Appendix A

PROCEDURE FOR TESTS PERFORMED ON FIELD SAMPLES BY A/C CONTENT NUCLEAR GAUGE

I. Determination of Base Weight

A. Base weight is the amount of oven dried aggregate that is required to fill the sample pan level full. This establishes the weight to be used for preparation of calibration and test samples for a specific mix design. Any change in mix class will require a new base weight. This weight will generally be between 6,000 and 8,000 grams.

B. The base weight will be determined by taking oven dried aggregate which has been combined in the proportions designated by the mix design. Tare the sample pan and fill it one half full. Lift the sample pan about an inch above the table top and drop twice. After leveling materials with a spoon, overfill the sample pan and repeat dropping procedure. Fill in the corners and any void areas that might exist. Place a straight edge at one end of the sample pan and with a sawing motion strike it off. Fill in any voids that might exist after striking off. Weigh the sample to determine the base weight.

II. Calibration of Sample

It is recommended that calibration samples be fabricated at the Materials Laboratory in Salem. The nuclear A/C gauge is calibrated using three samples. Samples asphalt contents are prepared at both one percent above and below the design asphalt content, and one at the recommended asphalt content. Aggregate samples are batched out in the mix design proportions with sufficient quantity to equal base weight. Samples are dried overnight in a 325° F oven. Dry weight of aggregate is determined, and asphalt content is calculated using the following formula:

$$\text{Desired Asphalt Weight} = \frac{\text{Aggregate Weight X \% Asphalt}}{\text{100 - \% Asphalt}} \text{X100}$$

Calibration samples are mixed and fabricated into sample pans in three lifts. Obtain base weight and level surface while filling in corners. Use a board to compact the mix into the sample pan by standing on it. Determine if sample weight is within desired tolerance, base weight ± 5 grams.

The calibration samples are run in the asphalt gauge for a 16 minute count as described in the operators manual. The calibration points should be plotted on a graph showing counts-per-minute on the Y axis versus % asphalt on the X axis. This can be used to check your calibration when running field samples.

III. Sampling Procedures for Plant Mix

Samples will be obtained and quartered by OSHD TM 368-85, Section 4.3. This covers sampling from the vehicle transporting mix from the plant. The Sample size must be large enough for a 1,000 grams moisture sample (OSHD TM 311M-87) and 8,000 grams for the A/C content gauge. The mix shall be placed in the sample pan following the same procedures used for the calibration samples.

IV. Gauge Operation for Field Samples

Standard counts shall be taken daily and whenever there is a change in the environment. Any hydrogen sources such as coffee cups, water jugs, etc., should be kept at least 10 feet away from the gauge.

The field sample will be placed in the gauge and run according to the operators manual for one four minute count. You can also use four, four-minute counts and average the results for greater accuracy. The attached form can be used to record the results.

The results shall be corrected for moisture content by subtracting the moisture content of the sample on a 1:1 basis (one percent moisture in the sample will read as 1% asphalt). The moisture shall be determined by OSHD TM 311M-87.

Appendix B

PROCEDURE FOR DETERMINING BITUMEN BY NUCLEAR ASPHALT CONTENT GAUGE

Scope

1.1 This method is to provide a procedure for determining asphalt content of bituminous mixtures by neutron moderation analysis.

Determination of Base Weight

2.1 The base weight is determined by using oven dried aggregate which has been combined to mix design proportions. Tare the sample pan and fill one-third full with dried aggregate. Lift the sample pan about an inch above the table top, drop twice, and level surface. Fill sample pan two-thirds full, drop twice, and level surface. Overfill the sample pan, place a straight edge at one end, and strike off with a sawing motion to prepare the final lift. Fill in any voids that might exist after striking off. Weigh and record base weight. Base weight is the amount of bituminous mixture required for subsequent calibration and test samples. This will generally be between 6,000 and 8,000 grams.

Calibration of Sample

3.1 The nuclear gauge is calibrated using a three point calibration curve. The three points are one percent above the design asphalt content, one percent below, and at the design asphalt content. Batch aggregate samples according to mix design proportions and dry overnight in a 325° F oven. Weigh and calculate asphalt weight using the following formula:

$$\text{Desired Asphalt Weight} = \frac{\text{Aggregate Weight X \% Asphalt}}{100 - \text{\% Asphalt}} \text{X100}$$

Mix and prepare samples following similar procedure used for the base weight determination. To prepare the final lift, weigh bituminous mixture to equal base weight. Use metal plate to compact top lift. Verify that the sample is equal to the base weight within ±1 grams. Establish a base line moisture by maintaining the sample at 325° F. Test samples will be corrected back to this base line moisture. Establish calibration curve by performing a 16 minute count on each calibration point. Save the calibration pan that contains the design asphalt content, which is the center point of the curve, for a future

field reference sample. Plot calibration curve on a graph showing counts-per-minute on the Y axis versus % asphalt on the X axis. Reference the curve when performing field samples.

Gauge Setup For Field Operation

4.1 Setup and maintain gauge out of the normal work area of the test trailer. Any hydrogen sources i.e. water jugs, personnel, are kept at least five feet away. **Walk away from the gauge while it is operating.**

4.2 Perform standard count and check chi ratio. Standard counts will be taken twice daily. Perform standard count first in the morning and once in the afternoon. Also perform standard count whenever there is a change in the environment.

4.3 Insure the gauge is on the proper calibration curve.

4.4 Check the field setup by determining the asphalt content of the known sample saved when calibration was performed. Moisture of this sample is calculated from the relative comparison of sample weight to the base weight.

Sampling & Testing Bituminous Mixture

5.1 A representative sample will be obtained and quartered by OSHD TM 368-85. The mix will be placed in a homogenous mass and transported to the testing facility in a manner that will minimize temperature loss. Expedite mixing and splitting of sample to minimize sample cooling.

5.2 Prepare the field control samples as the calibration samples were prepared.

5.3 Recommended test duration is sixteen minutes.

5.4 Split, weigh, and record, immediately after asphalt determination, a 1000 gram moisture sample taken from the test sample. Place moisture sample in 325° F oven for 24 hours.

5.5 After 24 hours weigh moisture sample, and calculate moisture content. Subtract moisture from gauge reading to determine asphalt content.

5.6 Correlate test results to all other testing e.g. vacuum extraction, tank sticking, and asphalt metering.

Appendix C **OSHD TM319**

Method of Test for

Asphalt Content of Bituminous Mixtures by Nuclear Method

GENERAL DESCRIPTION OF PROCEDURE

1. **SCOPE**

   A. This method is a procedure for a rapid, safe, and accurate determination of asphalt content by utilizing neutron thermalization techniques. It encompasses both Central Laboratory Procedure and Field Operation Procedure.

2. **SIGNIFICANCE AND USE**

   A. This procedure utilizes a transfer routine to calibrate Field gauges from constants derived from the Master gauge located at the Materials Laboratory (Salem). Annually every Field gauge will be standardized (cross calibrated) to the Master gauge.

   B. Unless the test sample is completely free of moisture, the moisture percentage must be determined per OSHD TM 311(N) and a correction made to directly compensate the asphalt reading for moisture content.

3. **APPARATUS**

   A. While exact details of construction for the apparatus may vary, the system shall consist of the following items:

      1. **Neutron Source** - A double encapsulated 100mCi - 300mCi Americium - Beryllium radioactive source.

      2. **Detectors** - Helium^3 or boron trifluoride.

      3. **Read-Out** - Automatic direct sunlight LCD to display percent asphalt

      4. **Printer/Computer** - Easy-to-use downloading feature compatible with printer or IBM PC computer.

      5. **Precision** - Limit is $\pm$0.050 % at four min. count and $\pm$0.025 % at sixteen min count based on 6.0% AC.

4. EQUIPMENT

A. The following is a list of the equipment required to perform this test.

1. Asphalt Content Gauge (Meets ASTM D4125)

2. Sample Pans (4) four

3. Balance (Weighing capacity 10K sensitive to 0.2 g)

4. Conventional horizontal flow oven (Capable of maintaining 350° ±5°F.

5. Straightedge

6. Minimum 3/4" plywood or 3/8" metal plate sized to compact sample

7. Assorted spoons, spatulas, pans, and bowls.

MATERIALS LABORATORY PROCEDURE

5. PROCEDURE FOR DETERMINATION OF BASE WEIGHT

NOTE: Base weight is defined as the amount of oven dried aggregate, combined at mix design proportions, that is required to fill the sample pan level full. Henceforth all samples (calibration and test) will be prepared to equal the base weight within ±1 gram. The procedure to prepare the blank sample and determine the base weight is outlined as follows:

A. Batch aggregate to mix design proportions and oven dry overnight at 325° ±5°F.

B. Obtain sample pan tare weight, and fill pan one-third full with dried aggregate. Lift sample pan about inch above surface and drop twice.

C. Level aggregate with spoon, and fill pan two-thirds full. Lift sample pan about inch above surface and drop twice.

D. Level aggregate with spoon, and overfill the pan. Place a straight edge at one end of the sample pan and with a sawing motion strike it off. Fill in any voids.

E. Weigh and subtract tare weight. Record value to nearest 5 grams. This establishes the base weight.

F. Store blank sample at 250° ±9°F oven for use in checking aggregate uniformity.

6. **CROSS CALIBRATION**

NOTE: Cross calibration is the calibration of both Master and Field Gauges with identical samples. This establishes a relational curve for both gauges which is stored on the field gauge.

A. Heat aggregate to 325° ±5°F.

B. Calculate five samples at 0.5% asphalt content increments, ranging from 5.0 to 7.0, and proportion a minimum quantity to equal base weight.

C. Calculate the % of asphalt based on total weight of mixture. Formula for determining weight of asphalt is:

$$\text{Asphalt Weight} = \frac{\text{Aggregate weight X \% Asphalt}}{\text{\% Aggregate}} \text{ X } 100$$

D. Mix and place material into pan in three layers. Each layer is leveled with spoon to fill voids in corners.

E. Temperature of sample shall be 250° ±10°F.

F. Use plate to compact final lift. Weigh sample and adjust weight to equal base weight ±1 gram.

G. Calibrate master and field gauges with sixteen minute count by following manufacture instructions.

7. **CALIBRATION OF JOB MIX FORMULA**

NOTE: It is recommended that the initial calibration samples be fabricated at the Materials Laboratory (Salem) in conjunction with the preparation of each job mix formula. Field calibration is necessary, e.g. when the Salem lab does not perform the mix design or when a change is made in the design parameters. The gauge is calibrated using a minimum of three points. One sample shall represent the design asphalt content while the other two are one percent below and above the design sample.

