 O T S S S S S S S S S S P P P P P P P P P P P P P P P P
 233 B R P P P P P P P P P P 1 1 1 1 1 1 1 1 1 1 1 1 2
 234 S T 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0

235
 236 1 A 81 180 176 140 111 165 = 953 should be 859
 237 2 B 82 126 127 186 73 156 = 750 ok
 238 3 C 175 61 110 147 133 = 626 should be 767
 239 4 D 62 157 200 121 75 62 = 677 ok

240 SAS 12:57 THURSDAY, JUNE 2, 1988 2
 241

242 GENERAL LINEAR MODELS PROCEDURE

243 CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

250 NUMBER OF OBSERVATIONS IN DATA SET = 80

254 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
 255 ONLY 23 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

256 SAS 12:57 THURSDAY, JUNE 2, 1988 3

257 GENERAL LINEAR MODELS PROCEDURE

260 DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	2614.75072464	871.58357488	0.41	0.7494	0.060452	36.6036
ERROR	19	40638.46666667	2138.86666667		ROOT MSE		RESP MEAN
CORRECTED TOTAL	22	43253.21739130			46.24788283		126.34782609

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	2614.75072464	0.41	0.7494	3	2614.75072464	0.41	0.7494

274 SAS 12:57 THURSDAY, JUNE 2, 1988 4
 275

276 GENERAL LINEAR MODELS PROCEDURE

278 DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
 279 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
 280 NOT THE EXPERIMENTWISE ERROR RATE

