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Water Quality Impacts of Natural Riparian Grasses Part 1: Empirical Studies

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WATER QUALITY IMPACTS OF NATURAL RIPARIAN GRASSES:

PART I. EMPIRICAL STUDIES[1]

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ABSTRACT

Studies were conducted on the effectiveness of natural riparian grass buffer strips in removing sediment and ag chemicals from surface runoff. No till and conventional tillage erosion plots served as the sediment and chemical source area. Runoff from the plots was directed onto 15, 30 and 45 foot filter strips where the inflow and outflow concentrations and sediment size distributions. Trapping percentages for sediment and ag chemicals typically ranged near or above 90 percent. An evaluation was made of the distribution of trapped chemicals among infiltrated mass and mass stored in the surface layer and on plant surfaces. The analysis showed that most of the chemicals were trapped by infiltration onto the soil matrix.

CHAPTER I.I

INTRODUCTION

Widespread interest in improving water quality in surface waters along with a general perception that stream water quality is poor has lead to emphasis on best management practices for controlling agricultural non point source pollution. Physical reasoning coupled with limited data has lead a number of researchers and agency officials to the conclusion that the best places to control non point source pollution are on site where flows are not concentrated into channels. Thus, sediment control is best accomplished while the flow is still classed as shallow overland flow.

One practice that has received widespread interest is the use of vegetated riparian zones to remove chemicals from the flow prior to their entry into a stream. These riparian zones served a number of functions related to surface water quality, including:

- Reduction in flow velocity and resulting loss in transport capacity which leads to deposition of sediment and the adsorbed chemicals on the exchange phase.
- Enhancing infiltration of water, sediment and chemicals into the soil matrix.
- Adsorbing chemicals onto the litter, vegetation and surface layer of soil, all of which reduce the outflow concentration.
- Storing chemicals in the stored soil water in the surface layer for subsequent biological or chemical transformation or uptake between runoff events.

Movement of water, chemicals and sediment through riparian zones is a complex problem, which needs input from a number of disciplinary areas for ultimate definition. A number of studies have been conducted on trapping of sediment and chemicals in natural and constructed grass filter strips.

A sizeable number of studies have been conducted on the impact of riparian zones and constructed vegetative filter strips on water quality, thus an exhaustive discussion would not be feasible. A summary of selected studies is given in Table I.1. Studies on the movement of sediment have been the most definitive, with a number of investigators developing laboratory and field data as well as process based models. Empirical studies have been conducted on grasslands of varying slopes from flat lands near 0% slope to steep slopes near 30%. Trapping efficiencies were frequently greater than 90%, depending on sediment size, slope steepness and length, propensity to channelize and density of vegetation (Hayes and Harriston, 1983; Hayes et al., 1984; Barfield and Albrecht, 1982; Wilson, 1967; Dillaha et al., 1986, 1989; Neibling and Alberts, 1979) These studies along with computer models have shown

that coarser sediments (both primary particles and aggregates) are deposited in a delta at the leading edge of a filter strip, causing channelization to occur after significant deposition. Downstream of the delta, silt size aggregates and primary particles are trapped by settling and infiltration with actual percentages depending on velocity, flow depth, and media density. Clay size primary particles are typically only trapped by movement of particles int he soil matrix with infiltrating water. The studies also show that the effectiveness of the filter strips for trapping sediment decreased with time, particularly if the filter strip became inundated with sediment.

TABLE I.1. EXAMPLES OF PREVIOUS STUDIES ON SEDIMENT TRAPPING

REFERENCE	STUDY LOCATION	FILTER DESCRIPTION	SEDIMENT SOURCE	PLOT LENGTH, m	TRAPPING EFFICIENCY %
Neibling and Alberts, 1979	W. Lafayette, IN	Filterstrip (7%) slope	Cropland	0.6-4.9	> 90
Hayes et al., 1984	Lexington, KY	Fescue (3-20% slope)	Strip mine spoil	30	87-99
Hayes and Harrison, 1983	Starkville, MS	KY 31 fescue (3% slope)	Fallow cropland	30	> 90
Dillaha et al., 1989	Blacksburg, VA	Orchardgrass (5-16% slope)	Silt loam cropland	4.6 9.1	70 91
Parsons et al., 1993	Raleigh, NC	Bermuda and crab grass (slope unknown)	Cropland	4.3-5.3	70
Magette et al., 1989	Maryland	Fescue (slope unknown	Cropland	4.6 5.2	52 75

Studies by Dillaha et al. (1986, 1988, 1989) on 4.6 and 9.1 m plots indicate that trapping is most efficient when flow is spread over the filter strip and that channelization reduces trapping significantly. Even with channelization trapping was in the range of 30 to 60 percent. Studies by Cooper et al (1987) and Lowrence et al (1984, 1988) on naturally occurring riparian vegetation also indicate that these zones are major sinks for sediment.

In other studies, the effectiveness of vegetative filter strips in controlling nutrients in runoff were evaluated. Examples are given in Table I.2, illustrating the highly variable results. In general, the fraction of nutrients trapped increased with filter length, however, nutrients are not trapped as effectively as sediment. In general the very short filter strips were not highly effective in trapping nutrients, and in fact sometimes became a nutrient source of soluble N and P.

Due to a desire to prevent disruption of naturally developed channelized flow, these studies of natural zones did not include monitoring of inflow to the filter strip. Rather, flow from an adjacent similar source plot was monitored and assumed to be the same as the flow onto the filter. Also, there was no partitioning of trapped sediment and chemicals among infiltrated mass, absorbed mass and mass stored in the surface layer. To fill that void, this study had as its objective the development of a data base on trapping of sediment and chemicals in natural grass riparian vegetation where inflows and outflows were carefully measured. In addition, estimates were made of the partitioning of trapped chemicals among those absorbed and infiltrated.

TABLE I.2. EXAMPLES OF PREVIOUS STUDIES ON NUTRIENT TRAPPING

REFERENCE	STUDY LOCATION	FILTER DESCRIPTION	NUTRIENT SOURCE	PLOT LENGTH, m	NUTRIENT	TRAPPING EFFICIENCY, %
Dillaha et al., 1989	Blacksburg, VA	Orchardgrass (5-16% slope)	Cropland runoff	4.6	P_{total}	75
					N_{total}	61
				9.1	P_{total}	87
					N_{total}	61
Dillaha et al., 1988	Blacksburg, VA	Orchardgrass (5-16% slope)	Simulated feedlot	4.6	P_{total}	39
					N_{total}	43
				9.1	P_{total}	52
					N_{total}	52
Doyle et al., 1977		Fescue (10% slope)	Dairy waste on silt loam soil	1.5	$P_{dissolved}$	8
					No_3	57
				4.0	$P_{dissolved}$	62
					No_3	68
Young et al., 1980		Corn-oats-or orchardgrass mixture (4% slope)	Feedlot	13.7	P_{total}	88
					N_{total}	87
		Sorghum-sundangrass mixture 4% slope)		13.7	P_{total}	81
					N_{total}	84
Thompson et al., 1978	Minnesota	Orchardgrass (slope unknown)	Dairy manure or frozen orchardgrass	12	P_{total}	55
					N_{total}	45
				30	P_{total}	61
					N_{total}	69
Magette et al., 1989	Maryland	Fescue (slope unknown)	Cropland runoff	4.6	P_{total}	6
					N_{total}	-15
				9.2	P_{total}	20
					N_{total}	35
Parsons et al., 1992	Raleigh, NC	Bermuda-crabgrass mixture (slope unknown)	Cropland runoff	4.3-5.3	P_{total}	26
					N_{total}	50

CHAPTER I.II

EXPERIMENTAL PROCEDURES

Grass filter strips for this study were selected in 1990 on a natural mixture of bluegrass and fescue sod. These filter strips were located immediately downslope from erosion plots which had been established in 1989. A schematic of the plot and filter strip layout is given in Figure I.1. All of the erosion plots and the filter strips were located on the Kentucky Agricultural Experiment Station Spindletop Research Farm in a well-drained Maury silt loan soil (*fine, mixed, mesic Typic Palendalfs*) with an average slope of approximately 9%. The erosion plots consisted of three conventional tillage plots and three no-tillage plots. The filter strips consisted of one set of duplicates for each filter strip length of 15, 30 and 45 feet. Each erosion plot had a size of 4.5m wide by 22.1 m long. Metal borders were placed on the two sides and the uphill end. The lower end had a narrow (approximately 14 cm) excavated trench across the width of the plot with a combination wood and metal abutment controlling the upslope face. A 10 cm gutter was placed on the downslope side of the wood abutment to facilitate sampling. A metal sampling device with 10 controllable openings was placed over the trench. The openings were normally closed, diverting flow directly onto the filter. When opened, the flow moved directly into the gutter for measuring flow rate and collecting flow samples for sediment and nutrient concentration measurements.

The Kentucky rainfall simulator (Moore et al., 1983) was used to effectively deliver 6.35 cm (2.5 in) of simulated rainfall per hour for 2 hours on the erosion plots to simulate a 1 in 10 year storm on an intensity basis. This rainfall event was repeated once on each plot after a period of approximately three weeks. The erosion plots and the filter strips were wetted to the point of runoff prior to conducting each rainfall event. Immediately prior to run 1 on each plot, chemicals were broadcast applied to the erosion plot at rates shown in Table I.3. Runoff from both the erosion plots and the filter strips was sampled periodically through both runs. Runoff from the erosion plots onto the filters was measured and sampled for 10 seconds on 5 minute intervals. Flow rates were measured volumetrically and separate samples were taken for laboratory determination of sediment and chemical concentrations. One liter samples were taken for sediment analysis and 0.5 liter samples for chemical analyses. Samples taken for chemical concentrations were stored at 28 °C to prevent degradation. Sediment analyses were conducted gravimetrically. Soluble nitrate and ammonium analyses were conducted with a Technicon Auto Analyzer System II with AI-400 computer software. Soluble phosphorus was measured with an automated microplate reader, model EL 311 with a colorimetric method. Bromide was measured with an ion specific electrode and soluble atrazine was measured with an immunoassay method. Further details are given in Madison (1992).

TABLE I.3. CHARACTERISTICS OF FILTER STRIPS

	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6
Filter length, m	9.14	9.14	13.72	4.57	4.57	13.72
Slope %	9	9	9	9	9	9
Source Plot Tillage	CT[1]	NT[2]	NT	CT	NT	CT
Chemicals Applied to Erosion Plots						
• 170 kg N/ha as granular ammonium nitrate						
• 44 kg P_2O_5/ha as triple super phosphate						
• 33.6 kg Br/ha as granular potassium bromide						
• 2.24 kg atrazine/ha						
Soil Type - Maury Silt Loam						
Simulated Rainfall Intensity	Event 1 - 63.5 mm/h for 2 hours					
	Event 2 - 63.5 mm/h for 2 hours (approximately 3 weeks after Event 1)					