A. Batch aggregate to mix design proportions and oven dry overnight at 325° ±5°F. Heat asphalt at 300° ±5°F.

B. Mix samples using desired asphalt contents and follow the same procedure as in cross calibration section (6D-6G).

C. Match base weight within ±1 gram.

D. Perform calibration on Master gauge and send calibration data to field for calibration of Field gauge.

8. AGGREGATE UNIFORMITY

NOTE: This is a quantitative determination of the difference in aggregate counts between blank (base weight) and blank test (final belt) samples to verify that the aggregate used in production of asphaltic concrete is substantially the same as the aggregate used for the preparation of the calibration curve.

A. Measure background count and select appropriate calibration curve.

B. Obtain blank sample saved in 5F and perform eight minute count

C. Record blank sample count. All subsequent field test shall be within ±1.5% of the blank sample count.

FIELD OPERATION PROCEDURE

9. SETUP OF FIELD GAUGE

A. Setup and maintain gauge out of the congested area inside the test trailer. Any hydrogen sources, e.g. water reservoirs, personnel, are kept at least five feet away. **Walk away from gauge while it is operating.**

B. Perform at least three background counts to establish an average value and determine standard deviation (sd), subsequently determine (sd) on running average. The background count shall be within 2 sd of mean before it is accepted.

10. CALIBRATION OF FIELD GAUGE

A. Use calibration data supplied in item 7D above, which is listed on preliminary bituminous sheet, and program field gauge via calibration transfer routine.

B. Check aggregate uniformity by running a blank test sample and comparing against value from 8C. If check does not comply within tolerance, another calibration shall be performed.

11. FIELD GAUGE TESTING ROUTINE

A. Perform background count twice daily, once in morning and once in afternoon, and whenever there is a sudden change in the environment.

B. Insure proper calibration curve is prompted.

C. Obtain sample of mixture from the plant, and split sample for moisture and nuclear gauge.

D. Using the split portion obtain a moisture content by OSHD TM 311(N).

E. Prepare test sample by simulating the procedure in preparing calibration samples (6D through 6F).

F. Eight minute count time shall be used to perform test.

G. The asphalt content shall be corrected for moisture content on a 1:1 basis.

Appendix D **OSHD TM311(N)**

Method of Test for

Moisture Correction for Bituminous Mixtures When Asphalt Content is Determined by Nuclear Method

1. **SCOPE**

1.1 This method describes the procedure to be used in the Central Laboratory or field for determining the moisture content of hot mixed bituminous mixtures by use of a conventional drying oven.

1.2 Results from this method are used to correct the asphalt gauge reading for moisture content.

2. **APPARATUS**

2.1 Balance capable of weighing 2000 grams to an accuracy of 0.1 gram.

2.2 Conventional oven capable of maintaining 250° ±9°F

2.3 Sample pans measuring 9" X 13" X 2" or 23cm X 33cm X 2cm

3. **SAMPLE**

3.1 One sample shall be a split to determine both asphalt and moisture content. The moisture sample shall be weighed before the preparation of asphalt sample.

3.2 Place a 1000 gram representative sample into a tared pan in an even thin layer. Weigh the sample and record the weight. Dry to a constant weight in a 250° ±9°F conventional oven. Generally this will be for 24 hours.

Note: Constant weight shall be defined as less than 0.1% loss in weight. (1 gram in 1 hour on 1000 gram sample)

4. **CALCULATION**

4.1 Moisture Loss = Initial Weight - Final Weight

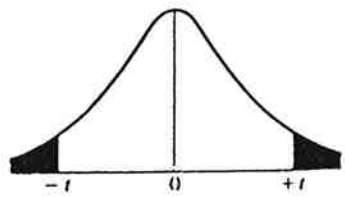
$$\% \text{ Moisture Content} = \frac{\text{Moisture Loss}}{\text{Final Weight}} \times 100$$

4.2 Moisture content percentage shall be directly subtracted from the asphalt gauge reading.

Appendix E Student t Distribution

The Student t Distribution Curve exhibits the probability that t lies between two given values as determined by the appropriate area under the curve. The degrees of freedom are listed in the first column, and the t value corresponding to various two-tail areas are listed in the other columns. For example, with 15 degrees of freedom, the t value corresponding to a confidence value of 0.05 for the two-tail area equals 2.131. This means that the probability of obtaining a mean difference between two sample populations by chance with a Student t- statistic between 2.131 or -2.131 (15 degrees of freedom) is equal to 0.05 (5 percent).

Student's *t*-Distribution



Example For 15 degrees of freedom, the *t*-value which corresponds to an area of 0.05 in both tails combined is 2131.

Degrees of Freedom	*Area in Both Tails Combined*			
	0.10	0.05	0.02	0.01
1	6.314	12.706	31.821	63.657
2	2.920	4.303	6.965	9.925
3	2.353	3.182	4.541	5.841
4	2.132	2.776	3.747	4.604
5	2.015	2.571	3.365	4.032
6	1.943	2.447	3.143	3.707
7	1.895	2.365	2.998	3.499
8	1.860	2.306	2.896	3.355
9	1.833	2.262	2.821	3.250
10	1.812	2.228	2.764	3.169
11	1.796	2.201	2.718	3.106
12	1.782	2.179	2.681	3.055
13	1.771	2.160	2.650	3.012
14	1.761	2.145	2.624	2.977
15	1.753	2.131	2.602	2.947
16	1.746	2.120	2.583	2.921
17	1.740	2.110	2.567	2.898
18	1.734	2.101	2.552	2.878
19	1.729	2.093	2.539	2.861
20	1.725	2.086	2.528	2.845
21	1.721	2.080	2.518	2.831
22	1.717	2.074	2.508	2.819
23	1.714	2.069	2.500	2.807
24	1.711	2.064	2.492	2.797
25	1.708	2.060	2.485	2.787
26	1.706	2.056	2.479	2.779
27	1.703	2.052	2.473	2.771
28	1.701	2.048	2.467	2.763
29	1.699	2.045	2.462	2.756
30	1.697	2.042	2.457	2.750
40	1.684	2.021	2.423	2.704
60	1.671	2.000	2.390	2.660
120	1.658	1.980	2.358	2.617
Normal Distribution	1.645	1.960	2.326	2.576

Source: Table A-6 is taken from Table III of Fisher and Yates: *Statistical Tables for Biological, Agricultural and Medical Research*, published by Oliver and Boyd Ltd., Edinburgh, and by permission of the authors and publishers.

Appendix F AGGREGATE SOURCE DATA

Hilroy 24-002-2

Date Report	Fine Agg Bulk	Fine Agg Abs	Coarse Agg Bulk	Coarse Agg Abs
890619	2.53	3.24		
890619			2.62	1.84
880902	2.52	3.11		
880902			2.63	1.79
880526	2.51	3.52		
880526			2.62	1.90
870820	2.56	2.65		
870820			2.63	1.82
870703			2.61	2.10
870716	2.53	3.07		
870716	2.55	2.82		
870713	2.52	3.46		
870713			2.61	1.94
870518	2.56	2.97		
870518			2.63	1.72
861001	2.55	2.99		
861001			2.60	2.10
860827	2.57	2.73		
860827			2.62	1.95
860728	2.53	3.26		
860728			2.66	1.66
860722	2.53	3.46		
860722			2.61	2.10
860717	2.51	3.82		
860717			2.59	2.41
860514	2.56	2.69		
860514			2.62	1.79

Delta 20-046-3

Date Report	Fine Agg Bulk	Fine Agg Abs	Coarse Agg Bulk	Coarse Agg Abs
881004	2.65	1.73		
881004	2.59	2.67		
881004			2.64	2.17
880707			2.58	2.18
871028	2.50	3.07		
871028	2.59	2.77		
871028			2.64	1.96
870720	2.52	3.67		
870720	2.56	3.16		
870720			2.65	1.95
870624			2.65	1.83
870511	2.55	3.20		
870511			2.62	2.07

Dayton 36-004-2

Date Report	Fine Agg Bulk	Fine Agg Abs	Coarse Agg Bulk	Coarse Agg Abs
890602	2.58	2.77		
890602			2.61	1.69
880705	2.50	3.07		
880705			2.62	2.07

Appendix F AGGREGATE SOURCE DATA

Wildish 20-048-3				
Date Report	Fine Agg Bulk	Fine Agg Abs	Coarse Agg Bulk	Coarse Agg Abs
890817			2.64	1.96
890810	2.60	2.71		
890727			2.61	2.26
890723			2.62	2.17
890731	2.56	3.33		
890627			2.62	2.20
880902			2.62	2.02
880907			2.61	2.39
880812	2.59	2.71		
880722	2.56	3.20		
880722			2.63	2.05
880617	2.44	5.04		
880617			2.61	2.35
880617			2.61	2.20
880330	2.45	5.17		
870831			2.62	2.20
870831	2.92	2.33		
870805	2.53	3.84		
870805			2.62	2.24
870805			2.63	1.95
870730	2.54	3.48		
870730			2.62	2.26
870730			2.60	2.32
870706			2.61	2.42
870706			2.61	2.19
870730			2.60	2.44
870716	2.57	3.48		
870610	2.57	3.24		
870629			2.63	2.23
870629			2.63	2.03

Brossi 10-193-3				
Date Report	Fine Agg Bulk	Fine Agg Abs	Coarse Agg Bulk	Coarse Agg Abs
890727	2.56	2.82		
890727	2.55	3.11		
890727			2.67	1.48
890727			2.69	1.45
890707	2.56	3.05		
890707			2.69	1.38
881205	2.57	2.54		
881205			2.67	1.62
881118	2.60	2.31		
881118			2.65	1.65
881005	2.60	2.31		
881005			2.67	1.55
880728	2.58	2.61		
880728			2.72	1.31
880718	2.63	1.79		
880718			2.70	1.41
870713	2.54	2.82		
870713			2.68	1.55

APPENDIX G

STUDENT t ANALYSIS FOR ASPHALT CONTENT

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District 7

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24 Tank Stick vs Extraction 49
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TABLE 1
DETROIT -IDANHA
NUCLEAR VS EXTRACTION

NOTE: d=X2-X1; D=ave. d; Sd=std.dev.; SD=Sd/sqrt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	6.14	5.60	-0.54	-0.79	0.25	0.06	0.21	0.06	-13.1397
2	6.22	5.80	-0.42		0.37	0.14			
3	6.60	5.50	-1.10		-0.31	0.10			
4	5.94	5.30	-0.64		0.15	0.02			
5	6.37	5.60	-0.77		0.02	0.00			
6	6.32	5.40	-0.92		-0.13	0.02			
7	6.24	5.40	-0.84		-0.05	0.00			
8	6.21	5.50	-0.71		0.08	0.01			
9	6.36	5.50	-0.86		-0.07	0.00			
10	6.10	5.40	-0.70		0.09	0.01			
11	6.27	5.40	-0.87		-0.08	0.01			
12	6.53	5.40	-1.13		-0.34	0.11			