282 ALPHA=0.05 DF=19 MSE=2138.87

284 WARNING: CELL SIZES ARE NOT EQUAL.
 285 HARMONIC MEAN OF CELL SIZES=5.71429

287 NUMBER OF MEANS 2 3 4
 288 CRITICAL RANGE 57.1845 60.0438 62.0203

52

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

290
.291
292
293
294
295
296
297
298
299
300
QUEUE

DUNCAN	GROUPING	MEAN	N	TRT
	A	142.17	6	A
	A			
	A	125.20	5	C
	A			
	A	125.00	6	B
	A			
	A	112.83	6	D

Mallard Eggs Cracked

fetch 2955

1

JES2 JOB LOG -- SYSTEM EPA2 -- NODE NCCIBM1

QUEUE

f 'n.c.' all

QUEUE

QUEUE

f 'n.c.' all

168 NOTE: COPYRIGHT (C) 1984,1986 SAS INSTITUTE INC., CARY, N.C. 27511, U.S.A.

226 CARY, N.C. 27511-8000

QUEUE

I 169 999

169 NOTE: THE JOB RMHXX HAS BEEN RUN UNDER RELEASE 5.16 OF SAS AT ENVIRONMENTAL PROTECTION AGENCY (01189001).

170 NOTE: CPUID VERSION = 31 SERIAL = 072402 MODEL = 3090 .

171 CPUID VERSION = 31 SERIAL = 172402 MODEL = 3090 .

172 CPUID VERSION = 31 SERIAL = 272402 MODEL = 3090 .

173 NOTE: SAS OPTIONS SPECIFIED ARE:

174 SORT=4

175

176 1 OPTIONS LINESIZE=130; 00000050

177 2 DATA A; 00000060

178 3 INFILE INDATA MISSEVER; 00000070

179 4 INPUT TRT \$ RESP1-RESP20; 00000080

180

181 NOTE: INFILE INDATA IS:

182 DSNAME=RMHPHED.CL2,

183 UNIT=DISK,VOL=SER=USR097,DISP=SHR,

184 DCB=(BLKSIZE=4240,LRECL=80,RECFM=FB)

185 NOTE: 4 LINES WERE DELETED FROM INFILE INDATA.

186 NOTE: DATA SET WORK.A HAS 4 OBSERVATIONS AND 21 VARIABLES. 272 OBS/TRK.

187 NOTE: THE DATA STATEMENT USED 0.05 SECONDS AND 172K.

188

189 5 PROC PRINT; 00000090

190 NOTE: THE PROCEDURE PRINT USED 0.05 SECONDS AND 224K AND PRINTED PAGE 1.

191

192 6 DATA B; SET A; 00000100

193 7 DROP RESP1-RESP20; 00000110

194 8 RESP=RESP1; OUTPUT; 00000120

195 9 RESP=RESP2; OUTPUT; 00000130

196 10 RESP=RESP3; OUTPUT; 00000140

197 11 RESP=RESP4; OUTPUT; 00000150

198 12 RESP=RESP5; OUTPUT; 00000160

199 13 RESP=RESP6; OUTPUT; 00000170

200 14 RESP=RESP7; OUTPUT; 00000180

201 15 RESP=RESP8; OUTPUT; 00000190

202 16 RESP=RESP9; OUTPUT; 00000200

203 17 RESP=RESP10; OUTPUT; 00000210

204 18 RESP=RESP11; OUTPUT; 00000220

205 19 RESP=RESP12; OUTPUT; 00000230

206 20 RESP=RESP13; OUTPUT; 00000240

207 21 RESP=RESP14; OUTPUT; 00000250

208 22 RESP=RESP15; OUTPUT; 00000260

209 23 RESP=RESP16; OUTPUT; 00000270

210 24 RESP=RESP17; OUTPUT; 00000280

211 25 RESP=RESP18; OUTPUT; 00000290

212 26 RESP=RESP19; OUTPUT; 00000300

213 27 RESP=RESP20; OUTPUT; 00000310

214

215 NOTE: DATA SET WORK.B HAS 80 OBSERVATIONS AND 2 VARIABLES. 2346 OBS/TRK.

216 NOTE: THE DATA STATEMENT USED 0.04 SECONDS AND 108K.

217

219 29 MEANS TRT/DUNCAN; 00000330
 220 NOTE: THE PROCEDURE GLM USED 0.10 SECONDS AND 424K AND PRINTED PAGES 2 TO 4.
 221 NOTE: SAS USED 424K MEMORY.
 222 2 SAS(R) LOG OS SAS 5.16 MVS/XA JOB RMHXX STEP SAS PROC SAS 12:49 THURSDAY, JUNE 2, 1988
 223 NOTE: SAS INSTITUTE INC.
 224 SAS CIRCLE
 225 PO BOX 8000
 226 CARY, N.C. 27511-8000

227 SAS 12:49 THURSDAY, JUNE 2, 1988 1

229											R	R	R	R	R	R	R	R	R	R
230		R	R	R	R	R	R	R	R	R	E	E	E	E	E	E	E	E	E	E
231		E	E	E	E	E	E	E	E	E	S	S	S	S	S	S	S	S	S	S
232	O	T	S	S	S	S	S	S	S	S	P	P	P	P	P	P	P	P	P	P
233	B	R	P	P	P	P	P	P	P	P	1	1	1	1	1	1	1	1	1	2
234	S	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8
235																				
236	1	A	2	13	17	6	19	14=71. ← should be 72.												
237	2	B	7	12	3	12	2	2=38. ok.												
238	3	C	18	5	8	12	14	3=60 ← should be 6!												
239	4	D	7	10	37	8	1	7=70. ← should be 76.												

240 SAS 12:49 THURSDAY, JUNE 2, 1988 2

241
 242 GENERAL LINEAR MODELS PROCEDURE
 243
 244 CLASS LEVEL INFORMATION
 245
 246 CLASS LEVELS VALUES
 247
 248 TRT 4 A B C D
 249
 250
 251 NUMBER OF OBSERVATIONS IN DATA SET = 80
 252
 253

254 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
 255 ONLY 24 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

256 SAS 12:49 THURSDAY, JUNE 2, 1988 3

257
 258 GENERAL LINEAR MODELS PROCEDURE
 259

260 DEPENDENT VARIABLE: RESP

261																				
262	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.												
263																				
264	MODEL	3	117.45833333	39.15277778	0.60	0.6226	0.082545	81.1310												
265																				
266	ERROR	20	1305.5000000	65.27500000		ROOT MSE		RESP MEAN												
267																				
268	CORRECTED TOTAL	23	1422.95833333			8.07929452		9.95833333												