[1]CT - Conventional Tillage; [2] No Tillage

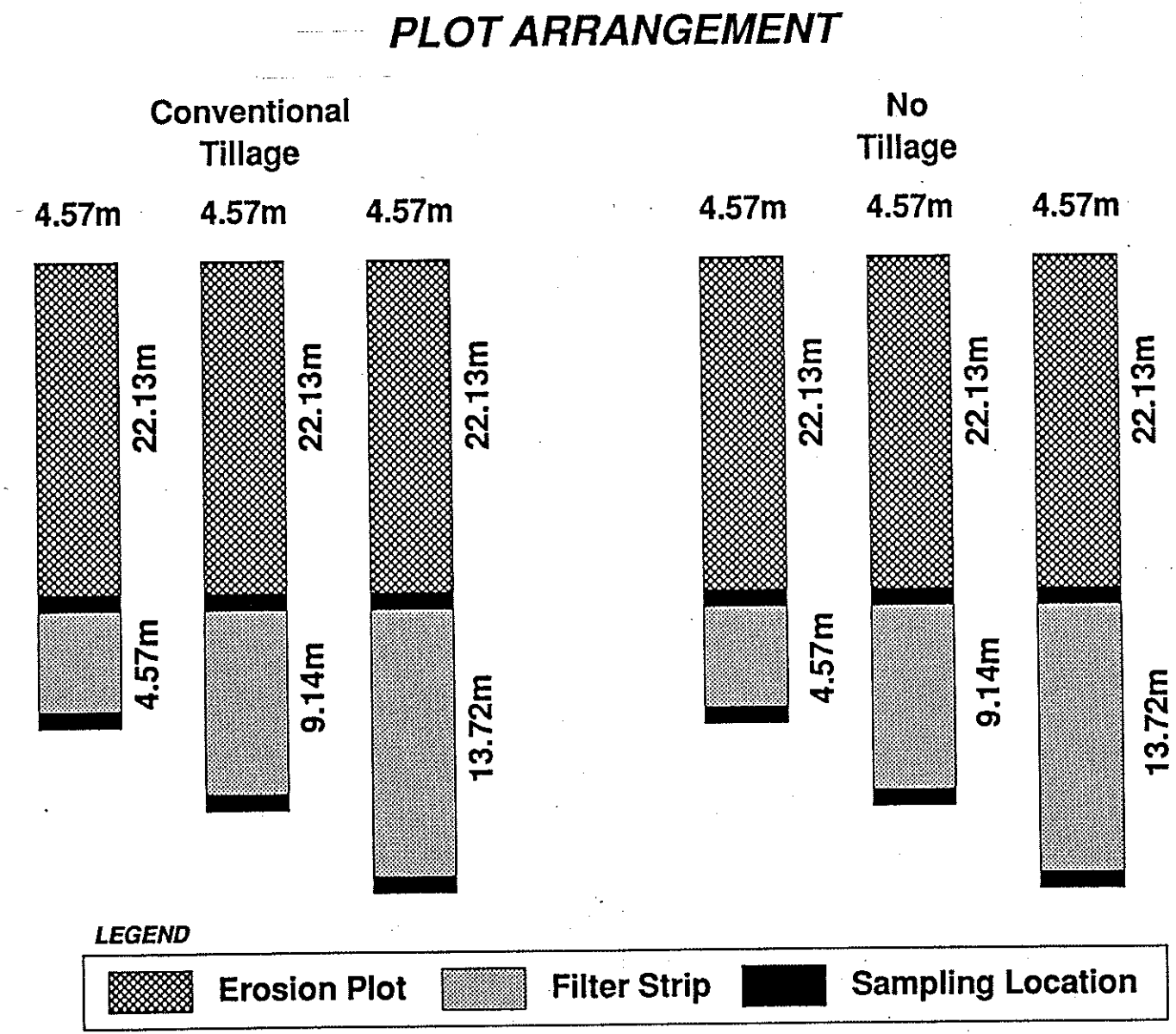

Figure I.1. Schematic of the erosion plot and filter strip arrangement.

CHAPTER I.III

DATA ANALYSIS PROCEDURES

The analysis being conducted is of the impact of the riparian zone on sediment and on dissolved solids. No analysis was conducted on trapping of chemicals on the exchange phase of the sediment.

The simplest analysis that can be made is to determine the trapping efficiency, which is simply

$$T_E = \frac{M_i - M_o}{M_i} \qquad \text{(I.III.1)}$$

where M_i is the total mass flowing onto the filter and M_o is the total mass flow off the filter. M_i and M_o are given by

$$M_i = \int_0^T q_i C_i \, dt \qquad \text{(I.III.2)}$$

and

$$M_o = \int_0^T q_o C_o \, dt \qquad \text{(I.III.3)}$$

where C_i and C_o are inflow and outflow concentrations, q_i and q_o are inflow and outflow rates and T is the duration of the test.

Dissolved solids and sediment are trapped by several mechanisms as illustrated in Figure I.2, or

- Infiltration of mass into and through the soil matrix, carried there by the infiltrating water.
- Absorption onto vegetation and the soil surface layer plus storage in the soil water in the surface layer.

Rather than simply predicting the trapping efficiency, it would be desirable to divide it into fraction infiltrated and fractions absorbed and stored on vegetation and the surface layer. This would require partitioning the trapped sediment. Using the mass balance shown in Figure I.2,

$$M_i - M_o = M_{inf} + M_{as} \qquad \text{(I.III.4)}$$

where M_{inf} is mass infiltrated and M_{as} is mass adsorbed and stored on vegetation and in the surface layer. The mass stored would likely be stored in the water in the soil matrix. Mass adsorbed would be adsorbed on both the soil matrix in the surface layer and on the vegetation. The soil surface layer is that layer that both receives and discharges flow from the overland flow. Infiltrated water, on the other hand, is that flow that moves into the soil matrix and does not return to the surface layer.

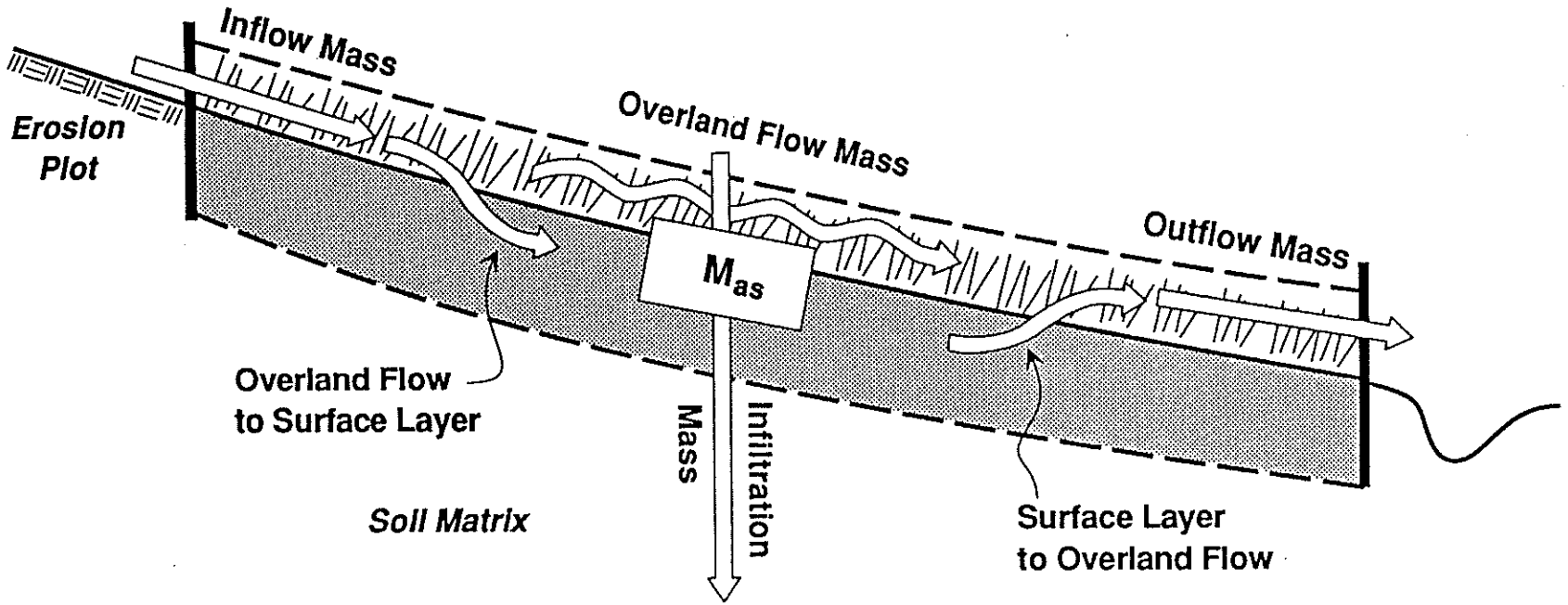

Figure I.2. Illustration of the mass balance for a given dissolved solid on the filter strip.

To be able to calculate mass infiltrated, the infiltrated volume must be known. This is calculated as the difference between inflow and outflow volume of runoff. Knowing the infiltrated volume, $\forall_{inf}$, the mass infiltrated into the soil matrix becomes

$$M_{inf} = \forall_{inf} C_{avg} \qquad \text{(I.III.5)}$$

where C_{avg} is the average concentration over the filter, or

$$C_{avg} = \frac{\overline{C_i} + \overline{C_o}}{2} \qquad \text{(I.III.6)}$$

where $\overline{C_i}$ is the average inflow concentration and $\overline{C_o}$ is the average outflow concentration, both averaged over the duration of the test.

Knowing M_{inf}, M_i and M_o, then M_{as} can be calculated as a residual, or

$$M_{as} = M_i - M_o - M_{inf} \qquad \text{(I.III.7)}$$

Equations 5 through 7 can be used to make a first partition of the chemicals among the various components.

It would also be desirable to determine which portions of M_{as} are attributed to mass absorbed on vegetation and the surface layer soil matrix, M_{avs}, and that which is simply stored in the surface layer soil water, M_{sint}, or

$$M_{as} = M_{avs} + M_{sint} \qquad \text{(I.III.8)}$$

The mass stored in the surface layer soil water can be determined if the exchange or interflow volume, $\forall_{int}$, is known. This would be the volume that flows into and out of the surface layer, as illustrated in Figure I.2. The net mass of chemical stored in the soil water in the surface layer would be equal to the mass flow into the surface layer by interflow minus the mass flow out of the surface layer by interflow, or

$$M_{sint} = \forall_{int}\left[\frac{\alpha\overline{C_i} + \beta\overline{C_o}}{2} - C_{sw}\right] \qquad \text{(I.III.9)}$$

where C_{ss} is the concentration of the chemical in the surface layer and α and β are coefficients to account for the fact that the average inflow concentration is not necessarily equal to the average concentration on the filter. A method for calculating $\forall_{int}$ will be discussed subsequently. The mass absorbed on the surface layer and the vegetation is determined by residual, or

$$M_{asv} = M_{as} - M_{sint} = M_{as} - \forall_{int}\left[\frac{\alpha\overline{C_i} + \beta\overline{C_o}}{2} - C_{sw}\right] \qquad \text{(I.III.10)}$$

As mentioned previously, the surface layer is that layer that exchanges water both ways with the surface runoff, that is, water moves into the surface layer from overland flow and returns back to surface flow further downstream. This can be referred to as pseudo interflow. Using the bromide data, the volume of interflow can be estimated. from the bromide data. Only a small fraction of the Bromide should have been absorbed on the soil and vegetation matrix, so it can be assumed that the bromide trapped should have been either infiltrated into the soil matrix, or stored in the soil water in the surface layer. Using the mass absorbed for bromide, as determined by equation 7, the volume infiltrated can be determined by making the assumption that the mass stored in the surface layer is zero at the start of the test, that is, C_{sw} is 0.0, and that α and β are 1.0. In this case, M_{int} is equal to M_{as} and

$$\forall_{int} = \frac{M_{as,br}}{C_{avg,br}} \qquad \text{(I.III.11)}$$

where the additional subscript, br, references this particular calculations only to bromide.

If the assumption is made that C_{sw} is zero and α and β assumed to be 1.0 for any chemical, then $\forall_{int}$ can be used with the average concentration for any chemical to calculate the mass stored, or

$$M_{sint} = \forall_{int} C_{avg} \qquad \text{(I.III.12)}$$

By residual, the mass absorbed on the soil matrix and vegetation, M_{asv}, is given by

$$M_{asv} = M_{as} - M_{sint} \qquad \text{(I.III.13)}$$

These calculations are summarized in the following section.

CHAPTER I.IV

RESULTS

Trapping Efficiency

Using the concentrations and flow rates measured at the end of the erosion plot and filter, the inflow and outflow mass was calculated and utilized to determine the trapping efficiency for sediment and dissolved solids and the mass of water infiltrated. These values are summarized in Tables I.4 and I.5. The trapping efficiencies for sediment and chemicals were generally higher than those observed by other researchers for similar sized plots. This is not surprising, since the plots were in an area of Karst topography, characterized by well structured soils with rapid infiltration rates. Although the vegetative plots were saturated prior to the test to the point of flow through to the outlet, the infiltration rates were still extremely high, as evidenced by the high fraction of runoff which infiltrated in the filter strip (see Table I.5). One would anticipate that much of the trapping was a result of infiltration into the soil matrix. This will be evaluated in the following section.

Partitioning of Fraction Trapped: Infiltration, Absorption and Storage

The infiltrated mass, M_{inf}, and mass absorbed and stored on the surface layer and vegetation, M_{as} were determined by equations 5 and 7 for dissolved solids and normalized by the total mass flowing off the erosion plots (inflow mass to the filter strips). These values are plotted in Figures I.3 and I.4. Since sediment is deposited and infiltrated differentially by size fractions, this analysis was not made for sediment.

The results show that fraction absorbed generally increases with plot length while the fraction infiltrated decreases. This is consistent with what would be expected, that is, the opportunity for absorption increases with increasing length, causing a decrease in average concentration. Since the infiltrated mass is equal to the infiltrated volume times the average concentration over the filter, this would correspond to a decrease in the infiltration fraction.

By partitioning these results as shown, one can get some indication of the potential impact of a filter strip in areas where infiltration is minimal. In that case, it would be anticipated that the fraction trapped would either be absorbed or stored in the surface layer. The results in Figure I.4 indicate that this fraction could range from near zero for phosphorous on the 15 ft strip to near 50 percent on longer strips.

The negative values for absorption of phosphorous are indicative of phosphorous being generated on the filter strip. During the tests, some of the phosphorous was transported off the plots in granular form and on the active phase of the sediment. and would not have contributed to the mass of dissolved phosphorous calculated by equation 2. This was typically deposited in the delta that formed at the inlet to the filter strip. For the very short filter strips, this delta covered much of the strip length, providing a source of dissolved phosphorous for the outflow measurement. These measurements are consistent with results presented by Dillaha (1989) who indicated that effluent concentrations of phosphorous were sometimes greater than inflows.