TABLE 2
DETROIT - IDANHA
TANK STICK VS EXTRACTION

NOTE: d=X2-X1; D=ave. d; Sd=std.dev.; SD=Sd/sqrt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.81	5.60	-0.21	-0.36	0.15	0.02	0.17	0.05	-7.1745
2	5.81	5.80	-0.01		0.35	0.12			
3	5.81	5.50	-0.31		0.05	0.00			
4	5.95	5.30	-0.65		-0.29	0.08			
5	5.95	5.60	-0.35		0.01	0.00			
6	5.95	5.40	-0.55		-0.19	0.04			
7	5.95	5.40	-0.55		-0.19	0.04			
8	5.76	5.50	-0.26		0.10	0.01			
9	5.76	5.50	-0.26		0.10	0.01			
10	5.76	5.40	-0.36		0.00	0.00			
11	5.76	5.40	-0.36		0.00	0.00			
12	5.86	5.40	-0.46		-0.10	0.01			

TABLE 3
DETROIT - IDANHA
TANK STICK VS NUCLEAR

NOTE: d=X2-X1; D=ave. d; Sd=std.dev.; SD=Sd/sqrt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.81	6.14	0.33	0.43	-0.10	0.01	0.20	0.06	7.3118
2	5.81	6.22	0.41		-0.02	0.00			
3	5.81	6.60	0.79		0.36	0.13			
4	5.95	5.94	-0.01		-0.44	0.19			
5	5.95	6.37	0.42		-0.01	0.00			
6	5.95	6.32	0.37		-0.06	0.00			
7	5.95	6.24	0.29		-0.14	0.02			
8	5.76	6.21	0.45		0.02	0.00			
9	5.76	6.36	0.60		0.17	0.03			
10	5.76	6.10	0.34		-0.09	0.01			
11	5.76	6.27	0.51		0.08	0.01			
12	5.86	6.53	0.67		0.24	0.06			

TABLE 4
NOTI-VENETA, EAST UNIT
NUCLEAR VS EXTRACTION

NOTE: d=X2-X1; D=ave. d; Sd=std.dev.; SD=Sd/sqrt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	6.49	5.70	-0.79	-0.84	0.05	0.00	0.21	0.07	-12.0340
2	6.49	5.50	-0.99		-0.15	0.02			
3	6.64	5.80	-0.84		0.00	0.00			
4	6.81	5.60	-1.21		-0.37	0.13			
5	6.29	5.50	-0.79		0.05	0.00			
6	6.38	5.80	-0.58		0.26	0.07			
7	6.02	5.50	-0.52		0.32	0.10			
8	6.61	5.70	-0.91		-0.07	0.00			
9	6.66	5.70	-0.96		-0.12	0.01			

TABLE 5
NOTI-VENETA, EAST UNIT
TANK STICK VS EXTRACTION

NOTE: d=X2-X1; D=ave. d; Sd=std.dev.; SD=Sd/sqrt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.74	5.70	-0.04	-0.10	0.06	0.00	0.24	0.08	-1.2665
2	5.74	5.50	-0.24		-0.14	0.02			
3	5.59	5.80	0.21		0.31	0.10			
4	5.59	5.60	0.01		0.11	0.01			
5	5.59	5.50	-0.09		0.01	0.00			
6	5.59	5.80	0.21		0.31	0.10			
7	5.59	5.50	-0.09		0.01	0.00			
8	6.14	5.70	-0.44		-0.34	0.11			
9	6.14	5.70	-0.44		-0.34	0.11			

TABLE 6
NOTI-VENETA, EAST UNIT
TANK STICK VS NUCLEAR

NOTE: d=X2-X1; D=ave. d; Sd=std.dev.; SD=Sd/sqrt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.74	6.49	0.75	0.74	0.01	0.00	0.26	0.09	8.5064
2	5.74	6.49	0.75		0.01	0.00			
3	5.59	6.64	1.05		0.31	0.09			
4	5.59	6.81	1.22		0.48	0.23			
5	5.59	6.29	0.70		-0.04	0.00			
6	5.59	6.38	0.79		0.05	0.00			
7	5.59	6.02	0.43		-0.31	0.10			
8	6.14	6.61	0.47		-0.27	0.07			
9	6.14	6.66	0.52		-0.22	0.05			

TABLE 7
WAPATO ROAD - N.C.L. YAMHILL
NUCLEAR VS EXTRACTION

NOTE: d=X2-X1; D=ave. d; Sd=std.dev.; SD=Sd/sqrt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	7.27	6.40	-0.87	-0.76	-0.11	0.01	0.29	0.11	-6.9661
2	6.85	6.60	-0.25		-0.51	0.26			
3	7.39	6.50	-0.89		-0.13	0.02			
4	7.56	6.50	-1.06		-0.30	0.09			
5	7.19	6.30	-0.89		-0.13	0.02			
6	7.52	6.60	-0.92		-0.16	0.02			
7	6.97	6.50	-0.47		0.29	0.09			

TABLE 8
DISTRICT 5 LIME TREATED
NUCLEAR VS EXTRACTION

NOTE: X1 = NUC; X2 = EXT; d = X2-X1; D = AVG d; Sd = std. dev.; SD = Sd/sq rt(N); t = D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	4.93	6.06	1.13	0.66	0.47	0.22	0.48	0.22	3.0457
2	4.88	6.10	1.22		0.56	0.32			
3	5.31	5.74	0.43		-0.23	0.05			
4	5.54	5.89	0.35		-0.31	0.09			
5	5.40	5.56	0.16		-0.50	0.25			

TABLE 9
DISTRICT 5 LIME TREATED
TANK STICK VS EXTRACTION

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.80	6.06	0.26	0.23	0.03	0.00	0.20	0.09	2.5524
2	5.80	6.10	0.30		0.07	0.00			
3	5.80	5.74	-0.06		-0.29	0.08			
4	5.40	5.89	0.49		0.26	0.07			
5	5.40	5.56	0.16		-0.07	0.00			

TABLE 10
DISTRICT 5 LIME TREATED
TANK STICK VS NUCLEAR

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.80	4.93	-0.87	-0.43	-0.44	0.20	0.49	0.22	-1.9668
2	5.80	4.88	-0.92		-0.49	0.24			
3	5.80	5.31	-0.49		-0.06	0.00			
4	5.40	5.54	0.14		0.57	0.32			
5	5.40	5.40	0.00		0.43	0.18			

TABLE 11
DISTRICT 5 LIME TREATED
METER VS EXTRACTION

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.60	6.06	0.46	0.25	0.21	0.05	0.23	0.12	2.1283
2	5.90	6.10	0.20		-0.05	0.00			
3	5.80	5.74	-0.06		-0.31	0.09			
4	5.50	5.89	0.39		0.14	0.02			

TABLE 12
DISTRICT 5 LIME TREATED
METER VS NUCLEAR

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.60	4.93	-0.67	-0.54	-0.13	0.02	0.44	0.22	-2.4208
2	5.90	4.88	-1.02		-0.49	0.24			
3	5.80	5.31	-0.49		0.04	0.00			
4	5.50	5.54	0.04		0.58	0.33			

TABLE 13
DISTRICT 5 NO LIME
NUCLEAR VS EXTRACTION

Note: X1 = NUC; X2 = EXT; d = X2-X1; D = AVG d; Sd = std dev; SD = Sd/sq rt (N); t = D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.98	6.46	0.48	0.05	0.43	0.19	0.43	0.12	0.3878
2	5.92	6.12	0.20		0.15	0.02			
3	5.61	5.83	0.22		0.17	0.03			
4	5.97	6.09	0.12		0.07	0.01			
5	5.39	5.92	0.53		0.48	0.23			
6	5.41	5.81	0.40		0.35	0.12			
7	5.63	5.81	0.18		0.13	0.02			
8	7.09	6.05	-1.04		-1.09	1.18			
9	6.17	5.85	-0.32		-0.37	0.14			
10	5.95	5.67	-0.28		-0.33	0.11			
11	5.73	5.83	0.10		0.05	0.00			
12	5.91	5.90	-0.01		-0.06	0.00			

TABLE 14
DISTRICT NO LIME
TANK STICK VS EXTRACTION

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.90	6.46	0.56	0.11	0.45	0.20	0.18	0.05	2.1360
2	5.90	6.12	0.22		0.11	0.01			
3	5.90	5.83	-0.07		-0.18	0.03			
4	5.90	6.09	0.19		0.08	0.01			
5	5.80	5.92	0.12		0.01	0.00			
6	5.80	5.81	0.01		-0.10	0.01			
7	5.80	5.81	0.01		-0.10	0.01			
8	5.80	6.05	0.25		0.14	0.02			
9	5.80	5.85	0.05		-0.06	0.00			
10	5.80	5.67	-0.13		-0.24	0.06			
11	5.80	5.83	0.03		-0.08	0.01			
12	5.80	5.90	0.10		-0.01	0.00			

TABLE 15
DISTRICT 5 NO LIME
TANK STICK VS NUCLEAR

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.90	5.98	0.08	0.06	0.02	0.00	0.45	0.13	0.4865
2	5.90	5.92	0.02		-0.04	0.00			
3	5.90	5.61	-0.29		-0.35	0.12			
4	5.90	5.97	0.07		0.01	0.00			
5	5.80	5.39	-0.41		-0.47	0.22			
6	5.80	5.41	-0.39		-0.45	0.21			
7	5.80	5.63	-0.17		-0.23	0.05			
8	5.80	7.09	1.29		1.23	1.50			
9	5.80	6.17	0.37		0.31	0.09			
10	5.80	5.95	0.15		0.09	0.01			
11	5.80	5.73	-0.07		-0.13	0.02			
12	5.80	5.91	0.11		0.05	0.00			

TABLE 16
DISTRICT 5 NO LIME
METER VS EXTRACTION

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.80	6.46	0.66	-0.02	0.68	0.46	0.32	0.10	-0.1719
2	6.00	5.83	-0.17		-0.15	0.02			
3	6.00	6.09	0.09		0.11	0.01			
4	6.20	5.92	-0.28		-0.26	0.07			
5	5.90	5.81	-0.09		-0.07	0.01			
6	6.40	5.81	-0.59		-0.57	0.33			
7	5.80	6.05	0.25		0.27	0.07			
8	5.90	5.85	-0.05		-0.03	0.00			
9	5.80	5.67	-0.13		-0.11	0.01			
10	5.80	5.83	0.03		0.05	0.00			
11	5.80	5.90	0.10		0.12	0.01			

TABLE 17
DIATRICT 5 NO LIME
METER VS NUCLEAR

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.80	5.98	0.18	-0.05	0.23	0.05	0.59	0.18	-0.2886
2	6.00	5.61	-0.39		-0.34	0.11			
3	6.00	5.97	-0.03		0.02	0.00			
4	6.20	5.39	-0.81		-0.76	0.58			
5	5.90	5.41	-0.49		-0.44	0.19			
6	6.40	5.63	-0.77		-0.72	0.52			
7	5.80	7.09	1.29		1.34	1.80			
8	5.90	6.17	0.27		0.32	0.10			
9	5.80	5.95	0.15		0.20	0.04			
10	5.80	5.73	-0.07		-0.02	0.00			
11	5.80	5.91	0.11		0.16	0.03			