270																				
271	SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F											
272																				
273	TRT	3	117.45833333	0.60	0.6226	3	117.45833333	0.60	0.6226											

274 SAS 12:49 THURSDAY, JUNE 2, 1988 4

275
 276 GENERAL LINEAR MODELS PROCEDURE
 277
 278 DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
 279 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
 280 NOT THE EXPERIMENTWISE ERROR RATE

281
 282 ALPHA=0.05 DF=20 MSE=65.275
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CRITICAL RANGE 9.71712 10.2046 10.5415

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

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QUEUE

DUNCAN	GROUPING	MEAN	N	TRT
	A	11.833	6	A
	A			
	A	11.667	6	D
	A			
	A	10.000	6	C
	A			
	A	6.333	6	B

290
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A
A
A
A
A
A
A

1061.33
1013.17
1010.67
960.67

6 A
6 D
6 B
6 C

QUEUE

21-Day Embryonic Deaths (MD)

1 227 999

CDS

		SAS										8:51 MONDAY, JUNE 6, 1988										1										
227												R	R	R	R	R	R	R	R	R	R											
228												E	E	E	E	E	E	E	E	E	E											
229												S	S	S	S	S	S	S	S	S	S											
230		R	R	R	R	R	R	R	R	R	R	E	E	E	E	E	E	E	E	E	E											
231		E	E	E	E	E	E	E	E	E	E	S	S	S	S	S	S	S	S	S	S											
232	0	T	S	S	S	S	S	S	S	S	S	P	P	P	P	P	P	P	P	P	P											
233	B	R	P	P	P	P	P	P	P	P	P	1	1	1	1	1	1	1	1	1	1											
234	S	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9											
235																																
236	1	A	3	4	3	4	9	2	.	.	.	.	.	.	.	.	.	.	.	.	.
237	2	B	6	4	3	7	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.
238	3	C	3	3	2	5	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.
239	4	D	1	15	9	2	6	4	.	.	.	.	.	.	.	.	.	.	.	.	.

240 SAS 8:51 MONDAY, JUNE 6, 1988 2

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 80

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 23 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

256 SAS 8:51 MONDAY, JUNE 6, 1988 3

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	22.73913043	7.57971014	0.68	0.5773	0.096459	74.0470
ERROR	19	213.00000000	11.21052632		ROOT MSE		RESP MEAN.
CORRECTED TOTAL	22	235.73913043			3.34821241		4.52173913

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	22.73913043	0.68	0.5773	3	22.73913043	0.68	0.5773

274 SAS 8:51 MONDAY, JUNE 6, 1988 4

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
 NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=19 MSE=11.2105

WARNING: CELL SIZES ARE NOT EQUAL.
 HARMONIC MEAN OF CELL SIZES=5.71429

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	4.13999	4.34699	4.49009

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

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QUEUE

DUNCAN	GROUPING	MEAN	N	TRT
	A	6.167	6	D
	A			
	A	4.167	6	A
	A			
	A	4.000	5	C
	A			
	A	3.667	6	B

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QUEUE

NUMBER OF MEANS 2 3 4
CRITICAL RANGE 42.1045 44.2165 45.6767

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	92.33	6	A
	A			
	A	66.33	6	D
	A			
	A	62.33	6	C
	A			
	A	62.17	6	B

L7

of 14-Day Surviving (M D)

fetch 6306

1 JES2 JOB LOG -- SYSTEM EPA2 -- NODE NCCIBM1

QUEUE

1 227 999

227 SAS 8:52 MONDAY, JUNE 6, 1988 1

228

229 R

230 E E E E E E E E E E S S S S S S S S S S S S S

231 O T S S S S S S S S S S P P P P P P P P P P P P P

232 B R P P P P P P P P P P 1 1 1 1 1 1 1 1 1 1 2

233 S T 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0

235

236 1 A 36 115 98 110 70 91 = 520 .ok

237 2 B 40 11 84 82 28 96 = 341 .should be 351

238 3 C 37 77 89 81 73 . = 357 .should be 355

239 4 D 40 84 99 92 30 34 = 379 . should. be 374

240 SAS 8:52 MONDAY, JUNE 6, 1988 2

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 80

254 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
 255 ONLY 23 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