TABLE I.4 MASS OF SEDIMENT AND CHEMICALS IN RUNOFF FROM EROSION PLOTS AND FILTER STRIPS

FILTER STRIP LENGTH and NO		RUNOFF kg		ATRAZ mg		PHOSPH mg		NO_3-N mg		NH_4-N mg		SED kg	
		EP	FS	EP	FS	EP	FS	EP	FS	EP	FS	EP	FS
4.57 m length - CT	Event 1	6,073	713	288	23.2	10,140	1,270	5,232	574	21,840	2,678	103	2.62
	Event 2	9,268	942	197	15.8	1,710	203	11,300	539	23,670	1,814	258	8.44
4.57 m length - NT	Event 1	9,230	470	2,049	97.1	34,850	2,513	117,300	1,970	120,000	2,974	55.7	.018
	Event 2	9,009	720	292	13.5	6,658	387	20,840	466	22,320	1,750	67.4	4.13
9.14 m length - CT	Event 1	3,223	27.7	49.8	.007	11,940	45.0	7,570	8.24	23,220	49.3	26.6	.0188
	Event 2	6,982	617	361	.534	268,900	21,110	304,000	23,060	307,300	21,54 0	21.2	1.10
9.14 m length - NT	Event 1	4,306	*	15.5	*	1,446	*	1,506	*	3,852		19.6	*
	Event 2	473	11.6	40.6	.252	1,377	1.3	10,220	7.10	10,470	* 6.80	21.5	.00105
13.72 m length - CT	Event 1	8,859	623	35.29	78.6	40,640	1,713	63,770	3,274	114,400	59,36	28.4	2.09
	Event 2	11,634	706	456	17.9	2,982	232	15,220	3,269	42,210	0 2,149	36.1	2.06
13.72 m length - NT	Event 1	609	*	46.8	*	452	*	591	*	1,337		.098	*
	Event 2	4,932	478	111.3	.405	1,300	30.0	1,350	48.7	9,973	* 33.8	10.3	.00244

EP - Mass discharged from erosion plot; FS - Mass discharged from filterstrip; CT - Erosion plot treated with conventional tillage; NT - Erosion plot treated with no tillage; * - No discharge from the filter strip.

TABLE I.5. TRAPPING EFFICIENCIES FOR SEDIMENT AND CHEMICALS

PLOT LENGTH	% RUNOFF INFIL	TRAPPING EFFICIENCIES[1]				
		ATRAZ	PHOS	NO_3-N	NH_4-N	SED
4.57 m length	91.4	93.5	89.9	93.6	92.5	98.6
Event 1	90.8	93.6	88.2	95.3	92.1	95.2
Event 2	91.1	93.5	89.1	94.4	92.3	96.9
Average						
9.14 m length	99.6	99.9	99.8	99.9	99.9	99.7
Event 1	95.4	99.6	96.4	96.1	99.4	99.7
Event 2	97.5	99.8	98.1	98.0	99.7	99.7
Average						
13.72 m length	96.4	98.9	97.4	97.4	97.4	99.6
Event 1	96.9	97.8	97.3	97.0	97.3	99.7
Event 2	96.7	98.4	97.3	97.2	97.3	99.7
Average						

[1]Average of no-till and conventional till plots.

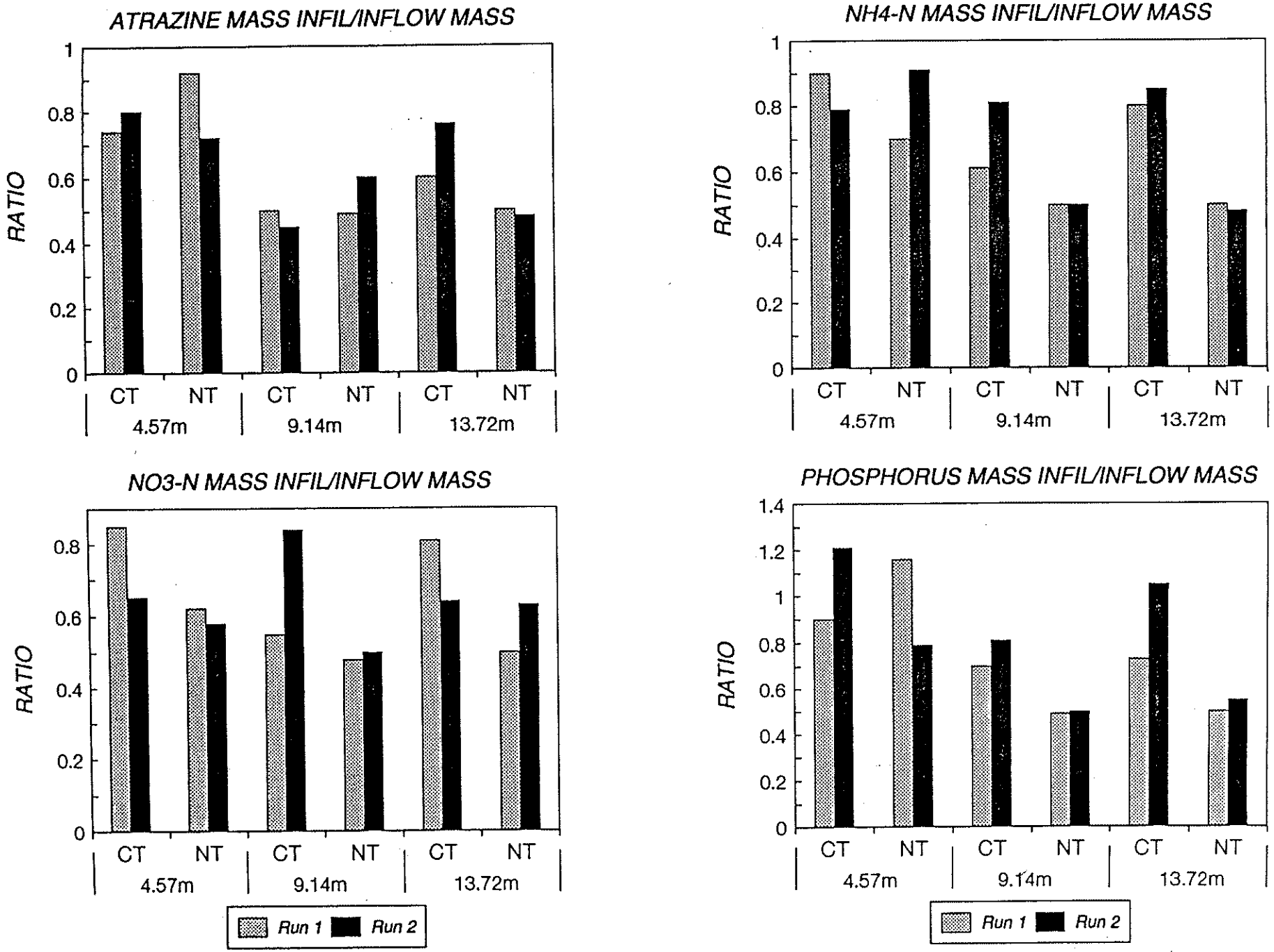

Figure I.3. Infiltrated mass for all chemicals, plot lengths and tillage treatments.

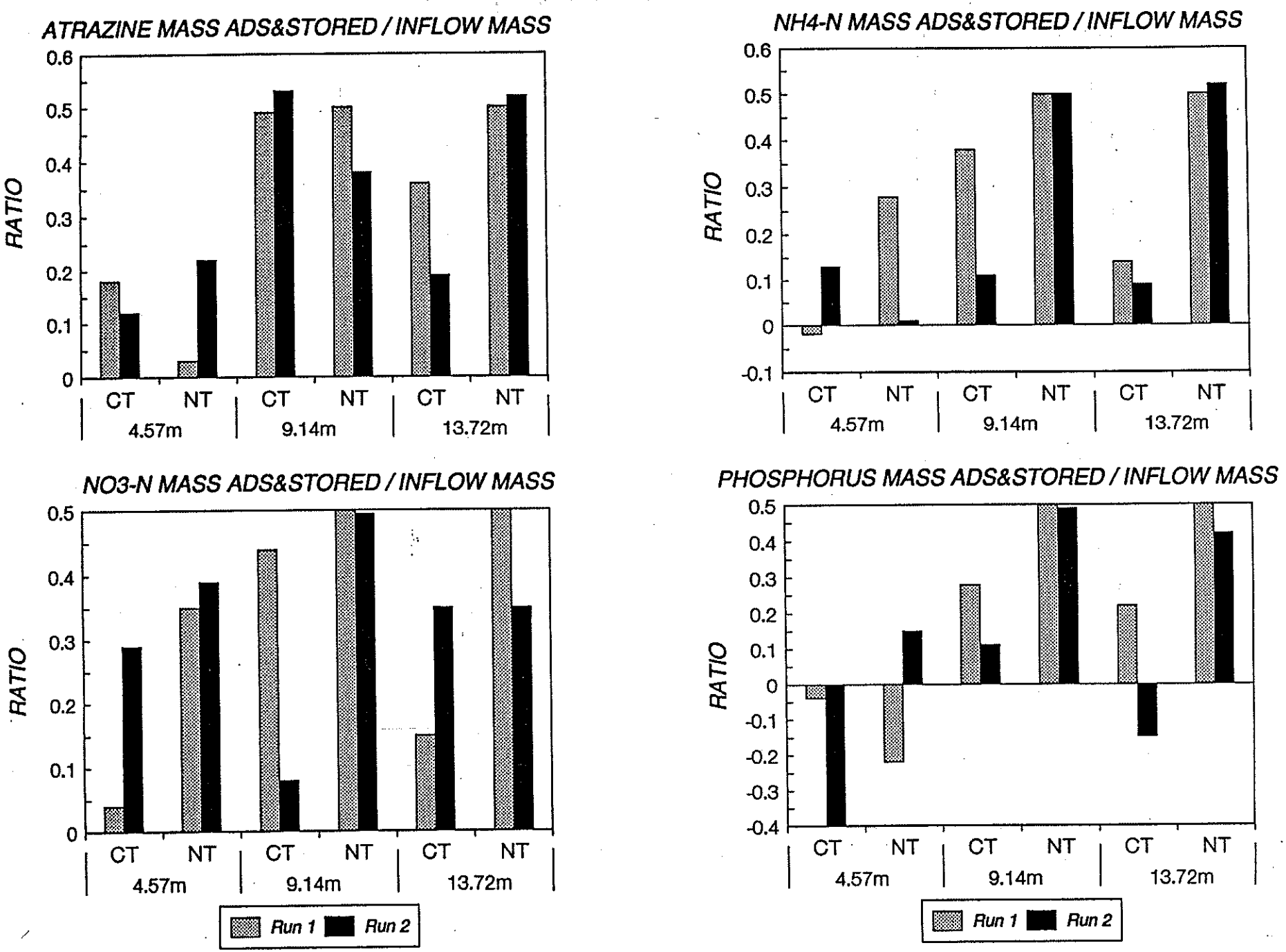

Figure I.4. Absorbed and stored mass for all chemicals, plot lengths and tillage treatments.