TABLE 18
CAMAS MT - MUNS CREEK
NUCLEAR VS EXTRACTION

NOTE: X1 = NUC; X2 = EXT; d = X2-X1; D = Avg d; Sd = std dev; SD = Sd/sq rt (N); t = D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.78	5.30	-0.48	-0.78	0.30	0.09	0.37	0.16	-4.7335
2	6.37	5.42	-0.95		-0.17	0.03			
3	6.12	5.44	-0.68		0.10	0.01			
4	6.20	5.75	-0.45		0.33	0.11			
5	6.88	5.55	-1.33		-0.55	0.30			

TABLE 19
FISH CREEK-CHINQUAPIN CREEK
NUCLEAR VS EXTRACTION

NOTE: X1 = NUC; X2 = EXT; d = X2-X1; D = AVG d; Sd = std dev; SD = Sd/sq rt (N); t = D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.03	5.86	0.83	0.43	0.40	0.16	0.26	0.09	4.9684
2	5.44	5.98	0.54		0.11	0.01			
3	5.04	5.40	0.36		-0.07	0.01			
4	5.42	5.69	0.27		-0.16	0.03			
5	5.62	5.83	0.21		-0.22	0.05			
6	5.15	5.64	0.49		0.06	0.00			
7	5.57	5.53	-0.04		-0.47	0.22			
8	5.36	6.00	0.64		0.21	0.04			
9	5.32	5.90	0.58		0.15	0.02			

TABLE 20
E MCMINNVILLE-INTCGHE AIRPORT RD
NUCLEAR VS EXTRACTION

NOTE: X1 = NUC; X2 = EXT; d = X2-X1; D = AVG d; Sd = std dev; SD = Sd/sq rt (N); t = D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.55	5.36	-0.19	-0.29	0.10	0.01	0.13	0.03	-8.6637
2	5.44	5.13	-0.31		-0.02	0.00			
3	5.79	5.40	-0.39		-0.10	0.01			
4	5.24	4.92	-0.32		-0.03	0.00			
5	6.01	5.45	-0.56		-0.27	0.07			
6	5.78	5.38	-0.40		-0.11	0.01			
7	5.41	5.16	-0.25		0.04	0.00			
8	5.74	5.45	-0.29		0.00	0.00			
9	6.08	5.69	-0.39		-0.10	0.01			
10	5.61	5.23	-0.38		-0.09	0.01			
11	5.52	5.25	-0.27		0.02	0.00			
12	5.71	5.57	-0.14		0.15	0.02			
13	5.79	5.54	-0.25		0.04	0.00			
14	5.55	5.56	0.01		0.30	0.09			
15	5.52	5.25	-0.27		0.02	0.00			

TABLE 21
E MCMINNVILLE - INTCHGE AIRPORT RD
TANK STICK VS EXTRACTION

NOTE: d=X2-X1; D=ave. d; Sd=std.dev.; SD=Sd/sqrt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.20	5.36	0.16	0.03	0.13	0.02	0.23	0.06	0.5499
2	5.20	5.13	-0.07		-0.10	0.01			
3	5.40	5.40	0.00		-0.03	0.00			
4	5.33	4.92	-0.41		-0.44	0.20			
5	5.33	5.45	0.12		0.09	0.01			
6	5.33	5.38	0.05		0.02	0.00			
7	5.41	5.16	-0.25		-0.28	0.08			
8	5.41	5.45	0.04		0.01	0.00			
9	5.41	5.69	0.28		0.25	0.06			
10	5.20	5.23	0.03		0.00	0.00			
11	5.39	5.25	-0.14		-0.17	0.03			
12	5.39	5.57	0.18		0.15	0.02			
13	5.16	5.54	0.38		0.35	0.12			
14	5.16	5.56	0.40		0.37	0.13			
15	5.52	5.25	-0.27		-0.30	0.09			

TABLE 22
E MICMINNVILLE-INTCHGE AIRPORT RD
TANK STICK VS NUCLEAR

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.20	5.55	0.35	0.33	0.02	0.00	0.24	0.06	5.2968
2	5.20	5.44	0.24		-0.09	0.01			
3	5.40	5.79	0.39		0.06	0.00			
4	5.33	5.24	-0.09		-0.42	0.17			
5	5.33	6.01	0.68		0.35	0.12			
6	5.33	5.78	0.45		0.12	0.02			
7	5.41	5.41	0.00		-0.33	0.11			
8	5.41	5.74	0.33		0.00	0.00			
9	5.41	6.08	0.67		0.34	0.12			
10	5.20	5.61	0.41		0.08	0.01			
11	5.39	5.52	0.13		-0.20	0.04			
12	5.39	5.71	0.32		-0.01	0.00			
13	5.16	5.79	0.63		0.30	0.09			
14	5.16	5.55	0.39		0.06	0.00			
15	5.52	5.52	0.00		-0.33	0.11			

TABLE 23
DISTRICT 7
NUCLEAR VS EXTRACTION

NOTE: X1 = NUC; X2 = EXT; d = X2-X1; D = AVG d; Sd = std dev; SD = Sd/sq rt (N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	6.15	5.30	-0.85	-0.29	-0.56	0.31	0.31	0.09	-3.2718
2	5.57	5.40	-0.17		0.12	0.02			
3	5.39	5.40	0.01		0.30	0.09			
4	5.76	5.30	-0.46		-0.17	0.03			
5	5.61	5.60	-0.01		0.28	0.08			
6	5.22	4.50	-0.72		-0.43	0.18			
7	5.75	5.30	-0.45		-0.16	0.02			
8	5.09	5.30	0.21		0.50	0.25			
9	5.87	5.40	-0.47		-0.18	0.03			
10	5.36	5.10	-0.26		0.03	0.00			
11	5.31	5.20	-0.11		0.18	0.03			
12	5.63	5.40	-0.23		0.06	0.00			

TABLE 24
DISTRICT 7
TANK STICK VS EXTRACTION

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.48	5.30	-0.18	-0.25	0.07	0.01	0.30	0.10	-2.5009
2	5.48	5.40	-0.08		0.17	0.03			
3	5.82	5.40	-0.42		-0.17	0.03			
4	5.56	5.30	-0.26		-0.01	0.00			
5	5.37	5.60	0.23		0.48	0.23			
6	5.37	4.50	-0.87		-0.62	0.38			
7	5.46	5.10	-0.36		-0.11	0.01			
8	5.46	5.20	-0.26		-0.01	0.00			
9	5.46	5.40	-0.06		0.19	0.04			

TABLE 25
DISTRICT 7
TANK STICK VS NUCLEAR

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.48	6.15	0.67	0.06	0.61	0.37	0.31	0.10	0.5724
2	5.48	5.57	0.09		0.03	0.00			
3	5.82	5.39	-0.43		-0.49	0.24			
4	5.56	5.76	0.20		0.14	0.02			
5	5.37	5.61	0.24		0.18	0.03			
6	5.37	5.22	-0.15		-0.21	0.04			
7	5.46	5.36	-0.10		-0.16	0.03			
8	5.46	5.31	-0.15		-0.21	0.04			
9	5.46	5.63	0.17		0.11	0.01			

APPENDIX H

STUDENT t ANALYSIS FOR GRADATION

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TABLE 1
FISH CREEK-CHINQUAPIN CREEK SECTION
EXTRACTION VS COLD FEED 1/2"

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	73.00	72.00	-1.00	-5.92	4.92	24.17	7.00	2.02	-2.9282
2	79.00	65.00	-14.00		-8.08	65.34			
3	72.00	56.00	-16.00		-10.08	101.67			
4	68.00	62.00	-6.00		-0.08	0.01			
5	72.00	53.00	-19.00		-13.08	171.17			
6	64.00	59.00	-5.00		0.92	0.84			
7	66.00	62.00	-4.00		1.92	3.67			
8	73.00	77.00	4.00		9.92	98.34			
9	67.00	68.00	1.00		6.92	47.84			
10	76.00	71.00	-5.00		0.92	0.84			
11	75.00	70.00	-5.00		0.92	0.84			
12	73.00	72.00	-1.00		4.92	24.17			

TABLE 2
FISH CREEK-CHINQUAPIN CREEK SECTION
EXTRACTION VS COLD FEED 1/4"

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	28.00	31.00	3.00	-3.33	6.33	40.11	4.33	1.25	-2.6640
2	31.00	21.00	-10.00		-6.67	44.44			
3	28.00	20.00	-8.00		-4.67	21.78			
4	27.00	21.00	-6.00		-2.67	7.11			
5	28.00	20.00	-8.00		-4.67	21.78			
6	27.00	23.00	-4.00		-0.67	0.44			
7	27.00	23.00	-4.00		-0.67	0.44			
8	26.00	30.00	4.00		7.33	53.78			
9	26.00	23.00	-3.00		0.33	0.11			
10	27.00	24.00	-3.00		0.33	0.11			
11	27.00	26.00	-1.00		2.33	5.44			
12	29.00	29.00	0.00		3.33	11.11			

TABLE 3
FISH CREEK-CHINQUAPIN CREEK SECTION
EXTRACTION VS COLD FEED #10

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	17.00	18.00	1.00	-2.58	3.58	12.84	2.94	0.85	-3.0465
2	19.00	12.00	-7.00		-4.42	19.51			
3	18.00	11.00	-7.00		-4.42	19.51			
4	17.00	13.00	-4.00		-1.42	2.01			
5	17.00	13.00	-4.00		-1.42	2.01			
6	17.00	14.00	-3.00		-0.42	0.17			
7	17.00	14.00	-3.00		-0.42	0.17			
8	12.00	14.00	2.00		4.58	21.01			
9	13.00	11.00	-2.00		0.58	0.34			
10	14.00	10.00	-4.00		-1.42	2.01			
11	13.00	12.00	-1.00		1.58	2.51			
12	13.00	14.00	1.00		3.58	12.84			

TABLE 4
FISH CREEK-CHINQUAPIN CREEK SECTION
EXTRACTION VS COLD FEED #40

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	8.00	6.00	-2.00	-1.83	-0.17	0.03	1.70	0.49	-3.7431
2	9.00	4.00	-5.00		-3.17	10.03			
3	8.00	5.00	-3.00		-1.17	1.36			
4	8.00	5.00	-3.00		-1.17	1.36			
5	8.00	5.00	-3.00		-1.17	1.36			
6	8.00	6.00	-2.00		-0.17	0.03			
7	8.00	6.00	-2.00		-0.17	0.03			
8	6.00	7.00	1.00		2.83	8.03			
9	7.00	6.00	-1.00		0.83	0.69			
10	7.00	5.00	-2.00		-0.17	0.03			
11	7.00	6.00	-1.00		0.83	0.69			
12	6.00	7.00	1.00		2.83	8.03			