256 SAS 8:52 MONDAY, JUNE 6, 1988 3

GENERAL LINEAR MODELS PROCEDURE

260 DEPENDENT VARIABLE: RESP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	2989.45217391	996.48405797	1.11	0.3711	0.148687	43.2265
ERROR	19	17116.20000000	900.85263158			ROOT MSE	RESP MEAN
CORRECTED TOTAL	22	20105.65217391				30.01420716	69.43478261

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
TRT	3	2989.45217391	1.11	0.3711	3	2989.45217391	1.11	0.3711

274 SAS 8:52 MONDAY, JUNE 6, 1988 4

GENERAL LINEAR MODELS PROCEDURE

278 DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
 279 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,

ALPHA=0.05 DF=19 MSE=900.853

WARNING: CELL SIZES ARE NOT EQUAL.
HARMONIC MEAN OF CELL SIZES=5.71429

NUMBER OF MEANS 2 3 4
CRITICAL RANGE 37.1119 38.9675 40.2503

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	86.67	6	A
	A			
	A	71.40	5	C
	A			
	A	63.17	6	D
	A			
	A	56.83	6	B

QUEUE

Egg Shell Thickness (MD)

fetch 6318

1 JES2 JOB LOG -- SYSTEM EPAG -- NODE NCCIBM1

QUEUE

1 225 999

225 PD BOX 8000
226 CARY, N.C. 27511-8000

227 SAS 8:57 MONDAY, JUNE 6, 1988 1

229										R	R	R	R	R	R	R	R	R	R	R
230		R	R	R	R	R	R	R	R	E	E	E	E	E	E	E	E	E	E	E
231		E	E	E	E	E	E	E	E	S	S	S	S	S	S	S	S	S	S	S
232	O	T	S	S	S	S	S	S	S	S	P	P	P	P	P	P	P	P	P	P
233	B	R	P	P	P	P	P	P	P	1	1	1	1	1	1	1	1	1	1	2
234	S	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8

235																				
236	1	A	32	34	33	34	32	32	.	.	.	.	.	.	.	.	.	.	.	.
237	2	B	35	34	34	35	33	34	.	.	.	.	.	.	.	.	.	.	.	.
238	3	C	35	34	31	33	34	33	.	.	.	.	.	.	.	.	.	.	.	.
239	4	D	34	34	35	32	33	32	.	.	.	.	.	.	.	.	.	.	.	.

240 SAS 8:57 MONDAY, JUNE 6, 1988 2

241
242 GENERAL LINEAR MODELS PROCEDURE

243
244 CLASS LEVEL INFORMATION

245	CLASS	LEVELS	VALUES
246	TRT	4	A B C D

247
248
249
250
251 NUMBER OF OBSERVATIONS IN DATA SET = 80

252
253
254 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
255 ONLY 24 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

256 SAS 8:57 MONDAY, JUNE 6, 1988 3

257
258 GENERAL LINEAR MODELS PROCEDURE

259
260 DEPENDENT VARIABLE: RESP

261	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
262	MODEL	3	5.50000000	1.83333333	1.51	0.2433	0.184358	3.3008
263	ERROR	20	24.33333333	1.21666667		ROOT MSE		RESP MEAN
264	CORRECTED TOTAL	23	29.83333333			1.10302614		33.41666667

265	SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
266	TRT	3	5.50000000	1.51	0.2433	3	5.50000000	1.51	0.2433

267 SAS 8:57 MONDAY, JUNE 6, 1988 4

268
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270
271 GENERAL LINEAR MODELS PROCEDURE

272
273 DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
274
275 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE.