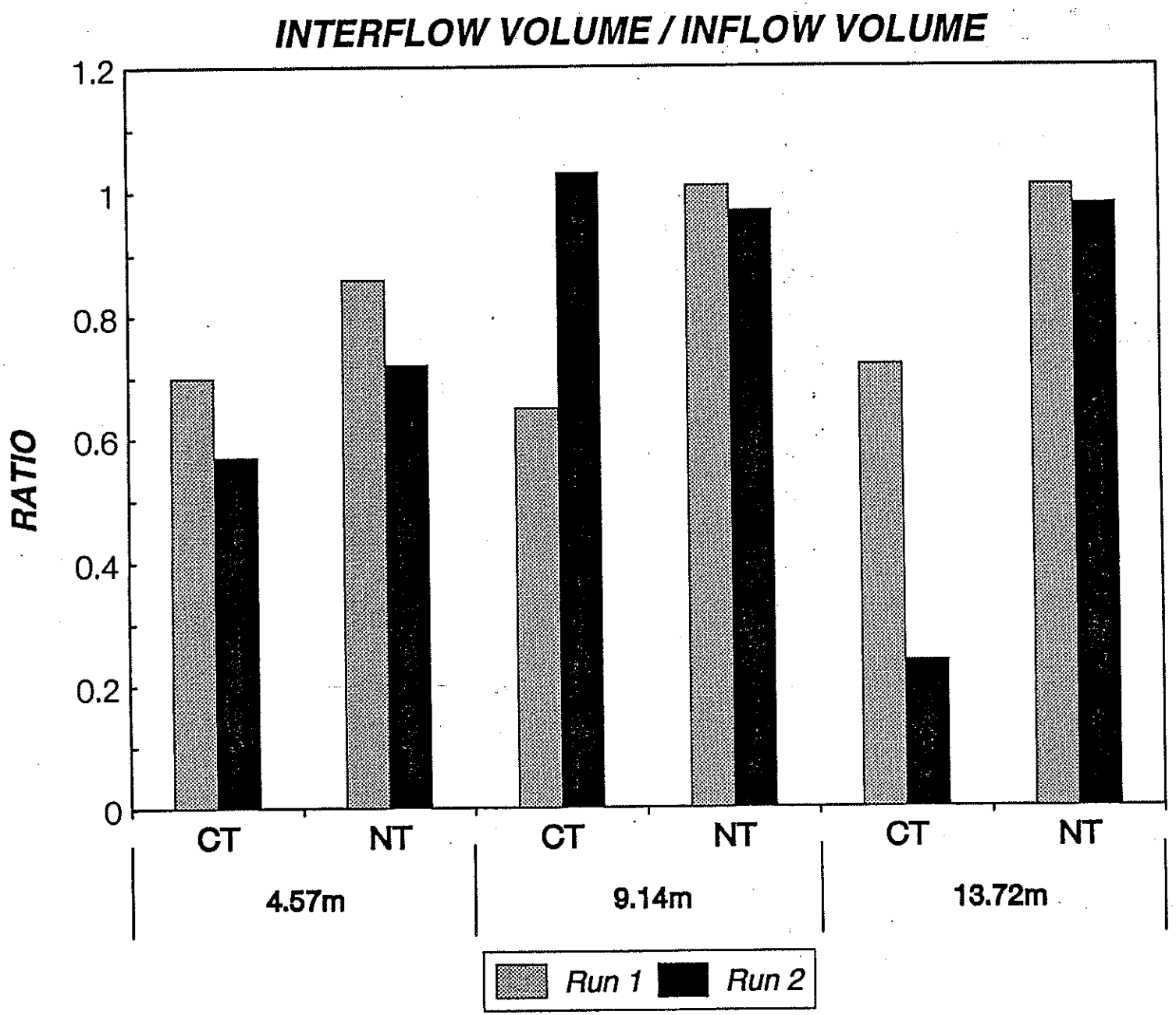

Figure I.5. Volume of interflow as a fraction of the plot runoff.

Volume of Interflow

The volume of interflow, V_{int}, was calculated from the bromide data, utilizing the relationship in equation 11. The results are shown in normalized form in Figure I.5. These values can be interpreted as the fraction of plot runoff that becomes interflow at some point along the filter. In general, the fraction increases with plot length as would be expected.

The high fraction is indicative of the exchange occurring between the surface runoff and the surface layer. These results imply that most of the water stored in the surface layer at the beginning of runoff will be exchanged with the runoff onto the filter strip. Thus, the microbial and plant uptake processes which cause denitrification, degradation of chemicals and reduction of chemical concentration in the surface layer between runoff events will determine to a great extent the effluent concentrations from filter strips when infiltration is high.

Partitioning the Fraction Absorbed and Stored.

It would be desirable to determine the distribution of M_{as} between that stored in the surface layer and that absorbed on the soil and vegetation. Such a determination would require knowledge of the initial concentration of chemicals stored in the surface layer at the start of runoff. Since these measurements were not available, that determination could not be made. An analysis was made of the data based on the assumption that the initial concentration were 0.0, as given in equations 12 and 13. In that case, the soil and vegetation matrix became a source of chemicals in nearly all cases. The results of that analysis are not presented, since the assumption of zero initial concentration is not realistic in many cases, however, it does indicate that the quantity absorbed on the soil and vegetation is likely small.

Inflow and Outflow Concentrations

Peak Concentrations. An important impact of riparian vegetative filter strips is to decrease the peak concentration in runoff. Such a decrease in peak results in a lowered peak discharge in the receiving stream and, hopefully, a lower impact. An example of the impact of the riparian grass vegetation on the concentrations of atrazine for the 4.56 m filter strips is given in Figure I.6 (note the difference in scales for inflow concentration from the erosion plot and discharge concentration from the filter strip. The results show a greatly reduced peak discharge. The ratio of peak outflow to peak inflow concentrations was evaluated in this study and is presented graphically in Figure I.7 for all tests. Based just on peak flows, it is obvious that the filter strips had a significant impact on water quality.

Average Concentrations. Much of the reduction in peak concentration shown in Figure I.7 is a result of early infiltration of high concentration runoff from the erosion plot. As can be seen in Figure I.7, there is a time delay between the start of runoff onto the filter and the time when discharge begins to occur from the filter. During this time, essentially all of the water and accompanying hich concentration chemicals flowing onto the filter are infiltrated. With

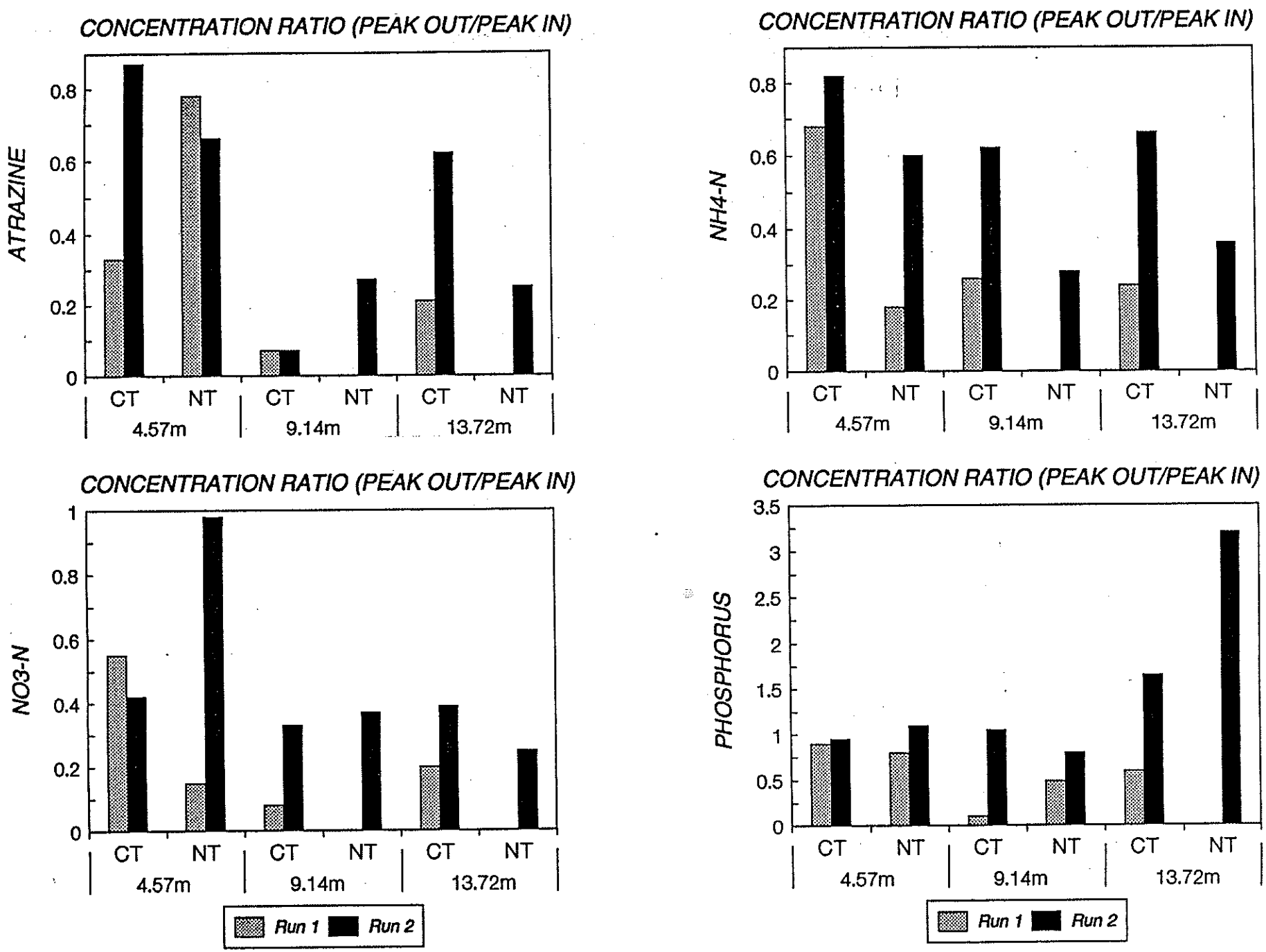

Figure I.7. Ratio of peak outflow to inflow concentrations.

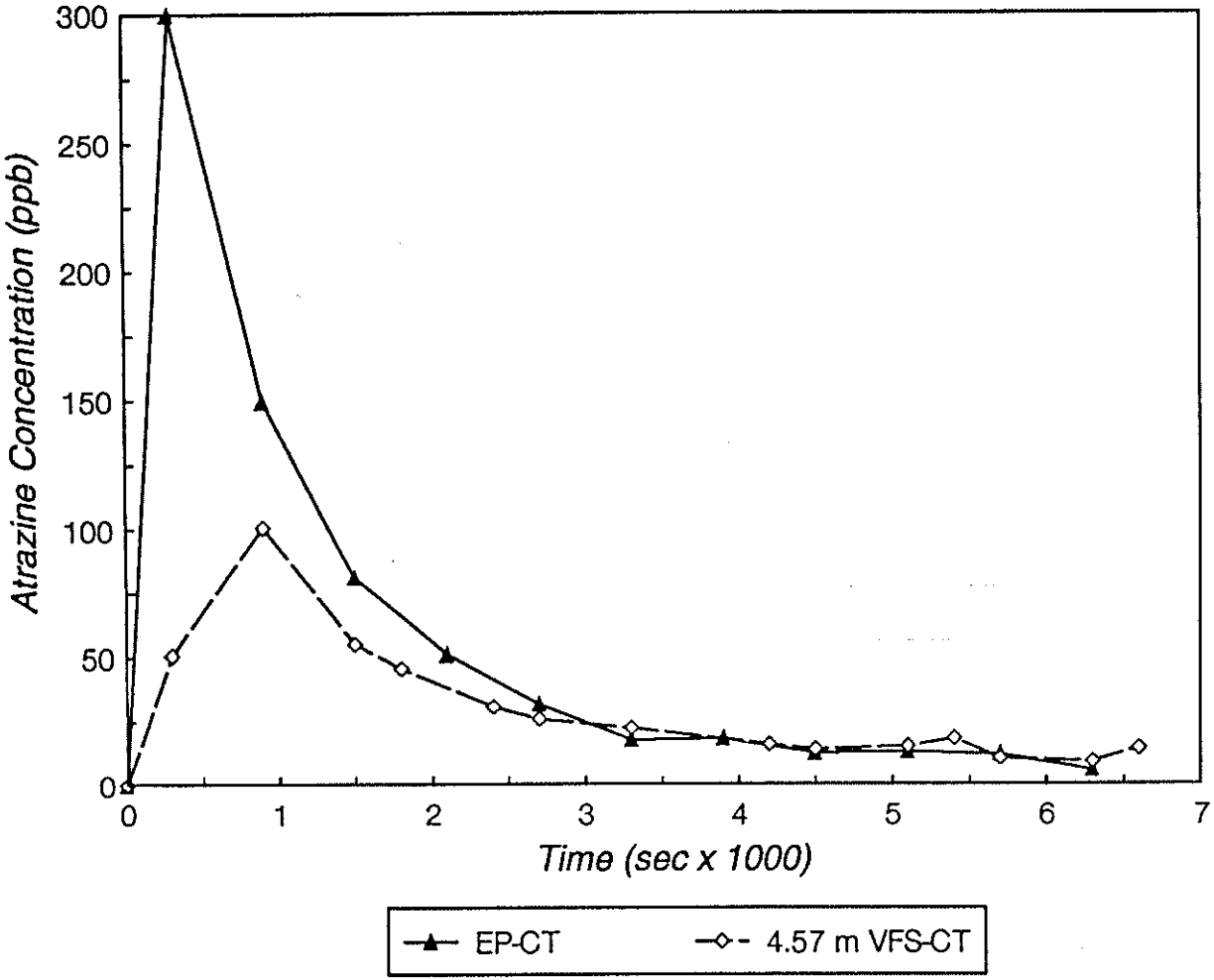

Figure I.6. Inflow and outflow concentrations for Atrazine on the 4.57 m plots. Note the change in scales for the inflow from the erosion plots and the discharge from the filter.