TABLE 5
FISH CREEK-CHINQUAPIN CREEK SECTION
EXTRACTION VS COLD FEED #200

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	3.30	0.40	-2.90	-1.82	-1.08	1.17	1.25	0.36	-5.0390
2	3.60	0.30	-3.30		-1.48	2.20			
3	2.80	0.30	-2.50		-0.68	0.47			
4	2.80	0.40	-2.40		-0.58	0.34			
5	3.70	1.20	-2.50		-0.68	0.47			
6	3.70	0.40	-3.30		-1.48	2.20			
7	3.50	0.80	-2.70		-0.88	0.78			
8	3.10	2.70	-0.40		1.42	2.01			
9	3.50	3.20	-0.30		1.52	2.30			
10	3.40	2.80	-0.60		1.22	1.48			
11	3.20	2.70	-0.50		1.32	1.73			
12	3.20	2.80	-0.40		1.42	2.01			

TABLE 6
E MCMINNVILLE - INTCGHE AIRPORT RD SECT
EXTRACTION VS COLD FEED 1/2"

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	78.00	83.00	5.00	0.00	5.00	25.00	2.77	0.74	0.0000
2	86.00	82.00	-4.00		-4.00	16.00			
3	84.00	85.00	1.00		1.00	1.00			
4	87.00	85.00	-2.00		-2.00	4.00			
5	89.00	85.00	-4.00		-4.00	16.00			
6	85.00	83.00	-2.00		-2.00	4.00			
7	87.00	87.00	0.00		0.00	0.00			
8	88.00	86.00	-2.00		-2.00	4.00			
9	79.00	84.00	5.00		5.00	25.00			
10	83.00	83.00	0.00		0.00	0.00			
11	84.00	85.00	1.00		1.00	1.00			
12	87.00	87.00	0.00		0.00	0.00			
13	89.00	89.00	0.00		0.00	0.00			
14	84.00	86.00	2.00		2.00	4.00			

TABLE 7
E MCMINNVILLE - INTCGHE AIRPORT RD SECT
EXTRACTION VS COLD FEED 1-4"

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	50.00	56.00	6.00	-0.29	6.29	39.51	2.92	0.78	-0.3661
2	59.00	60.00	1.00		1.29	1.65			
3	53.00	55.00	2.00		2.29	5.22			
4	61.00	60.00	-1.00		-0.71	0.51			
5	61.00	60.00	-1.00		-0.71	0.51			
6	58.00	55.00	-3.00		-2.71	7.37			
7	60.00	61.00	1.00		1.29	1.65			
8	65.00	59.00	-6.00		-5.71	32.65			
9	54.00	55.00	1.00		1.29	1.65			
10	60.00	58.00	-2.00		-1.71	2.94			
11	54.00	56.00	2.00		2.29	5.22			
12	60.00	61.00	1.00		1.29	1.65			
13	63.00	60.00	-3.00		-2.71	7.37			
14	58.00	56.00	-2.00		-1.71	2.94			

TABLE 8
E MCMINNVILLE - INTCGHE AIRPORT RD SECT
EXTRACTION VS COLD FEED #10

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	26.00	28.00	2.00	-0.71	2.71	7.37	1.86	0.50	-1.4388
2	30.00	31.00	1.00		1.71	2.94			
3	27.00	29.00	2.00		2.71	7.37			
4	32.00	30.00	-2.00		-1.29	1.65			
5	31.00	31.00	0.00		0.71	0.51			
6	30.00	29.00	-1.00		-0.29	0.08			
7	31.00	31.00	0.00		0.71	0.51			
8	34.00	29.00	-5.00		-4.29	18.37			
9	29.00	28.00	-1.00		-0.29	0.08			
10	30.00	29.00	-1.00		-0.29	0.08			
11	28.00	28.00	0.00		0.71	0.51			
12	31.00	30.00	-1.00		-0.29	0.08			
13	32.00	31.00	-1.00		-0.29	0.08			
14	31.00	28.00	-3.00		-2.29	5.22			

TABLE 9
E MCMINNVILLE - INTCGHE AIRPORT RD SECT
EXTRACTION VS COLD FEED #40

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	12.00	13.00	1.00	-0.79	1.79	3.19	0.97	0.26	-3.0154
2	14.00	14.00	0.00		0.79	0.62			
3	13.00	13.00	0.00		0.79	0.62			
4	14.00	13.00	-1.00		-0.21	0.05			
5	14.00	13.00	-1.00		-0.21	0.05			
6	13.00	12.00	-1.00		-0.21	0.05			
7	13.00	13.00	0.00		0.79	0.62			
8	15.00	12.00	-3.00		-2.21	4.90			
9	13.00	12.00	-1.00		-0.21	0.05			
10	13.00	12.00	-1.00		-0.21	0.05			
11	13.00	12.00	-1.00		-0.21	0.05			
12	14.00	13.00	-1.00		-0.21	0.05			
13	14.00	14.00	0.00		0.79	0.62			
14	14.00	12.00	-2.00		-1.21	1.47			

TABLE 10
E MCMINNVILLE - INTCGHE AIRPORT RD SECT
EXTRACTION VS COLD FEED #200

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	4.80	5.20	0.40	0.11	0.29	0.09	0.47	0.12	0.8593
2	5.10	5.70	0.60		0.49	0.24			
3	5.00	5.20	0.20		0.09	0.01			
4	5.70	5.70	0.00		-0.11	0.01			
5	5.70	6.00	0.30		0.19	0.04			
6	5.50	5.40	-0.10		-0.21	0.04			
7	5.10	6.00	0.90		0.79	0.63			
8	6.20	5.40	-0.80		-0.91	0.82			
9	5.40	5.20	-0.20		-0.31	0.09			
10	5.20	5.60	0.40		0.29	0.09			
11	5.30	5.60	0.30		0.19	0.04			
12	5.90	5.80	-0.10		-0.21	0.04			
13	6.00	6.30	0.30		0.19	0.04			
14	5.80	5.10	-0.70		-0.81	0.65			

TABLE 11
DISTRICT 7 PAVING
EXTRACTION VS COLD FEED 1/2"

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	63.00	73.00	10.00	-1.91	11.91	141.83	10.85	3.27	-0.5836
2	72.00	70.00	-2.00		-0.09	0.01			
3	71.00	77.00	6.00		7.91	62.55			
4	72.00	77.00	5.00		6.91	47.74			
5	79.00	71.00	-8.00		-6.09	37.10			
6	65.00	68.00	3.00		4.91	24.10			
7	79.00	50.00	-29.00		-27.09	733.92			
8	70.00	77.00	7.00		8.91	79.37			
9	75.00	73.00	-2.00		-0.09	0.01			
10	72.00	70.00	-2.00		-0.09	0.01			
11	73.00	64.00	-9.00		-7.09	50.28			

TABLE 12
DISTRICT 7 PAVING
EXTRACTION VS COLD FEED 1/4"

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	30.00	39.00	9.00	-1.18	10.18	103.67	6.34	1.91	-0.6185
2	29.00	32.00	3.00		4.18	17.49			
3	32.00	38.00	6.00		7.18	51.58			
4	32.00	34.00	2.00		3.18	10.12			
5	36.00	28.00	-8.00		-6.82	46.49			
6	24.00	24.00	0.00		1.18	1.40			
7	36.00	24.00	-12.00		-10.82	117.03			
8	30.00	31.00	1.00		2.18	4.76			
9	32.00	27.00	-5.00		-3.82	14.58			
10	24.00	22.00	-2.00		-0.82	0.67			
11	26.00	19.00	-7.00		-5.82	33.85			

TABLE 13
DISTRICT 7 PAVING
EXTRACTION VS COLD FEED #10

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	16.00	23.00	7.00	0.55	6.45	41.66	4.50	1.36	0.4018
2	14.00	19.00	5.00		4.45	19.84			
3	15.00	22.00	7.00		6.45	41.66			
4	16.00	21.00	5.00		4.45	19.84			
5	18.00	14.00	-4.00		-4.55	20.66			
6	13.00	11.00	-2.00		-2.55	6.48			
7	18.00	13.00	-5.00		-5.55	30.75			
8	15.00	13.00	-2.00		-2.55	6.48			
9	15.00	13.00	-2.00		-2.55	6.48			
10	11.00	10.00	-1.00		-1.55	2.39			
11	11.00	9.00	-2.00		-2.55	6.48			

TABLE 14
DISTRICT 7 PAVING
EXTRACTION VS COLD FEED #200

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	3.90	2.50	-1.40	-1.45	0.05	0.00	0.52	0.16	-9.2039
2	3.40	2.80	-0.60		0.85	0.73			
3	4.00	3.10	-0.90		0.55	0.31			
4	4.00	3.20	-0.80		0.65	0.43			
5	3.90	1.80	-2.10		-0.65	0.42			
6	3.70	2.00	-1.70		-0.25	0.06			
7	4.80	3.10	-1.70		-0.25	0.06			
8	3.80	2.70	-1.10		0.35	0.13			
9	4.30	2.50	-1.80		-0.35	0.12			
10	3.70	1.70	-2.00		-0.55	0.30			
11	3.50	1.60	-1.90		-0.45	0.20			

TABLE 15
POCAHONTAS - AUBURN
EXTRACTION VS COLD FEED (1/2")

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	98.00	98.00	0.00	-0.31	0.31	0.09	0.95	0.26	-1.1711
2	99.00	98.00	-1.00		-0.69	0.48			
3	98.00	97.00	-1.00		-0.69	0.48			
4	98.00	98.00	0.00		0.31	0.09			
5	97.00	97.00	0.00		0.31	0.09			
6	97.00	98.00	1.00		1.31	1.71			
7	98.00	98.00	0.00		0.31	0.09			
8	98.00	98.00	0.00		0.31	0.09			
9	100.00	97.00	-3.00		-2.69	7.25			
10	98.00	98.00	0.00		0.31	0.09			
11	98.00	98.00	0.00		0.31	0.09			
12	98.00	98.00	0.00		0.31	0.09			
13	98.00	98.00	0.00		0.31	0.09			

TABLE 16
POCAHONTAS - AUBURN
EXTRACTION VS COLD FEED 1/4"

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	68.00	64.00	-4.00	-1.08	-2.92	8.54	3.45	0.96	-1.1251
2	71.00	65.00	-6.00		-4.92	24.24			
3	69.00	64.00	-5.00		-3.92	15.39			
4	60.00	62.00	2.00		3.08	9.47			
5	60.00	63.00	3.00		4.08	16.62			
6	58.00	61.00	3.00		4.08	16.62			
7	63.00	62.00	-1.00		0.08	0.01			
8	67.00	62.00	-5.00		-3.92	15.39			
9	67.00	63.00	-4.00		-2.92	8.54			
10	62.00	62.00	0.00		1.08	1.16			
11	64.00	63.00	-1.00		0.08	0.01			
12	58.00	62.00	4.00		5.08	25.78			
13	62.00	62.00	0.00		1.08	1.16			