65

NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=20 MSE=1.21667

NUMBER OF MEANS 2 3 4
CRITICAL RANGE 1.32663 1.39318 1.43918

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	34.1667	6	B
	A	33.3333	6	D
	A	33.3333	6	C
	A	32.8333	6	A

QUEUE

Food Consumption (g/bird/day - MD)

fetch 6320

JES2 JOB LOG -- SYSTEM EPAG -- NODE NCCIBM1

1
QUEUE

1 227 999

227	SAS																		8:58 MONDAY, JUNE 6, 1988			1												
228																				R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
229																				E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
230																				E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
231																				S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
232	D	T	S	S	S	S	S	S	S	S	S	S	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
233	B	R	P	P	P	P	P	P	P	P	P	P	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2				
234	S	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0												
235																																		
236	1	A	3385	4366	4412	3647	3254	3630	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
237	2	B	3331	3267	3792	4307	3873	3657	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
238	3	C	4316	3320	3713	4062	4388	3666	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
239	4	D	3665	3867	4058	4471	4296	3802	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

240 SAS 8:58 MONDAY, JUNE 6, 1988 2

241

242 GENERAL LINEAR MODELS PROCEDURE

243

244 CLASS LEVEL INFORMATION

245

246	CLASS	LEVELS	VALUES
247			
248	TRT	4	A B C D

249

250

251 NUMBER OF OBSERVATIONS IN DATA SET = 80

252

253

254 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,

255 ONLY 24 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

256 SAS 8:58 MONDAY, JUNE 6, 1988 3

257

258 GENERAL LINEAR MODELS PROCEDURE

259

260 DEPENDENT VARIABLE: RESP

261	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
262	MODEL	3	362735.79166667	120911.93055556	0.74	0.5432	0.099346	10.5158
263	ERROR	20	3288487.16666671	164424.35833334		ROOT MSE		RESP MEAN
264	CORRECTED TOTAL	23	3651222.95833337			405.49273524		3856.04166667

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271	SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
272	TRT	3	362735.79166667	0.74	0.5432	3	362735.79166667	0.74	0.5432

273

274 SAS 8:58 MONDAY, JUNE 6, 1988 4

275

276 GENERAL LINEAR MODELS PROCEDURE

277

278 DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP

279 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,

280 NOT THE EXPERIMENTWISE ERROR RATE

281

282 ALPHA=0.05 DF=20 MSE=164424

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QUEUE

NUMBER OF MEANS 2 3 4
CRITICAL RANGE 487.694 512.158 529.071

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	4026.5	6	D
	A			
	A	3910.8	6	C
	A			
	A	3782.3	6	A
	A			
	A	3704.5	6	B

Body Weight (MD)