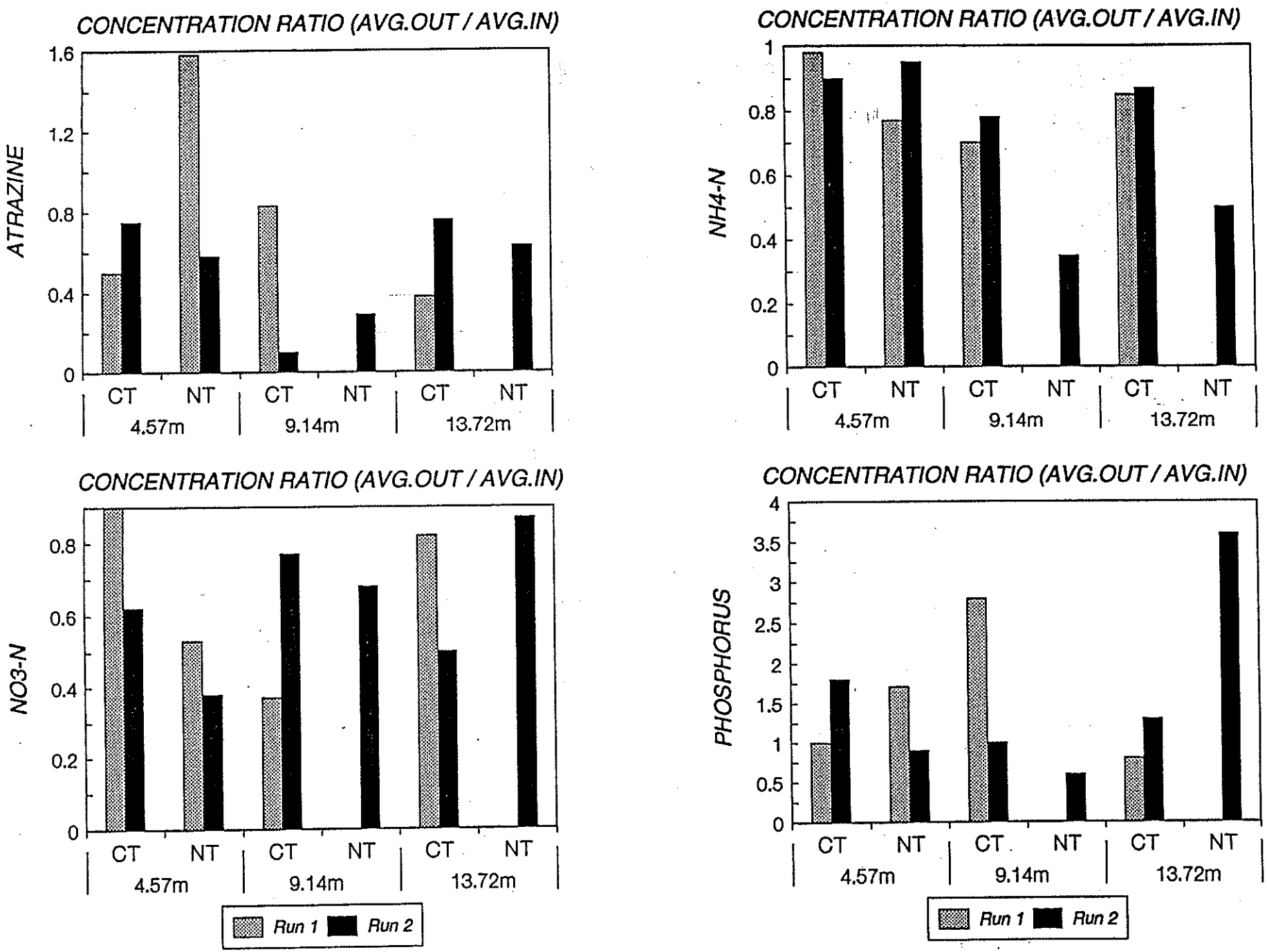

Figure I.8. Ratio of average outflow to average inflow concentration after flow begins.

passing time, the concentration of chemicals in the inflow from the erosion plot approaches a pseudo steady value and the reduction in concentration must be due to dilution from interchange with the surface layer and storage. An indication of the these later impact of the filter in reducing the concentration in the runoff can be seen in the ratio of concentrations for time periods after discharge occurs from the filter. The ratio of average concentration from the filter to that from the erosion plots for this later time period is given in Figure I.8. With the exception of phosphorus, the average concentration ratios are generally less than one, indicating some filtering of chemicals. Phosphorous concentration ratios are generally greater than 1, indicating that the filter is a source of phosphorus after the inflows and outflows reach some quasi equilibrium.

SUMMARY

Studies were conducted on the impact of natural riparian fescue strips on discharge of water, sediment and agricultural chemicals. Filter strips of naturally occurring fescue of lengths from 4.57, 9.14 and 12.72 m were utilized downslope from standard erosion plots to trap sediment and chemicals. The erosion plots were treated with atrazine, nitrogen, phosphorus, and bromide. Rainfall was applied to the plots with the University of Kentucky Rainfall Simulator. Runoff from the erosion plots was directed onto the filter and measurements made of the flow into the filter and off the filter. The results showed that the filters trapped over 90 percent of sediment and chemicals. Estimates were made of the distribution of trapping among infiltration mass and storage and absorption on the soil surface layer. It was determined that the major trapping mechanism was by infiltration, followed by storage in the surface layer.

Bromide concentrations were used to estimate the volume of interflow into the surface layer. The results indicate that the majority of the flow from the erosion plot flows into and out of the surface layer at some point along the filter.

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APPENDIX A

Raw Data

Runoff Rate
Sediment Concentration
Chemical Constituent Concentrations

PLOT #: 1 (RUN 1) DATE: 6/25/91
TYPE: CT STRIP LENGTH (ft): 30

time (sec)	runoff rate (g/min)	NH4+ conc (ppm)	NO3- conc (ppm)	atrazine conc (ppm)	phosphorus conc (ppm)	sediment conc (g/ml)	bromide conc (ppm)
EROSION PLOT							
0	0	0	0	0	0	0	0
300	21018	11.00037	6.51478	265.61	11.91666	0.006019	2.19316
480	16674	14.89871	7.89162		22.37500		1.14086
660	15504	5.76269	2.0841	189.384	16.00278	0.004629	1.77687
941	21249	9.25678	3.272553		5.13368		1.51426
1181	20934	8.06539	3.17442	147.632	13.37500	0.006902	1.20146
1421	23304	8.23068	2.90236		9.24791		0.67785
1661	25617	12.48418	6.0884	94.667	8.10584	0.008031	0.40681
1900	31324	6.24298	2.05833		5.41443		0.56782
2141	32412	5.04967	1.23468	82.42762	4.79559	0.005946	1.45036
2440	33388	4.75027	0.98204		5.11142		0.84707
2741	36740	5.3383	1.08588	63.652	2.53926	0.005397	1.14086
3041	33683.54	5.6417	1.61945		2.01973		1.26271
3340	38118	4.75451	1.04219	51.1	1.79545	0.005857	0.67785
3641	42120	4.04697	1.31071		1.84090		0.51363
3941	51360	4.55748	0.84486	52.369	1.65909	0.005860	0.40681
4240	55272	4.85882	1.02561	35.52051	1.11910		0.73369
4541	48864	4.00673	0.84145	26.053	1.13636	0.007204	1.38714
4841	49920	3.72906	0.77334		0.72727		1.20146
5140	51792	2.50373	0.69463	44.833	0.82575	0.014726	0.79009
5441	55788	3.69026	0.56254		0.81060		1.3246
5680	67428	3.45942	0.50522	20.475	0.56060	0.005606	1.91255
5981	66780	3.35672	0.55116		0.45454		0.45996
6281	61998	3.28077	0.65674	16.314	0.66666	0.008991	0.35419
6580	73674	3.23068	0.62811		0.54545		0.40681
6881	63426	0.63201	3.032	15.273	0.58333	0.014065	0.30207
7181	67482	1.00664	0.07642		0.37878		1.3246
7480	68664	1.33621	0.016793	23.349	0.59090	0.000719	2.19316
7781	67590	2.89332	0.61644	15.103	0.35606		0.62256
FILTER STRIP							
5520	0.002762	0.93301	0.13606	18.156	1.42424	0.000716	0.56782
6300	0.008850	0.73915	0.13039		1.47727		0.90463
6520	0.016667	0.90387	0.1302	13.191	1.54545	0.000629	1.26271
6760	0.023810	0.51286	0.022258		1.41666		0.40681
6880	0.020202	4.01669	0.49027		1.84868	0.000670	1.02153
7000	0.030769	2.93525	0.58473	14.74717	1.30303		0.96278
7240	0.022989	1.4662	0.27382	14.848	0.96969		0.51363
7420	0.020202	1.94721	0.53185		1.85606		0.67785

PLOT #:	2 (RUN 1)		DATE:	6/27/91			
TYPE:	NT		STRIP LENGTH (ft):		30		
time (sec)	runoff rate (g/min)	NH4+ conc (ppm)	NO3- conc (ppm)	atrazine conc (ppm)	phosphorus conc (ppm)	sediment conc (g/ml)	bromide conc (ppm)
EROSION PLOT							
0	0	0	0	0	0	0	0
300	2834.4	3.69172	0.76106	344.369	2.45394	0.004044	1.38714
600	3882	6.98577	2.72304		1.98026		1.26271
900	4092	5.45641	1.91755	220.113	1.80921	0.003344	1.02146
1200	4302	6.98392	2.30051		1.14528		1.20146
1500	6032	6.85011	2.59932	104.938	1.74342	0.003521	1.3246
1800	6938	3.79677	0.73629		1.78459		1.20146
2100	7142	5.19634	1.36145	95.97	1.84868	0.003033	1.45036
2400	9438	0.93989	3.42742		1.52272		0.96278
2700	10262	3.21048	1.39694	101.948	1.72727	0.002773	1.08088
3000	12824	3.52246	1.42234	90.666	1.29605		0.79009
3300	13020	4.12512	2.14596	78.08	1.46212	0.002727	0.96278
3600	11722	3.03833	1.1757		0.92277		1.02153
3900	12086	3.00272	1.28348	73.583	1.28030	0.002545	1.84433
4200	14058	3.143133	1.36348		1.06974		1.60975
4500	14376	2.26641	0.77651	58.91	0.85078	0.001992	1.3246
4800	14523	1.72274	0.38899		0.72643		1.38714
5100	12638	3.07517	1.16754	58.216	0.92931	0.002025	1.51426
5400	12962	2.12457	0.6254		0.96002		1.38714
5700	13538	2.25754	0.65544	36.034	0.99242	0.002386	1.14086
6000	14200	2.33342	0.72315		0.94240		1.45036
6300	14256	2.03542	0.5923	90.256	0.59848	0.002952	1.03542
6600	14130	1.493754	0.47046		0.60606		0.79009
6900	14490	2.27305	0.60387	59.33	0.59554	0.002441	1.20146
7200	14492	1.85555	0.41013		0.60863		1.08153

NO RUNOFF FROM FILTER STRIP: PLOT 2 RUN 1

PLOT #: 3 (RUN 1) DATE: 7/1/91
TYPE: NT STRIP LENGTH (ft): 45

time (sec)	runoff rate (g/min)	NH4+ conc (ppm)	NO3- conc (ppm)	atrazine conc (ppm)	phosphorus conc (ppm)	sediment conc (g/ml)	bromide conc (ppm)
EROSION PLOT							
0	0	0	0	0	0	0	0
300	2670	4.09283	2.26647	72.067	0.85078	0.003360	2.60192
600	3358	2.28214	1.17932		0.78787		1.20146
900	4182	3.74878	1.87589	192.39	0.65445	0.001518	1.98153
1200	3878	3.00616	1.43549		0.55628		1.84453
1500	4264	5.28538	2.44605	145.659	0.55628	0.001455	1.64414
1800	5238	5.29632	2.45698		3.07591		0.90463
2100	5018	4.21274	0.60449	132.877	2.08333	0.001192	2.05128
2400	5952	1.80671	0.79422		0.71989		1.98153
2700	5628	4.05043	1.80836	91.637	0.63914	0.004259	1.45036
3000	5438	2.30255	0.65146		0.53664		0.73369
3300	5678	1.09506	0.322628	51.732	0.53010	0.001198	1.64414
3600	7042	1.67268	0.53186		0.62121		1.14086
3900	6262	1.04756	0.29747	58.393	0.51701	0.001394	1.20146
4200	6766	1.99229	0.74444		0.68062		2.05146
4500	6692	0.63968	1.79468	45.695	0.44502	0.001376	1.02153
4800	6492	0.88077	0.25509		0.56937		1.20146
5100	7538	1.42459	0.52669	38.218	0.47727	0.001113	0.79009
5400	7988	1.11373	0.47165		0.43939		0.67785
5700	8228	0.9164	0.38472	31.242	0.29450	0.001106	1.45036
6000	9058	0.92882	0.4998		0.35340		0.79009
6300	9610	1.95904	0.89746	24.337	0.60606	0.001256	0.73369