TABLE 17
POCAHONTAS - AUBURN
EXTRACTION VS COLD FEED #10

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	35.00	32.00	-3.00	-2.15	-0.85	0.72	2.34	0.65	-3.3191
2	34.00	33.00	-1.00		1.15	1.33			
3	35.00	27.00	-8.00		-5.85	34.18			
4	31.00	31.00	0.00		2.15	4.64			
5	30.00	27.00	-3.00		-0.85	0.72			
6	30.00	28.00	-2.00		0.15	0.02			
7	32.00	31.00	-1.00		1.15	1.33			
8	34.00	32.00	-2.00		0.15	0.02			
9	33.00	29.00	-4.00		-1.85	3.41			
10	31.00	29.00	-2.00		0.15	0.02			
11	32.00	31.00	-1.00		1.15	1.33			
12	29.00	31.00	2.00		4.15	17.25			
13	34.00	31.00	-3.00		-0.85	0.72			

TABLE 18
POCAHONTAS - AUBURN
EXTRACTION VS COLD FEED #40

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	11.00	10.00	-1.00	-0.31	-0.69	0.48	1.89	0.52	-0.5876
2	12.00	11.00	-1.00		-0.69	0.48			
3	12.00	8.00	-4.00		-3.69	13.63			
4	11.00	10.00	-1.00		-0.69	0.48			
5	11.00	9.00	-2.00		-1.69	2.86			
6	10.00	12.00	2.00		2.31	5.33			
7	11.00	10.00	-1.00		-0.69	0.48			
8	9.00	12.00	3.00		3.31	10.94			
9	10.00	12.00	2.00		2.31	5.33			
10	11.00	12.00	1.00		1.31	1.71			
11	11.00	11.00	0.00		0.31	0.09			
12	11.00	10.00	-1.00		-0.69	0.48			
13	11.00	10.00	-1.00		-0.69	0.48			

TABLE 19
POCAHONTAS - AUBURN
EXTRACTION VS COLD FEED #200

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	3.80	3.90	0.10	-0.09	0.19	0.04	0.76	0.21	-0.4405
2	4.30	3.70	-0.60		-0.51	0.26			
3	4.30	3.40	-0.90		-0.81	0.65			
4	4.20	3.20	-1.00		-0.91	0.82			
5	4.30	3.20	-1.10		-1.01	1.02			
6	3.80	5.20	1.40		1.49	2.23			
7	4.10	4.00	-0.10		-0.01	0.00			
8	3.00	3.60	0.60		0.69	0.48			
9	3.40	4.10	0.70		0.79	0.63			
10	4.10	4.00	-0.10		-0.01	0.00			
11	3.90	3.20	-0.70		-0.61	0.37			
12	4.20	4.70	0.50		0.59	0.35			
13	4.40	4.40	0.00		0.09	0.01			

TABLE 20
QUEEN AVE - CORVALLIS/LEBANON
EXTRACTION VS COLD FEED 1/2"

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	84.00	90.00	6.00	0.60	5.40	29.16	2.56	0.57	1.0470
2	93.00	87.00	-6.00		-6.60	43.56			
3	90.00	89.00	-1.00		-1.60	2.56			
4	88.00	92.00	4.00		3.40	11.56			
5	88.00	89.00	1.00		0.40	0.16			
6	92.00	91.00	-1.00		-1.60	2.56			
7	89.00	91.00	2.00		1.40	1.96			
8	90.00	91.00	1.00		0.40	0.16			
9	90.00	91.00	1.00		0.40	0.16			
10	92.00	91.00	-1.00		-1.60	2.56			
11	87.00	89.00	2.00		1.40	1.96			
12	90.00	89.00	-1.00		-1.60	2.56			
13	88.00	90.00	2.00		1.40	1.96			
14	88.00	89.00	1.00		0.40	0.16			
15	91.00	89.00	-2.00		-2.60	6.76			
16	88.00	91.00	3.00		2.40	5.76			
17	92.00	91.00	-1.00		-1.60	2.56			
18	88.00	88.00	0.00		-0.60	0.36			
19	87.00	90.00	3.00		2.40	5.76			
20	92.00	91.00	-1.00		-1.60	2.56			

TABLE 21
QUEEN AVE - CORVALLIS/LEBANON
EXTRACTION VS COLD FEED 1/4"

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	55.00	63.00	8.00	2.45	5.55	30.80	3.44	0.77	3.1843
2	67.00	62.00	-5.00		-7.45	55.50			
3	64.00	64.00	0.00		-2.45	6.00			
4	61.00	67.00	6.00		3.55	12.60			
5	63.00	65.00	2.00		-0.45	0.20			
6	63.00	65.00	2.00		-0.45	0.20			
7	63.00	64.00	1.00		-1.45	2.10			
8	65.00	68.00	3.00		0.55	0.30			
9	65.00	61.00	-4.00		-6.45	41.60			
10	65.00	67.00	2.00		-0.45	0.20			
11	61.00	64.00	3.00		0.55	0.30			
12	65.00	65.00	0.00		-2.45	6.00			
13	62.00	66.00	4.00		1.55	2.40			
14	62.00	64.00	2.00		-0.45	0.20			
15	62.00	65.00	3.00		0.55	0.30			
16	58.00	65.00	7.00		4.55	20.70			
17	65.00	67.00	2.00		-0.45	0.20			
18	55.00	64.00	9.00		6.55	42.90			
19	61.00	64.00	3.00		0.55	0.30			
20	63.00	64.00	1.00		-1.45	2.10			

TABLE 22
QUEEN AVE - CORVALLIS/LEBANON
EXTRACTION VS COLD FEED #10

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	28.00	30.00	2.00	0.35	1.65	2.72	2.01	0.45	0.7798
2	34.00	31.00	-3.00		-3.35	11.22			
3	36.00	32.00	-4.00		-4.35	18.92			
4	30.00	31.00	1.00		0.65	0.42			
5	31.00	32.00	1.00		0.65	0.42			
6	30.00	30.00	0.00		-0.35	0.12			
7	33.00	31.00	-2.00		-2.35	5.52			
8	33.00	34.00	1.00		0.65	0.42			
9	33.00	30.00	-3.00		-3.35	11.22			
10	32.00	33.00	1.00		0.65	0.42			
11	31.00	32.00	1.00		0.65	0.42			
12	32.00	32.00	0.00		-0.35	0.12			
13	30.00	33.00	3.00		2.65	7.02			
14	32.00	32.00	0.00		-0.35	0.12			
15	30.00	32.00	2.00		1.65	2.72			
16	29.00	30.00	1.00		0.65	0.42			
17	32.00	33.00	1.00		0.65	0.42			
18	28.00	32.00	4.00		3.65	13.32			
19	31.00	32.00	1.00		0.65	0.42			
20	31.00	31.00	0.00		-0.35	0.12			

TABLE 23
QUEEN AVE - CORVALLIS/LEBANON
EXTRACTION VS COLD FEED #40

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	12.00	11.00	-1.00	-1.40	0.40	0.16	0.68	0.15	-9.1998
2	14.00	12.00	-2.00		-0.60	0.36			
3	14.00	12.00	-2.00		-0.60	0.36			
4	13.00	12.00	-1.00		0.40	0.16			
5	13.00	12.00	-1.00		0.40	0.16			
6	13.00	11.00	-2.00		-0.60	0.36			
7	12.00	12.00	0.00		1.40	1.96			
8	14.00	13.00	-1.00		0.40	0.16			
9	14.00	12.00	-2.00		-0.60	0.36			
10	14.00	13.00	-1.00		0.40	0.16			
11	14.00	12.00	-2.00		-0.60	0.36			
12	14.00	12.00	-2.00		-0.60	0.36			
13	13.00	13.00	0.00		1.40	1.96			
14	14.00	12.00	-2.00		-0.60	0.36			
15	13.00	12.00	-1.00		0.40	0.16			
16	13.00	11.00	-2.00		-0.60	0.36			
17	14.00	12.00	-2.00		-0.60	0.36			
18	13.00	12.00	-1.00		0.40	0.16			
19	13.00	11.00	-2.00		-0.60	0.36			
20	13.00	12.00	-1.00		0.40	0.16			

TABLE 24
QUEEN AVE - CORVALLIS/LEBANON
EXTRACTION VS COLD FEED #200

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	5.00	3.30	-1.70	-2.58	0.88	0.77	0.52	0.12	-22.1148
2	6.00	3.30	-2.70		-0.12	0.01			
3	5.20	3.40	-1.80		0.78	0.61			
4	5.40	3.10	-2.30		0.28	0.08			
5	5.50	3.30	-2.20		0.38	0.14			
6	5.40	3.10	-2.30		0.28	0.08			
7	5.30	2.90	-2.40		0.18	0.03			
8	6.00	3.60	-2.40		0.18	0.03			
9	6.10	3.10	-3.00		-0.42	0.18			
10	5.80	3.30	-2.50		0.08	0.01			
11	5.80	2.70	-3.10		-0.52	0.27			
12	5.70	3.30	-2.40		0.18	0.03			
13	5.10	3.40	-1.70		0.88	0.77			
14	6.40	3.30	-3.10		-0.52	0.27			
15	5.90	2.80	-3.10		-0.52	0.27			
16	5.50	3.10	-2.40		0.18	0.03			
17	6.30	2.70	-3.60		-1.02	1.04			
18	5.30	2.50	-2.80		-0.22	0.05			
19	5.40	2.50	-2.90		-0.32	0.10			
20	6.10	2.90	-3.20		-0.62	0.38			

TABLE 25
COLUMBIA R. BR. - OLD OREGON TRAIL
EXTRACTION VS COLD FEED 1/2"