fetch 3829

1 JES2 JOB LOG -- SYSTEM EPA2 -- NODE NCCIBM1

QUEUE

f 'n.c.' all

168 NOTE: COPYRIGHT (C) 1984,1986 SAS INSTITUTE INC., CARY, N.C. 27511, U.S.A.

226 CARY, N.C. 27511-8000

QUEUE

1 227 999

227											SAS											7:47 FRIDAY, JUNE 10, 1988	1
228																							
229											R	R	R	R	R	R	R	R	R	R	R	R	
230		R	R	R	R	R	R	R	R	R	E	E	E	E	E	E	E	E	E	E	E		
231		E	E	E	E	E	E	E	E	E	S	S	S	S	S	S	S	S	S	S	S		
232	O	T	S	S	S	S	S	S	S	S	P	P	P	P	P	P	P	P	P	P	P		
233	B	R	P	P	P	P	P	P	P	P	1	1	1	1	1	1	1	1	1	1	1		
234	S	T	1	2	3	4	5	6	7	8	0	1	2	3	4	5	6	7	8	9	0		
235																							
236	1	A	416	385	421	627	414	402	479	485	427	424	428	579	486	440	446	467	514	44	.	.	
237	2	B	406	486	477	436	474	412	406	439	396	475	413	466	433	409	434	376	536	48	.	.	
238	3	C	275	486	571	497	425	544	480	428	468	473	448	455	461	456	434	433	417	46	.	.	
239	4	D	405	484	441	470	443	456	434	414	407	441	480	498	410	448	489	420	487	38	.	.	
240											SAS											7:47 FRIDAY, JUNE 10, 1988	2
241																							
242	GENERAL LINEAR MODELS PROCEDURE																						
243																							
244	CLASS LEVEL INFORMATION																						
245																							
246	CLASS LEVELS VALUES																						
247																							
248	TRT 4 A B C D																						
249																							
250																							
251	NUMBER OF OBSERVATIONS IN DATA SET = 80																						
252																							
253																							
254	NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,																						
255	ONLY 72 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.																						
256											SAS											7:47 FRIDAY, JUNE 10, 1988	3
257																							
258	GENERAL LINEAR MODELS PROCEDURE																						
259																							
260	DEPENDENT VARIABLE: RESP																						
261																							
262	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.															
263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	
	MODEL	3	4167.66666667	1389.22222222	0.12	0.9489	0.005205	25.2457															
	ERROR	68	796592.77777778	11714.59967320		ROOT MSE		RESP MEAN															
	CORRECTED TOTAL	71	800760.44444445			108.23400424		428.72222222															
	SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F														
	TRT	3	4167.66666667	0.12	0.9489	3	4167.66666667	0.12	0.9489														
											SAS											7:47 FRIDAY, JUNE 10, 1988	4
	GENERAL LINEAR MODELS PROCEDURE																						
	DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP																						

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QUEUE

NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
NOT THE EXPERIMENTWISE ERROR RATE

ALPHA=0.05 DF=68 MSE=11714.6

NUMBER OF MEANS	2	3	4
CRITICAL RANGE	72.0537	75.7649	78.1941

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	438.00	18	A
	A			
	A	433.17	18	C
	A			
	A	425.83	18	D
	A			
	A	417.89	18	B

pr on
Q2702 PRINT COMMAND NOT AVAILABLE TO TELETYPE USERS
QUEUE

1 227 999

227																								SAS			9:13 THURSDAY, JANUARY 19, 1989	1
228																												
229												R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
230			R	R	R	R	R	R	R	R	R	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
231			E	E	E	E	E	E	E	E	E	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
232	O	T	S	S	S	S	S	S	S	S	S	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
233	B	R	P	P	P	P	P	P	P	P	P	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
234	S	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0						
235																												
236	1	A	39	55	47	70	45	46	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
237	2	B	41	7	60	38	34	63	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
238	3	C	4	51	61	51	51	47	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
239	4	D	53	47	38	66	37	40	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

240 SAS 9:13 THURSDAY, JANUARY 19, 1989 2

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TRT	4	A B C D

NUMBER OF OBSERVATIONS IN DATA SET = 80

254 NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER,
255 ONLY 24 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

256 SAS 9:13 THURSDAY, JANUARY 19, 1989 3

GENERAL LINEAR MODELS PROCEDURE

260 DEPENDENT VARIABLE: RESP

261								
262	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
263								
264	MODEL	3	311.45833333	103.81944444	0.39	0.7615	0.055263	35.8931
265								
266	ERROR	20	5324.50000000	266.22500000		ROOT MSE		RESP MEAN
267								
268	CORRECTED TOTAL	23	5635.95833333			16.31640279		45.45833333
269								
270								

271	SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
272									
273	TRT	3	311.45833333	0.39	0.7615	3	311.45833333	0.39	0.7615

274 SAS 9:13 THURSDAY, JANUARY 19, 1989 4

GENERAL LINEAR MODELS PROCEDURE

278 DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: RESP
279 NOTE: THIS TEST CONTROLS THE TYPE I COMPARISONWISE ERROR RATE,
280 NOT THE EXPERIMENTWISE ERROR RATE

281 ALPHA=0.05 DF=20 MSE=266.225

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NUMBER OF MEANS 2 3 4
CRITICAL RANGE 19.624 20.6084 21.289

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

DUNCAN	GROUPING	MEAN	N	TRT
	A	50.333	6	A
	A			
	A	46.833	6	D
	A			
	A	44.167	6	C
	A			
	A	40.500	6	B

QUEUE