NO RUNOFF FROM FILTER STRIP: FOR PLOT 3 RUN 1

PLOT #:	4 (RUN 1)		DATE:	7/3/91			
TYPE:	CT		STRIP LENGTH (ft):		15		
time (sec)	runoff rate (g/min)	NH4+ conc (ppm)	NO3- conc (ppm)	atrazine conc (ppm)	phosphorus conc (ppm)	sediment conc (g/ml)	bromide conc (ppm)
EROSION PLOT							
0	0	0	0	0	0	0	0
300	29468	7.14165	2.12918	299.703	5.27855	0.015602	2.48683
600	26760	5.8817	1.57009		5.47353		1.26271
900	43086	5.95628	1.29178	149.534	6.79665	0.016691	1.02146
1200	56226	4.28755	0.96192		4.84293		1.14086
1500	22302	4.77061	0.95389	81.136	2.64397	0.020487	
1800	62520	3.41411	0.81822		2.25757		1.77687
2100	71322	3.97523	0.83719	51.1	2.97120	0.020779	1.77687
2400	67176	3.21754	0.82783		1.63636		
2700	67308	3.59679	0.77957	31.7826	1.50000	0.024600	0.56782
3000	74070	3.87582	0.76131		0.51047		
3300	65468	2.31977	0.53805	17.973	0.61518	0.018721	0.40681
3600	80274	2.32644	0.59168		0.44696		0.73369
3900	74040	2.24163	0.6229	18.387	0.39393	0.016701	0.62256
4200	74934	2.04065	0.47882		0.67424		1.20146
4500	66090	2.60043	0.63607	12.6588	0.59848	0.012942	0.79009
4800	69810	2.32109	0.55997		0.56937		0.75196
5100	76854	3.17118	0.63886	13.1707	0.66666	0.012298	0.73369
5400	59610	2.80001	0.60251		0.49242		0.15363
5700	63192	2.80339	0.745496	12.1165	0.50000	0.013588	0.51363
6000	67818	2.77791	0.64776		0.39393		0.62256
6300	77058	2.14904	0.70219	5.95049	0.44696	0.016233	1.57885
6600	69168	1.80457	0.67257		0.22727		0.90463
FILTER STRIP							
300	0.021978	2.5194	1.05327	50.884	4.81640	0.004162	0.96278
600	0.058824	4.9124	1.16459		6.25348		1.51426
900	0.080000	4.75789	1.04695	100.687	2.98742	0.004180	1.77687
1200	0.090909	4.69643	0.91869		5.47353		0.90463
1500	0.105263	4.07537	0.74092	55.236	3.04973	0.004420	2.48683
1800	0.111111	4.31485	0.8541	45.63829	0.56937		1.38714
2100	0.125000	3.9483	0.76397		1.12878	0.004475	1.14086
2400	0.133333	3.79933	0.76425	30.7189	1.84868		1.02153
2700	0.133333	3.5545	0.73522	26.0138	1.94696	0.004785	
3000	0.142857	3.46519	0.73237		1.71969		1.20146
3300	0.133333	3.20295	0.70864	22.573	1.32894	0.003769	0.90463
3600	0.142857	3.00518	0.67026	16.0447	1.30921		1.14086
3900	0.142857	3.33755	0.6797		1.47727	0.004453	0.96278
4200	0.153846	3.15902	0.64389	14.1413	1.12878		1.08088
4500	0.153846	2.85963	0.62133	15.3624	1.29605	0.001462	1.324
4800	0.153846	2.37696	0.5237		0.64393		2.19316
5100	0.153846	2.74929	0.67374	18.438	1.04545	0.001430	0.67785
5400	0.153846	2.64619	0.6444	10.6165	0.78787	0.004126	0.67785
5700	0.153846	3.14568	0.64204	9.31123	0.70454		0.62256
6000	0.166667	2.90597	0.62383		0.44502		0.67785
6300	0.166667	2.64612	0.62249	10.945	0.02727		0.96387
6600	0.007463	2.86681	0.66449	14.4799	0.06061		0.96278

PLOT #:	5 (RUN 1)		DATE:	7/11/91			
TYPE:	NT		STRIP LENGTH (ft):		15		
time (sec)	runoff rate (g/min)	NH4+ conc (ppm)	NO3- conc (ppm)	atrazine conc (ppm)	phosphorus conc (ppm)	sediment conc (g/ml)	bromide conc (ppm)
EROSION PLOT							
0	0	0	0	0	0	0	0
300	60476	68.24504	67.89869	909.206	0.31060	0.016136	10.81139
600	84834	44.19844	46.1519		18.92686		7.44827
900	75576	21.5191	24.02012	432.848	11.66666	0.006766	4.26776
1200	78474	26.28172	22.39168		17.40063		3.91492
1500	85632	17.88765	14.93389	350.198	15.11128	0.006246	2.87369
1800	75942	13.33448	9.81319		0.00000		2.79448
2100	79098	12.76743	11.26122	269.664	1.85606	0.005973	2.41214
2400	89664	8.40047	9.43707		0.36363		2.19316
2700	78384	8.81614	6.81929	215.496	9.26073	0.007283	2.19316
3000	82494	8.60302	8.37685		0.38484		2.33831
3300	83136	7.47022	6.32486	172.196	0.06818	0.003763	2.05128
3600	83190	6.72813	6.64819		0.10501		1.98153
3900	82176	6.18069	6.49573	112.663	0.01515	0.006257	3.87174
4200	83160	5.99936	5.35937		4.72505		9.57359
4500	83028	5.6076	5.85973	45.918	3.99185	0.004366	4.0186
4800	86514	5.33825	6.09217		0.02727		1.38714
5100	88926	4.90039	5.489	98.838	0.02727	0.004743	19.71372
5400	80766	4.61873	5.15837		0.01515		10.81139
5700	84978	4.40166	5.23172	71.104	0.05890	0.006045	4.44755
6000	89814	4.53388	5.05546		0.09824		1.51426
6300	88554	4.32826	5.27953	73.751	0.40989	0.004667	7.67102
6600	89694	4.67731	4.2317		0.34848		1.77687
6900	85266	4.91075	3.94381	76.906	0.05303	0.004512	1.45036
FILTER STRIP							
360	0.032258	12.34467	9.25928	710.849	4.87327	0.000642	2.95386
660	0.055556	11.94243	9.15419		1.35162		3.07035
960	0.052632	11.7931	10.19232	504.787	0.03788	0.000433	3.5708
1260	0.060606	11.88142	9.13281		0.02727		6.17499
1560	0.062500	12.41234	9.29253	403.633	15.12718	0.000386	1.89592
1860	0.064516	10.49531	9.15679				1.95601
2160	0.076923	9.76842	9.1467	322.795	11.08333	0.000272	2.98876
2460	0.071429	8.01426	1.58706		11.60852		
2760	0.060606	7.99133	1.55447	339.349	9.75806	0.000259	7.44827
3060	0.062500	6.57734	0.78219		6.82829		4.03619
3360	0.062500	4.66208	0.81161	136.7211	5.33426	0.000342	1.14086
3660	0.052632	5.3494	5.49647		7.53481		2.41214
3960	0.071429	4.40675	0.98751		5.89136	0.000305	1.65047
4260	0.080000	3.48666	0.644		5.05571		1.84433
4560	0.095238	3.93626	0.66729	80.60608	4.79559	0.000396	1.26271
4860	0.086957	4.35511	0.89043		4.06230		2.412514
5160	0.086957	4.02054	1.0202	94.1784	4.13612	0.000452	
5460	0.090909	3.89766	0.84057		3.79581		1.98153
5760	0.095238	3.83911	5.00404	85.53895	1.72368		2.33831
6060	0.095238	3.63863	4.5138		1.73209	0.000386	2.05128
6360	0.105263	2.58849	5.50367	62.51934	1.75000		1.91255
6660	0.100000	3.77559	4.35393		1.63815		

PLOT #:	6 (RUN 1)		DATE:	7/15/91			
TYPE:	CT		STRIP LENGTH (ft):		45		
time (sec)	runoff rate (g/min)	NH4+ conc (ppm)	NO3- conc (ppm)	atrazine conc (ppm)	phosphorus conc (ppm)	sediment conc (g/ml)	bromide conc (ppm)
EROSION PLOT							
0	0	0	0	0	0	0	0
300	51810	46.97565	40.79089	1312.132	17.59141	0.017667	34.84768
600	59070	34.5955	20.18042		15.25437		27.13233
900	69864	27.04169	11.92791	934.039	14.09379	0.028128	29.88781
1200	77520	8.47698	6.94035		9.65818		18.95929
1500	77586	15.37606	5.59956	720.991	9.05405	0.036282	5.38199
1800	80160	14.86537	3.7203		5.47694		7.89695
2100	81660	11.62764	3.93711	175.535	7.92527	0.030713	13.35492
2400	79560	13.04545	2.99983		5.46104		9.82763
2700	84336	11.31945	3.12866	729.807	4.06313	0.031750	7.44827
3000	89364	10.17012	5.01542		1.82588		6.17499
3300	77196	13.05145	4.88186	135.543	3.02443	0.022422	2.48683
3600	82638	10.12525	5.20806		2.06300		2.7162
3900	82632	10.14622	5.87529	545.134	1.23644	0.020757	2.7162
4200	81378	9.65194	5.78016		2.36111		2.79448
4500	86214	9.05595	5.4214	549.507	2.10365	0.064033	2.87369
4800	81876	9.20944	6.05201		1.61585		2.33831
5100	83664	7.862	5.33387	127.887	0.69444	0.040953	2.7162
5400	83346	7.90063	5.70951		0.97899		2.41214
5700	83256	7.70638	5.80063	92.538	0.71476	0.018644	2.48683
6000	89034	5.86395	4.14228		0.74864		2.95386
6300	94800	6.77065	5.55408	78.957	0.62669	0.039566	1.26271
6600	89526	4.98235	3.90068		1.83943		2.33831
6900	86748	5.63345	5.21489	67.758	0.57249	0.017837	2.7162
FILTER STRIP							
840	0.047619	7.95443	7.81259	133.301	10.15103	0.002844	0
1140	0.074074	10.26193	0.49441		5.57233		3.23507
1440	0.090909	9.89623	0.75384	115.325	4.71198	0.002933	5.00093
1740	0.086957	10.15415	0.75347		4.79633		3.5708
2040	0.086957	9.13939	0.40685		3.65580	0.003492	2.79448
2340	0.095238	9.47016	3.34511	92.96	4.46028		2.19316
2640	0.095238	10.06519	4.17492		3.92057	0.002583	1.98153
2940	0.111111	10.62609	5.22873	91.6352	3.78818		2.26532
3240	0.105263	11.8078	6.92127		2.13753	0.003586	2.33831
3540	0.105263	10.37003	6.71462	292.59	2.24593		2.7162
3840	0.117647	9.809829	6.30948		1.96815	0.003142	3.07025
4140	0.117647	9.54034	6.39309	165.912	1.72368		2.95386
4440	0.117647	9.47057	6.38903		1.77168	0.003529	2.87369
4740	0.125000	8.2606	5.4658	71.49914	1.75813		2.7162
5040	0.142857	8.42673	5.62958		1.53455	0.003695	2.48683
5340	0.117647	6.84787	5.53135	91.91	1.46680		0.007778
5640	0.125000	7.48617	5.29852		1.35162	0.003931	1.77687
5940	0.133333	6.27291	5.14221	95.316	0.91802		1.77687
6240	0.142857	7.86513	6.53021		1.31097	0.003338	1.57887
6540	0.142857	6.31952	5.00246	93.1548	1.33462		1.20146
6840	0.125000	6.09556	4.22357		1.38092	0.002764	1.3246