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	90.00	88.00	-2.00	-2.52	0.52	0.27	2.47	0.37	-6.7666
2	93.00	87.00	-6.00		-3.48	12.09			
3	86.00	85.00	-1.00		1.52	2.32			
4	91.00	87.00	-4.00		-1.48	2.18			
5	88.00	84.00	-4.00		-1.48	2.18			
6	91.00	87.00	-4.00		-1.48	2.18			
7	87.00	85.00	-2.00		0.52	0.27			
8	89.00	89.00	0.00		2.52	6.36			
9	91.00	88.00	-3.00		-0.48	0.23			
10	88.00	88.00	0.00		2.52	6.36			
11	89.00	86.00	-3.00		-0.48	0.23			
12	87.00	87.00	0.00		2.52	6.36			
13	91.00	88.00	-3.00		-0.48	0.23			
14	91.00	88.00	-3.00		-0.48	0.23			
15	87.00	86.00	-1.00		1.52	2.32			
16	87.00	88.00	1.00		3.52	12.41			
17	90.00	85.00	-5.00		-2.48	6.14			
18	89.00	82.00	-7.00		-4.48	20.05			
19	90.00	87.00	-3.00		-0.48	0.23			
20	90.00	87.00	-3.00		-0.48	0.23			
21	90.00	85.00	-5.00		-2.48	6.14			
22	91.00	85.00	-6.00		-3.48	12.09			
23	87.00	87.00	0.00		2.52	6.36			
24	88.00	88.00	0.00		2.52	6.36			
25	87.00	87.00	0.00		2.52	6.36			
26	88.00	84.00	-4.00		-1.48	2.18			
27	89.00	85.00	-4.00		-1.48	2.18			
28	88.00	88.00	0.00		2.52	6.36			
29	88.00	83.00	-5.00		-2.48	6.14			
30	92.00	84.00	-8.00		-5.48	30.00			
31	89.00	90.00	1.00		3.52	12.41			
32	88.00	85.00	-3.00		-0.48	0.23			
33	89.00	87.00	-2.00		0.52	0.27			
34	89.00	86.00	-3.00		-0.48	0.23			
35	88.00	85.00	-3.00		-0.48	0.23			
36	88.00	86.00	-2.00		0.52	0.27			
37	91.00	85.00	-6.00		-3.48	12.09			
38	91.00	87.00	-4.00		-1.48	2.18			
39	89.00	87.00	-2.00		0.52	0.27			
40	87.00	88.00	1.00		3.52	12.41			
41	85.00	88.00	3.00		5.52	30.50			
42	85.00	87.00	2.00		4.52	20.46			
43	87.00	83.00	-4.00		-1.48	2.18			
44	88.00	84.00	-4.00		-1.48	2.18			

TABLE 26
COLUMBIA R. BR. - OLD OREGON TRAIL
EXTRACTION VS COLD FEED 1/4"

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	58.00	59.00	1.00	-2.36	3.36	11.31	2.59	0.39	-6.0563
2	59.00	60.00	1.00		3.36	11.31			
3	55.00	56.00	1.00		3.36	11.31			
4	60.00	55.00	-5.00		-2.64	6.95			
5	59.00	55.00	-4.00		-1.64	2.68			
6	64.00	55.00	-9.00		-6.64	44.04			
7	59.00	58.00	-1.00		1.36	1.86			
8	60.00	61.00	1.00		3.36	11.31			
9	62.00	60.00	-2.00		0.36	0.13			
10	61.00	60.00	-1.00		1.36	1.86			
11	61.00	58.00	-3.00		-0.64	0.40			
12	58.00	57.00	-1.00		1.36	1.86			
13	63.00	59.00	-4.00		-1.64	2.68			
14	62.00	57.00	-5.00		-2.64	6.95			
15	59.00	60.00	1.00		3.36	11.31			
16	60.00	61.00	1.00		3.36	11.31			
17	62.00	56.00	-6.00		-3.64	13.22			
18	61.00	57.00	-4.00		-1.64	2.68			
19	63.00	59.00	-4.00		-1.64	2.68			
20	59.00	59.00	0.00		2.36	5.59			
21	61.00	55.00	-6.00		-3.64	13.22			
22	63.00	59.00	-4.00		-1.64	2.68			
23	58.00	53.00	-5.00		-2.64	6.95			
24	62.00	59.00	-3.00		-0.64	0.40			
25	60.00	57.00	-3.00		-0.64	0.40			
26	60.00	56.00	-4.00		-1.64	2.68			
27	61.00	56.00	-5.00		-2.64	6.95			
28	61.00	59.00	-2.00		0.36	0.13			
29	59.00	54.00	-5.00		-2.64	6.95			
30	62.00	62.00	0.00		2.36	5.59			
31	60.00	61.00	1.00		3.36	11.31			
32	62.00	59.00	-3.00		-0.64	0.40			
33	63.00	61.00	-2.00		0.36	0.13			
34	61.00	61.00	0.00		2.36	5.59			
35	61.00	58.00	-3.00		-0.64	0.40			
36	64.00	60.00	-4.00		-1.64	2.68			
37	63.00	58.00	-5.00		-2.64	6.95			
38	60.00	60.00	0.00		2.36	5.59			
39	62.00	61.00	-1.00		1.36	1.86			
40	60.00	63.00	3.00		5.36	28.77			
41	60.00	61.00	1.00		3.36	11.31			
42	66.00	62.00	-4.00		-1.64	2.68			
43	61.00	58.00	-3.00		-0.64	0.40			
44	62.00	58.00	-4.00		-1.64	2.68			

TABLE 27
COLUMBIA R. BR. - OLD OREGON TRAIL
EXTRACTION VS COLD FEED #10

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	29.00	31.00	2.00	0.68	1.32	1.74	2.02	0.30	2.2384
2	30.00	33.00	3.00		2.32	5.37			
3	29.00	30.00	1.00		0.32	0.10			
4	28.00	30.00	2.00		1.32	1.74			
5	30.00	30.00	0.00		-0.68	0.46			
6	33.00	30.00	-3.00		-3.68	13.56			
7	29.00	33.00	4.00		3.32	11.01			
8	31.00	32.00	1.00		0.32	0.10			
9	31.00	32.00	1.00		0.32	0.10			
10	31.00	31.00	0.00		-0.68	0.46			
11	31.00	32.00	1.00		0.32	0.10			
12	30.00	29.00	-1.00		-1.68	2.83			
13	32.00	32.00	0.00		-0.68	0.46			
14	32.00	31.00	-1.00		-1.68	2.83			
15	30.00	34.00	4.00		3.32	11.01			
16	31.00	33.00	2.00		1.32	1.74			
17	33.00	30.00	-3.00		-3.68	13.56			
18	33.00	31.00	-2.00		-2.68	7.19			
19	33.00	33.00	0.00		-0.68	0.46			
20	31.00	31.00	0.00		-0.68	0.46			
21	31.00	32.00	1.00		0.32	0.10			
22	33.00	35.00	2.00		1.32	1.74			
23	31.00	30.00	-1.00		-1.68	2.83			
24	32.00	34.00	2.00		1.32	1.74			
25	30.00	33.00	3.00		2.32	5.37			
26	32.00	29.00	-3.00		-3.68	13.56			
27	31.00	31.00	0.00		-0.68	0.46			
28	31.00	32.00	1.00		0.32	0.10			
29	31.00	28.00	-3.00		-3.68	13.56			
30	31.00	32.00	1.00		0.32	0.10			
31	30.00	35.00	5.00		4.32	18.65			
32	33.00	32.00	-1.00		-1.68	2.83			
33	34.00	35.00	1.00		0.32	0.10			
34	30.00	34.00	4.00		3.32	11.01			
35	31.00	30.00	-1.00		-1.68	2.83			
36	32.00	33.00	1.00		0.32	0.10			
37	33.00	32.00	-1.00		-1.68	2.83			
38	31.00	32.00	1.00		0.32	0.10			
39	30.00	34.00	4.00		3.32	11.01			
40	31.00	34.00	3.00		2.32	5.37			
41	32.00	33.00	1.00		0.32	0.10			
42	33.00	32.00	-1.00		-1.68	2.83			
43	33.00	32.00	-1.00		-1.68	2.83			
44	33.00	34.00	1.00		0.32	0.10			

TABLE 28
COLUMBIA R. BR. - OLD OREGON TRAIL
EXTRACTION VS COLD FEED #40

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	11.00	11.00	0.00	0.18	-0.18	0.03	0.79	0.12	1.5350
2	11.00	12.00	1.00		0.82	0.67			
3	11.00	11.00	0.00		-0.18	0.03			
4	9.00	11.00	2.00		1.82	3.31			
5	11.00	11.00	0.00		-0.18	0.03			
6	12.00	11.00	-1.00		-1.18	1.40			
7	11.00	12.00	1.00		0.82	0.67			
8	11.00	12.00	1.00		0.82	0.67			
9	12.00	12.00	0.00		-0.18	0.03			
10	11.00	12.00	1.00		0.82	0.67			
11	12.00	12.00	0.00		-0.18	0.03			
12	11.00	11.00	0.00		-0.18	0.03			
13	12.00	11.00	-1.00		-1.18	1.40			
14	11.00	12.00	1.00		0.82	0.67			
15	11.00	12.00	1.00		0.82	0.67			
16	11.00	12.00	1.00		0.82	0.67			
17	12.00	11.00	-1.00		-1.18	1.40			
18	12.00	11.00	-1.00		-1.18	1.40			
19	12.00	12.00	0.00		-0.18	0.03			
20	11.00	12.00	1.00		0.82	0.67			
21	12.00	12.00	0.00		-0.18	0.03			
22	12.00	12.00	0.00		-0.18	0.03			
23	11.00	11.00	0.00		-0.18	0.03			
24	12.00	12.00	0.00		-0.18	0.03			
25	11.00	12.00	1.00		0.82	0.67			
26	11.00	11.00	0.00		-0.18	0.03			
27	11.00	11.00	0.00		-0.18	0.03			
28	11.00	11.00	0.00		-0.18	0.03			
29	11.00	9.00	-2.00		-2.18	4.76			
30	11.00	11.00	0.00		-0.18	0.03			
31	12.00	12.00	0.00		-0.18	0.03			
32	12.00	11.00	-1.00		-1.18	1.40			
33	12.00	12.00	0.00		-0.18	0.03			
34	11.00	12.00	1.00		0.82	0.67			
35	11.00	10.00	-1.00		-1.18	1.40			
36	12.00	12.00	0.00		-0.18	0.03			
37	12.00	12.00	0.00		-0.18	0.03			
38	11.00	11.00	0.00		-0.18	0.03			
39	11.00	12.00	1.00		0.82	0.67			
40	12.00	12.00	0.00		-0.18	0.03			
41	12.00	13.00	1.00		0.82	0.67			
42	12.00	13.00	1.00		0.82	0.67			
43	12.00	12.00	0.00		-0.18	0.03			
44	12.00	13.00	1.00		0.82	0.67			