PLOT #:	1 (RUN 2)		DATE:	7/18/91			
TYPE:	CT		STRIP LENGTH (ft):		30		
time (sec)	runoff rate (g/min)	NH4+ conc (ppm)	NO3- conc (ppm)	atrazine conc (ppm)	phosphorus conc (ppm)	sediment conc (g/ml)	bromide conc (ppm)
EROSION PLOT							
0	0	0	0	0	0	0	0
600	18560	3.336	6.19233	198.308	0.22018	0.023131	58.51877
900	49552	2.8776	3.69857		0.18631		29.88781
1200	57552	2.30667	2.24903	71.43	0.15921	0.022388	20.36421
1500	65700	2.22231	1.97202		0.27439		15.14269
1800	73038	2.59661	1.80848	87.9668	0.27423	0.026360	11.45036
2100	83586	2.81993	1.43481		0.19696		9.57359
2400	81918	2.55368	1.25626	57.594	0.24051	0.021309	5.23087
2700	75360	2.11016	1.24694		0.30568		1.41086
3000	85998	2.10449	1.16617	36.452	0.34214	0.039171	1.26271
3300	85980	2.19219	1.18295		0.10013		7.67102
3600	86148	1.81911	1.05593	22.438	0.22321	0.037438	6.27621
3900	86358	1.81574	0.99494		0.21341		4.82683
4200	83508	1.8347	0.9366	22.788	0.23596	0.013914	5.02679
4500	88338	1.81042	0.96194		0.22696		6.37999
4800	88308	2.02728	0.85682	22.727	0.10501	0.044588	2.48683
5100	86808	1.73152	0.86392		0.27439		1.98153
5400	91380	1.59415	0.97156	19.5799	0.12755	0.034527	1.7261
5700	86586	1.51111	0.83902		0.10606		1.64389
6000	88968	1.5953	0.83029	15.927	0.19770	0.032245	1.45036
6300	90708	1.64664	0.78469		0.19770		1.57885
6600	94920	1.46244	1.025	17.2291	0.10204	0.001105	1.77687
6900	89958	1.03435	0.72247		0.10204		1.66037
FILTER STRIP							
1260	0.037736	1.39576	1.62207	13.8681	0.23596	0.001560	1.58714
1560	0.074074	1.76905	1.79081		0.21045		1.51426
1860	0.095238	1.50773	1.45789	4.91805	0.16581	0.001453	1.45036
2160	0.100000	0.88579	0.021728		0.10204		1.45036
2460	0.105263	1.82591	0.2513	2.5197	0.29336	0.001546	1.43056
2760	0.111111	2.11147	0.17899		0.35714		1.38714
3060	0.111111	1.48333	0.12974	2.36945	0.27423	0.001814	1.71014
3360	0.117647	1.88358	1.03348		0.17857		1.51426
3660	0.117647	1.32735	1.0371	1.95799	0.19132	0.002053	1.45036
3960	0.117647	1.70201	1.01014		0.19132		1.38714
4260	0.117647	1.72588	0.96169	2.19716	0.14668	0.001624	1.98153
4560	0.117647	1.62038	0.24585		0.29974		2.19316
4860	0.125000	1.6436	0.25827	4.01428	0.25510	0.002062	1.71014
5160	0.125000	1.83963	0.76778		0.16581		1.57885
5460	0.133333	1.6071	0.815	2.71774	0.12117	0.002571	1.57885
5760	0.133333	1.414	0.88453		0.19132		1.38714
6060	0.142857	1.39572	0.86265	2.43872	0.10204	0.002247	1.3246
6360	0.125000	1.3718	0.89076		0.18494		1.38714
6660	0.133333	0.21166	2.04683	0.82887	0.24214		1.38714

PLOT #:	2 (RUN 2)		DATE:	7/22/91			
TYPE:	NT		STRIP LENGTH (ft):		30		
time (sec)	runoff rate (g/min)	NH4+ conc (ppm)	NO3- conc (ppm)	atrazine conc (ppm)	phosphorus conc (ppm)	sediment conc (g/ml)	bromide conc (ppm)
EROSION PLOT							
0	0	0	0	0	0	0	0
300	15390	5.65031	8.327	124.416	0.21208	0.007484	8.23964
600	32760	3.94307	7.5306		0.78030		5.78885
900	26640	3.75863	5.63181	54.232	0.73298	0.003985	5.18432
1200	29250	3.13519	4.10425		0.66666		3.20558
1500	28650	3.18271	3.7112	41.083	0.00758	0.004349	2.09431
1800	35622	2.30946	1.80791		0.23373		1.57885
2100	38610	2.84739	2.8156	25.4298	0.46409	0.003850	1.72621
2400	37230	2.29695	2.35641		0.10650		1.84433
2700	40110	2.38853	1.67185	36.257	0.16816	0.004265	1.51426
3000	55812	1.87991	2.22882	49.5643	0.44344		1.46614
3300	34800	1.94862	1.75538	67.674	0.12892	0.004440	1.26271
3600	38610	2.05036	1.72619		0.44696		1.53462
3900	39990	1.90834	1.57987	150.149	0.08408	0.004370	1.38714
4200	38910	1.80155	1.46701		0.11210		1.45036
4500	64782	1.80292	1.37502	123.689	0.15695	0.004836	1.45036
4800	58488	1.57506	1.2287		0.37878		1.51426
5100	42210	1.62145	1.16904	31.69	0.14393	0.005410	1.71014
5400	40080	1.416	1.0717	21.542	0.31060		1.51426
5700	39510	1.56885	0.98725		0.01515	0.005060	1.51426
6000	41640	1.35683	0.93541		0.33333		1.71014
6300	39540	1.54522	0.95813	56.282	0.41666	0.003855	1.64414
6600	38514	1.58699	1.08939		0.35606		1.84433
6900	42048	1.52067	0.86739	15.462	0.09824	0.004003	1.51426
7100	39048	1.64082	0.833		0.39393		1.3246
7400	41220	1.51806	0.85682	74.698	0.11363	0.005017	1.1714
FILTER STRIP							
3720	0.005560	1.52601	0.82818		0.00000	0.000112	0
4260	0.004320	0.87865	1.36656	40.137	0.00000		1.45036
4860	0.003846	0.90413	1.11914		0.02273	0.000071	1.45036
5580	0.005602	0.36699	0.17995		0.36836		1.51426
5940	0.007407	0.77451	0.34475		0.25784	0.000095	1.84433
6240	0.005181	0.31737	0.85664		0.00000		1.45036
6960	0.005102	0.6599	0.66911	14.19987	0.30829	0.000064	1.38714

PLOT #:	3 (RUN 2)		DATE:	7/24/91			
TYPE:	NT		STRIP LENGTH (ft):		45		
time (sec)	runoff rate (g/min)	NH4+ conc (ppm)	NO3- conc (ppm)	atrazine conc (ppm)	phosphorus conc (ppm)	sediment conc (g/ml)	bromide conc (ppm)
EROSION PLOT							
0	0	0	0	0	0	0	0
300	26028	3.40357	7.50357	56.3801	0.37121	0.005007	1.3246
600	31506	3.22801	6.44636		0.20179		1.71014
900	32634	2.78204	5.21944	33.5746	0.37878	0.002961	1.02153
1200	35574	2.79695	4.20504		0.18497		2.26532
1500	35796	2.33091	3.8773	26.17895	0.05030	0.002576	1.51426
1800	38160	2.08745	3.06541		0.13636		1.51426
2100	44472	1.87099	2.48468	31.7808	0.13452	0.001972	1.20146
2400	43134	1.97322	2.08449		0.33333		
2700	47394	1.75878	1.80903	21.9716	0.08333	0.002098	1.64414
3000	46200	1.9848	1.79212		0.18181		1.38714
3300	52074	1.67771	1.40468	19.115	0.49796	0.002506	1.20146
3600	52416	1.6373	1.26695		0.75757		1.51426
3900	51276	1.63004	1.17575	19.9201	0.12121	0.001918	1.91255
4200	49818	1.63376	1.60428		0.46915		1.64414
4500	51078	1.61287	1.0572	14.9463	0.05414		1.98431
4800	50022	1.57275	0.98053		0.08408	0.002254	1.91255
5100	51492	1.30897	0.9877		0.03788		1.86213
5400	55512	1.30497	0.99111	13.181	0.36246	0.001799	1.64414
5700	50466	1.31226	0.97366		0.09879		1.51426
6000	51180	1.39849	0.83206		0.00000	0.002003	1.45036
6300	49686	1.22742	0.8051		0.13452		1.326
6600	57756	1.3672	0.90739	11.746	0.14013	0.001741	1.77687
6900	56196	1.21537	0.8238	14.386	0.40311		1.64414
7200	54870	0.73565	1.86646		0.21860		1.51426
7500	54396	0.90347	1.76424	4.7467	0.03879		1.51426
FILTER STRIP							
0	0.008969	1.21537	0.8238	14.386	0.40311	0.000047	0
300							1.45036
600	0.009524	0.73565	1.86646		0.21860	0.000060	1.51426
900	0.009662	0.90347	1.76424	4.7467	0.03879		1.51426
1200	0.006472	0.72184	1.55231		0.00339	0.000060	1.45036
1500		0.40996	1.32846	14.2004	0.21208		1.45036
1800	0.009662	0.47525	1.13776		0.05303	0.000052	1.57885
2100	0.013333	0.5607	0.92745		0.03030		1.57885
2400	0.013072	0.48234	0.86374		1.53455	0.000055	1.51426
2700	0.010101	0.64621	0.80993	6.0286	0.46272		1.51426
3000	0.010101	0.72183	0.666		2.43273	0.000039	1.71014
3300	0.009852	0.58729	0.6941	10.2431	0.61098		1.3246
3600	0.014184	0.51244	0.62901		1.27032	0.000040	1.22189
3900	0.016129	0.68621	0.62139		0.03788		1.57885
4200	0.014184	0.60026	0.5507		0.39798		1.51426
4500	0.013986	0.63642	0.64589	1.35363	1.31578		

PLOT #:	4 (RUN 2)		DATE:	7/26/91			
TYPE:	CT		STRIP LENGTH (ft):		15		
time (sec)	runoff rate (g/min)	NH4+ conc (ppm)	NO3- conc (ppm)	atrazine conc (ppm)	phosphorus conc (ppm)	sediment conc (g/ml)	bromide conc (ppm)
EROSION PLOT							
0	0	0	0	0	0	0	0
300	45420	4.29446	5.73821	18.52971	0.12121	0.035896	1.38714
600							
900	79122	3.40069	2.05405		0.07653	0.034797	1.26271
1200	71960	3.06054	1.71569	9.75463	0.14030		1.55885
1500	78000	2.71943	1.77937		0.17219	0.028811	1.77687
1800	82068	2.96692	1.25664	20.69329	0.12755		1.66414
2100	86400	2.41298	0.96234		0.08929	0.030003	1.77687
2400	79920	2.86789	0.88147	1.51567	0.14668		1.66414
2700	79116	2.45576	0.71254		0.03827	0.018779	1.57885
3000	77400	1.87428	0.69005	21.66591	0.12117		1.71014
3300	85176	2.31761	0.78245		0.04643	0.029283	1.71014
3600	85104	2.16697	0.63695	22.3999	0.09566		1.66414
3900	85944	2.02823	0.70178		0.08929	0.023803	1.45036
4200	90984	2.29054	0.61571	14.41812	0.14030		1.38714
4500	89544	1.85007	0.59551		0.05740	0.029949	1.38714
4800	88716	1.89245	0.68939	18.88795	0.08929		1.57885
5100	83304	1.97076	0.55446		0.00638	0.023123	2.05128
5400	81300	1.97888	1.09881	18.76843	0.11479		1.9304
5700	86016	2.03714	0.29458		0.42729		1.71014
6000	88380	1.3735	0.75632	32.09608	0.12117	0.019299	1.38714
6300	86640	1.54691	0.56414		0.13392		1.45036
6600	88104	1.78867	0.45956	49.31331	0.01276	0.027184	1.3246
6900	87000	1.66612	0.40995		0.11479		1.60312
7200	87864	1.86928	0.51734	14.1058	0.15306	0.035825	1.64414
7500	91764	1.10556	0.46046		0.07015	0.009789	1.71014
FILTER STRIP							
240	0.059294	3.41915	2.44639		0.06818	0.009429	0
540	0.073314	3.51543	1.65163	12.35094	0.39203		1.38714
840	0.097276	3.14111	1.33223		0.25757	0.006407	1.51426
1140	0.102669	2.53336	0.16262		0.40989		1.38714
1440	0.108873	2.886	0.9627		0.06061	0.006047	1.51426
1740	0.118977	2.60106	0.83314	13.26581	0.07287		1.64414
2040	0.131148	2.81243	0.25383		0.33333	0.006121	1.45036
2340	0.135318	2.17797	0.64434	19.9683	0.21212		1.77687
2640	0.144196	1.90813	0.11698		0.32181	0.006640	1.71014
2940	0.147820	1.89967	0.82253	13.03651	0.08333		1.38714
3240	0.151286	2.08703	0.26974		0.35569	0.005562	1.57885
3540	0.150602	1.81455	0.13137	6.98811	0.16666		1.64414
3840	0.160000	1.8107	0.13141		0.10606	0.005737	2.05128
4140	0.157978	1.64135	0.26806	43.10991	0.39393		1.54126
4440	0.163800	1.59321	0.576149		0.30205	0.006336	1.64414
4740	0.165426	1.74739	0.50988	16.63476	0.31818		1.02133
5040	0.170648	1.20081	0.24513		0.36363	0.008560	1.51426
5340	0.171527	1.81078	0.35576	33.16552	0.07848		1.54389
5640	0.165700	1.78853	0.26959		0.30149	0.024204	1.57885
5940	0.165289	1.38123	0.55234	6.76923	0.06061		1.77687
6240	0.172414	1.53005	0.73373		0.06136	0.011976	1.91255
6540	0.166251	0.37372	1.18554	2.09437	0.09091		1.58885
6840	0.175285	1.17606	0.71805		0.01694		1.62879