TABLE 29
COLUMBIA R. BR. - OLD OREGON TRAIL
EXTRACTION VS COLD FEED #200

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	4.20	3.30	-0.90	-1.11	0.21	0.04	0.35	0.05	-21.0419
2	4.40	3.40	-1.00		0.11	0.01			
3	4.00	2.80	-1.20		-0.09	0.01			
4	3.80	3.20	-0.60		0.51	0.26			
5	4.20	3.30	-0.90		0.21	0.04			
6	4.90	3.00	-1.90		-0.79	0.63			
7	4.60	3.30	-1.30		-0.19	0.04			
8	4.60	3.80	-0.80		0.31	0.10			
9	4.60	3.80	-0.80		0.31	0.10			
10	4.40	3.80	-0.60		0.51	0.26			
11	4.80	3.70	-1.10		0.01	0.00			
12	4.70	3.30	-1.40		-0.29	0.08			
13	4.70	3.10	-1.60		-0.49	0.24			
14	4.40	3.60	-0.80		0.31	0.10			
15	4.60	3.80	-0.80		0.31	0.10			
16	4.60	3.90	-0.70		0.41	0.17			
17	4.60	3.20	-1.40		-0.29	0.08			
18	4.60	3.30	-1.30		-0.19	0.04			
19	4.80	3.50	-1.30		-0.19	0.04			
20	4.50	3.60	-0.90		0.21	0.04			
21	4.80	3.40	-1.40		-0.29	0.08			
22	4.40	3.60	-0.80		0.31	0.10			
23	4.10	3.00	-1.10		0.01	0.00			
24	4.50	3.30	-1.20		-0.09	0.01			
25	4.50	3.40	-1.10		0.01	0.00			
26	4.40	3.10	-1.30		-0.19	0.04			
27	4.10	2.90	-1.20		-0.09	0.01			
28	4.30	2.90	-1.40		-0.29	0.08			
29	4.40	3.10	-1.30		-0.19	0.04			
30	4.20	2.40	-1.80		-0.69	0.48			
31	4.80	3.20	-1.60		-0.49	0.24			
32	4.70	3.70	-1.00		0.11	0.01			
33	4.50	3.10	-1.40		-0.29	0.08			
34	4.30	3.40	-0.90		0.21	0.04			
35	4.50	3.50	-1.00		0.11	0.01			
36	4.50	3.10	-1.40		-0.29	0.08			
37	4.80	3.50	-1.30		-0.19	0.04			
38	4.30	3.60	-0.70		0.41	0.17			
39	4.30	3.30	-1.00		0.11	0.01			
40	4.70	3.30	-1.40		-0.29	0.08			
41	4.40	3.30	-1.10		0.01	0.00			
42	4.30	3.80	-0.50		0.61	0.37			
43	4.70	3.30	-1.40		-0.29	0.08			
44	4.40	4.20	-0.20		0.91	0.83			

TABLE 30
CAZADERO - N FORK CLACKAMAS RIVER
EXTRACTION VS COLD FEED 1/2"

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	87.00	88.00	1.00	-0.38	1.38	1.92	2.68	0.53	-0.7306
2	88.00	86.00	-2.00		-1.62	2.61			
3	89.00	88.00	-1.00		-0.62	0.38			
4	85.00	87.00	2.00		2.38	5.69			
5	82.00	84.00	2.00		2.38	5.69			
6	90.00	86.00	-4.00		-3.62	13.07			
7	86.00	87.00	1.00		1.38	1.92			
8	85.00	81.00	-4.00		-3.62	13.07			
9	85.00	86.00	1.00		1.38	1.92			
10	87.00	85.00	-2.00		-1.62	2.61			
11	88.00	88.00	0.00		0.38	0.15			
12	85.00	86.00	1.00		1.38	1.92			
13	88.00	86.00	-2.00		-1.62	2.61			
14	90.00	81.00	-9.00		-8.62	74.22			
15	87.00	87.00	0.00		0.38	0.15			
16	84.00	86.00	2.00		2.38	5.69			
17	87.00	85.00	-2.00		-1.62	2.61			
18	88.00	88.00	0.00		0.38	0.15			
19	91.00	89.00	-2.00		-1.62	2.61			
20	83.00	83.00	0.00		0.38	0.15			
21	83.00	86.00	3.00		3.38	11.46			
22	85.00	89.00	4.00		4.38	19.22			
23	87.00	87.00	0.00		0.38	0.15			
24	85.00	86.00	1.00		1.38	1.92			
25	84.00	86.00	2.00		2.38	5.69			
26	84.00	82.00	-2.00		-1.62	2.61			

TABLE 31
CAZADERO - N FORK CLACKAMAS RIVER
EXTRACTION VS COLD FEED 1/4"

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	64.00	64.00	0.00	-1.08	1.08	1.16	3.44	0.67	-1.5963
2	67.00	63.00	-4.00		-2.92	8.54			
3	65.00	66.00	1.00		2.08	4.31			
4	63.00	65.00	2.00		3.08	9.47			
5	60.00	60.00	0.00		1.08	1.16			
6	67.00	64.00	-3.00		-1.92	3.70			
7	61.00	63.00	2.00		3.08	9.47			
8	57.00	55.00	-2.00		-0.92	0.85			
9	62.00	62.00	0.00		1.08	1.16			
10	63.00	54.00	-9.00		-7.92	62.78			
11	66.00	63.00	-3.00		-1.92	3.70			
12	61.00	62.00	1.00		2.08	4.31			
13	66.00	63.00	-3.00		-1.92	3.70			
14	65.00	54.00	-11.00		-9.92	98.47			
15	65.00	65.00	0.00		1.08	1.16			
16	57.00	58.00	1.00		2.08	4.31			
17	66.00	64.00	-2.00		-0.92	0.85			
18	66.00	65.00	-1.00		0.08	0.01			
19	68.00	66.00	-2.00		-0.92	0.85			
20	57.00	58.00	1.00		2.08	4.31			
21	60.00	63.00	3.00		4.08	16.62			
22	62.00	65.00	3.00		4.08	16.62			
23	65.00	61.00	-4.00		-2.92	8.54			
24	59.00	62.00	3.00		4.08	16.62			
25	61.00	63.00	2.00		3.08	9.47			
26	61.00	58.00	-3.00		-1.92	3.70			

TABLE 32
CAZADERO - N FORK CLACKAMAS RIVER
EXTRACTION VS COLD FEED #10

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	35.00	35.00	0.00	-0.42	0.42	0.18	1.58	0.31	-1.3661
2	34.00	33.00	-1.00		-0.58	0.33			
3	35.00	35.00	0.00		0.42	0.18			
4	34.00	33.00	-1.00		-0.58	0.33			
5	32.00	33.00	1.00		1.42	2.03			
6	35.00	34.00	-1.00		-0.58	0.33			
7	32.00	33.00	1.00		1.42	2.03			
8	30.00	29.00	-1.00		-0.58	0.33			
9	34.00	34.00	0.00		0.42	0.18			
10	33.00	30.00	-3.00		-2.58	6.64			
11	34.00	33.00	-1.00		-0.58	0.33			
12	32.00	33.00	1.00		1.42	2.03			
13	35.00	34.00	-1.00		-0.58	0.33			
14	35.00	30.00	-5.00		-4.58	20.95			
15	35.00	35.00	0.00		0.42	0.18			
16	31.00	31.00	0.00		0.42	0.18			
17	36.00	36.00	0.00		0.42	0.18			
18	34.00	35.00	1.00		1.42	2.03			
19	37.00	36.00	-1.00		-0.58	0.33			
20	32.00	32.00	0.00		0.42	0.18			
21	35.00	33.00	-2.00		-1.58	2.49			
22	33.00	35.00	2.00		2.42	5.87			
23	35.00	33.00	-2.00		-1.58	2.49			
24	32.00	35.00	3.00		3.42	11.72			
25	35.00	35.00	0.00		0.42	0.18			
26	35.00	34.00	-1.00		-0.58	0.33			

TABLE 33
CAZADERO - N FORK CLACKAMAS RIVER
EXTRACTION VS COLD FEED #40

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	15.00	15.00	0.00	-0.04	0.04	0.00	1.04	0.20	-0.1888
2	15.00	15.00	0.00		0.04	0.00			
3	16.00	16.00	0.00		0.04	0.00			
4	15.00	15.00	0.00		0.04	0.00			
5	15.00	15.00	0.00		0.04	0.00			
6	16.00	15.00	-1.00		-0.96	0.92			
7	14.00	14.00	0.00		0.04	0.00			
8	13.00	13.00	0.00		0.04	0.00			
9	15.00	15.00	0.00		0.04	0.00			
10	14.00	14.00	0.00		0.04	0.00			
11	15.00	15.00	0.00		0.04	0.00			
12	14.00	15.00	1.00		1.04	1.08			
13	15.00	15.00	0.00		0.04	0.00			
14	15.00	13.00	-2.00		-1.96	3.85			
15	15.00	15.00	0.00		0.04	0.00			
16	14.00	14.00	0.00		0.04	0.00			
17	16.00	16.00	0.00		0.04	0.00			
18	15.00	15.00	0.00		0.04	0.00			
19	16.00	14.00	-2.00		-1.96	3.85			
20	14.00	14.00	0.00		0.04	0.00			
21	16.00	14.00	-2.00		-1.96	3.85			
22	13.00	16.00	3.00		3.04	9.23			
23	15.00	15.00	0.00		0.04	0.00			
24	14.00	16.00	2.00		2.04	4.16			
25	15.00	15.00	0.00		0.04	0.00			
26	15.00	15.00	0.00		0.04	0.00			

TABLE 34
CAZADERO - N FORK CLACKAMAS RIVER
EXTRACTION VS COLD FEED #200

NOTE: d=X2-X1; D=avg d; Sd=std.dev.; SD=Sd/sg rt(N); t=D/SD

N	X1	X2	d	D	(d-D)	(d-D)^2	Sd	SD	t
1	4.30	6.30	2.00	0.15	1.85	3.42	0.74	0.14	1.0360
2	6.20	6.70	0.50		0.35	0.12			
3	6.60	6.20	-0.40		-0.55	0.30			
4	5.80	6.70	0.90		0.75	0.56			
5	6.10	6.10	0.00		-0.15	0.02			
6	5.70	5.70	0.00		-0.15	0.02			
7	5.90	5.90	0.00		-0.15	0.02			
8	5.20	5.50	0.30		0.15	0.02			
9	5.80	6.70	0.90		0.75	0.56			
10	5.20	5.70	0.50		0.35	0.12			
11	5.20	6.10	0.90		0.75	0.56			
12	5.60	6.40	0.80		0.65	0.42			
13	6.20	6.50	0.30		0.15	0.02			
14	6.90	5.50	-1.40		-1.55	2.40			
15	7.20	6.40	-0.80		-0.95	0.90			
16	6.40	6.10	-0.30		-0.45	0.20			
17	7.00	6.80	-0.20		-0.35	0.12			
18	6.40	6.30	-0.10		-0.25	0.06			
19	7.00	6.80	-0.20		-0.35	0.12			
20	6.40	6.10	-0.30		-0.45	0.20			
21	6.80	6.30	-0.50		-0.65	0.42			
22	5.30	6.50	1.20		1.05	1.10			
23	6.30	6.30	0.00		-0.15	0.02			
24	5.20	6.20	1.00		0.85	0.72			
25	6.50	5.80	-0.70		-0.85	0.72			
26	6.40	5.90	-0.50		-0.65	0.42			