PLOT #:	5 (RUN 2)		DATE:	7/30/91			
TYPE:	NT		STRIP LENGTH (ft):		15		
time (sec)	runoff rate (g/min)	NH4+ conc (ppm)	NO3- conc (ppm)	atrazine conc (ppm)	phosphorus conc (ppm)	sediment conc (g/ml)	bromide conc (ppm)
EROSION PLOT							
0	0	0	0	0	0	0	0
300	45036	2.64356	1.36727	13.95602	1.34566	0.007036	5.5763
600	49326	5.57425	4.54682		1.14159		1.54896
900	61080	4.22887	3.17572	22.52262	1.00785	0.004564	1.51426
1200	60744	1.06041	0.72194		0.06061		1.51426
1500	61644	3.75298	2.86531	12.96988	0.87059	0.004749	1.41474
1800	62952	3.17799	2.32516		0.80994		1.45036
2100	74952	3.44736	2.5359	50	0.84183	0.006830	1.45036
2400	63504	2.77551	2.08		0.85459		1.51426
2700	76212	3.01584	2.5749	28.76617	0.72704	0.007303	1.26271
3000	72552	2.76032	2.49846		0.73341		1.3246
3300	75132	2.53344	2.29257	54.56506	0.75255	0.008260	1.57885
3600	80976	2.8863	2.51491		0.88010		1.51426
3900	76512	0.95313	0.65773	34.14754	0.77168	0.010360	1.45036
4200	78264	1.50327	1.30931		0.75892		1.51426
4500	79020	1.87457	1.90272	49.77061	0.87372	0.007737	1.57885
4800	80316	2.04304	2.37451		0.69515		1.56034
5100	78612	2.00584	2.81631		0.68182	0.008234	
5400	81132	2.4447	2.61417		0.68877		1.77867
5700	75468	1.29271	1.08162		0.84821	0.005892	1.51426
6000	81876	2.2093	2.8821	33.2633	0.61224		1.57885
6300	80832	2.3225	2.69126		0.69515	0.008142	1.77867
6600	86448	2.41285	2.93148	14.18688	0.55484		1.64414
6900	79812	1.23514	1.26844		0.59977	0.007784	1.57885
7200	78912	2.38107	2.68596		0.33071		1.45036
7500	87516	2.03095	2.65139	5.70734	0.25784	0.010201	1.38714
FILTER STRIP							
480	0.024096	1.84991	4.00022		1.48596	0.000386	1.98153
780	0.035714	3.10772	4.45094	23.75577	1.33290		1.3246
1080	0.028169	2.8922	0.82758		1.17346	0.000406	1.45036
1380	0.037736	3.23358	0.64199	22.2773	1.05867		1.38714
1680	0.045455	3.16686	0.70138		1.04591	0.000534	2.19316
1980	0.048780	2.30338	0.47416	16.8702	0.96938		1.91255
2280	0.080000	2.76696	0.51656		0.81632	0.000888	1.98153
2580	0.105263	2.28622	2.74781		0.52690		1.77687
2880	0.100000	2.73702	0.6801	8.97425	0.50488	0.009514	1.84433
3180	0.111111	3.37451	0.51934		0.51008		1.84433
3480	0.133333	2.12155	0.48924	36.14023	0.73991	0.006994	1.84433
3780	0.105263	2.4276	0.70652		0.52130		
4080	0.166667	1.85406	0.085926		0.44642	0.004545	1.714014
4380	0.142857	2.13013	0.31683	10.5704	0.19058		1.64414
4680	0.125000					0.005955	1.57885
4980	0.133333	2.47832	0.33339	9.41784	0.56760		1.57885
5280	0.142857	2.12517	0.49679		0.04843	0.007514	1.64414
5580	0.133333	1.883877	0.38957	25.197	0.51020		1.64414
5880	0.153846	1.84929	0.24138		0.47645	0.004807	1.64414
6180	0.153846	2.27056	0.33201	25.197	0.48469		1.51426
6480	0.142857	1.82734	0.67871		0.44843	0.008651	1.51426
6780	0.153846	2.20866	0.58104	17.10604	0.47645		
7080	0.153846	1.6862	0.282		0.09529	0.004836	
7380	0.133333	2.32939	0.34204		0.37556		

PLOT #:	6 (RUN 2)		DATE:	8/1/91			
TYPE:	CT		STRIP LENGTH (ft):		45		
time (sec)	runoff rate (g/min)	NH4+ conc (ppm)	NO3- conc (ppm)	atrazine conc (ppm)	phosphorus conc (ppm)	sediment conc (g/ml)	bromide conc (ppm)
EROSION PLOT							
0	0	0	0	0	0	0	0
300	82752	6.34207	7.21989	46.49888	0.34753	0.035734	1.45036
600	100380	5.56533	3.44948		0.30269		1.38714
900	90240	4.71775	2.17368	63.2932	0.25784	0.043287	1.71014
1200	87588	4.291	1.46538		0.27466		1.84433
1500	97872	4.51121	1.52095	22.64544	0.22421	0.038144	1.77867
1800	92940	4.69818	1.31591		0.26905		1.84433
2100	91848	4.27639	1.17095	38.78967	0.29708	0.027304	1.84433
2400	92964	4.02788	1.17723		0.23542		1.57885
2700	83748	3.82219	1.1498	38.3015	0.24894	0.035107	1.84433
3000	94140	3.47473	1.05346		0.26905		1.77867
3300	99288	3.41143	0.95578	42.27943	0.29147	0.021422	1.64414
3600	98544	3.28329	0.65414		0.21300		1.45036
3900	92832	3.04359	0.79474	49.08539	0.19058	0.028328	1.64414
4200	95508	3.01766	0.8797		0.31390		1.57885
4500						0.032175	1.51426
4800	92724	3.23951	0.6327	85.01552	0.27466		1.51426
5100	88980	2.95445	0.8394		0.30269	0.046586	1.84433
5400	88452	3.06083	0.74587	27.27963	0.24663		2.05128
5700		2.83189	0.84561		0.18497	0.031421	1.71014
6000	101292	3.02975	0.82641	26.9114	0.17376		1.38714
6300	82872	2.87246	0.66186		0.25784	0.012793	1.64414
6600	94620	2.90108	0.66869	13.84074	0.23542		1.64414
6900	92664	2.77771	0.64385		0.22421	0.021504	1.51426
7200	98808	2.47894	0.66676	33.06783	0.25784		1.57885
7500	90648	2.41945	0.65478		0.21860	0.020433	1.3246
7800	90108	2.17368	0.44516	17.69744	0.20179		1.91255
FILTER STRIP							
600	0.031746	4.04859	1.08986	53.18512	0.28026	0.002133	1.71014
900	0.058824	4.1585	2.83787		0.53251		1.77867
1200	0.074074	4.22736	2.53431	28.76617	0.55493	0.002570	1.57885
1500	0.083333	3.44478	1.50608		0.34753		1.77687
1800	0.100000	3.54494	0.18452	14.5331	0.01211	0.002955	1.71014
2100	0.095238	3.34295	0.15907		0.51658		1.71014
2400	0.090909	3.7543	0.44192	5.57174	0.44282	0.002577	1.77687
2700	0.100000	3.18572	0.12585		0.57397		1.51426
3000	0.111111	3.10286	0.19724	44.95487	0.40358	0.003109	1.98153
3300	0.105263	3.33788	0.11479		0.49107		1.57885
3600	0.117647	2.77995	0.28874	26.0877	0.39798	0.002930	1.71014
3900	0.117647	3.06195	0.10846		0.06166		1.71014
4200	0.111111	2.7584	0.057156		0.13452	0.003055	1.51426
4500	0.111111	2.77049	0.15635		0.03924		1.57885
4800	0.125000	2.27945	0.092957	30.26658	0.06166	0.002969	1.71014
5100	0.117647	2.31482	0.053071		0.44642		1.51426
5400	0.125000	2.35551	0.27064	24.50096	0.40358	0.003179	1.51426
5700	0.125000	2.32492	0.051031		0.14573		1.57885
6000	0.125000	2.88644	0.27353	33.16552	0.41479	0.002716	1.3246
6300	0.117647	3.05133	0.32497		0.39798		1.3246
6600	0.125000	2.36925	0.54234	12.69329	0.25784	0.002831	1.3246
6900	0.125000	2.15842	0.46874		0.28587		1.51426
7200	0.125000	2.29774	0.53671	50	0.23542	0.003098	1.71014
7500	0.095238	2.03541	0.55459		0.22982		1.51426

APPENDIX B

Plot Width Flow Distribution Data

PLOT 5 (RUN 1)	TYPE: NT				FILTER LENGTH: 15'					
	volume (ml)									
time	sampler slot number									
(sec)	1	2	3	4	5	6	7	8	9	10
60	1230	1150	1050	-	1100	580	820	1080	790	250
960	240	1620	850	1710	1580	600	840	1290	1100	510
1860	1440	1120	460	-	1610	610	650	1350	1320	550
2760	1170	650	710*	250	1250	360	330	820	960	390
3660	1300	1410	1000	730	1230	360	100	790	1070	390
4560	1180	1140	760	560	930	240	400	930	800	420
5460	1200	1100	700	770	730	120	550	1130	610	340
6360	1230	1080	840	810	660	110	480	1150	690	310

* sample volume is questionable

PLOT 1 (RUN 2)	TYPE: CT				FILTER LENGTH: 30'					
	volume (ml)									
time	sampler slot number									
(sec)	1	2	3	4	5	6	7	8	9	10
480	620	1160	30	50	70	240	160	30	140	0
1380	580	1440	500	80	120	510	260	30	310	120
2280	950	1610	560	150	120	440	60	60	240	30
3180	790	1350	450	90	130	400	70	80	360	60
4080	970	1600	400	60	230	410	80	100	340	70
4980	960	1650	310	70	100	330	30	70	360	80
5880	870	1310	270	90	90	340	40	80	400	70
6780	1290	1610	220	100	170	390	80	100	450	80

PLOT 2 (RUN 2)	TYPE: NT					FILTER LENGTH: 30'				
	volume (ml)									
time	sampler slot number									
(sec)	1	2	3	4	5	6	7	8	9	10
240	50	760	670	80	180	0	0	210	130	100
1140	50	950	830	140	530	30	20	90	220	210
2040	100	1090	850	190	480	210	30	210	150	100
2940	170	1530	1050	120	390	230	50	70	340	90
3840	150	960	560	310	630	250	70	50	110	260
4740	160	1240	500	230	730	400	110	60	80	250
5640	200	1190	520	180	650	280	80	40	130	250
6540	130	1150	480	230	580	250	110	50	230	310
7440	180	960	540	200	580	370	100	50	280	310

PLOT 3 (RUN 2)	TYPE: NT					FILTER LENGTH: 45'				
	volume (ml)									
time	sampler slot number									
(sec)	1	2	3	4	5	6	7	8	9	10
120	270	20	170	60	40	280	90	800	550	50
1020	210	20	170	80	70	210	120	930	810	100
1920	330	20	30*	130	60	220	210	1510	1110	180
2820	200	20	200	120	110	150	190	1090	1020	150
3720	290	20	230	70	60	140	180	1190	870*	180
4620	250	20	150	130	50	140	210	1190	1230	190
5520	220	20	130	140	80	130	190	1050	1080	210
6420	300	20	150	150	90	180	230	1220	1220	270
7320	410	40	120	120	90	150	310	1270	1070	280

* sample volume is questionable

PLOT 4 (RUN 2)	TYPE: CT				FILTER LENGTH: 15'					
	volume (ml)									
time	sampler slot number									
(sec)	1	2*	3	4	5	6	7	8	9	10
180	240	480	170	20	40	110	50	320	140	10
1080	360	210	130	70	70	160	60	110	30	0
1980	480	410	300	110	160	370	70	400	90	50
2880	360	240	130	30*	110	60*	150	270	60	50
3780	470	20	150	180	130	60*	140	290	50	80
4680	310	520	220	210	180	970	160	470	150	60
5580	300	40	180	130	150	640	80	320	110	20
6480	550	110	240	180	230	660	70	400	160	0
7380	360	280	220	140	230	630	90	370	150	20

* sample volume is questionable

PLOT 5 (RUN 2)	TYPE: NT				FILTER LENGTH: 15'					
	volume (ml)									
time	sampler slot number									
(sec)	1	2	3	4	5	6	7	8	9	10
60	300	460	310	300	310	230	250	230	350	70
960	1090	860	310	150	90	50	270	280	480	150
1860	1000	840	320	330	120	70	290	580	290	210
2760	1230	760	470	420	60	20	370	740	330	190
3660	1290	680	460	670	70	80	240	860	530	60
4560	1190	330	390	680	60	50	160	710	540	40
5460	1170	440	380	550	90	50	190	750	520	170
6360	1280	560	390	660	60	50	340	1160	190	50
7260	1220	700	590	680	130	30	350	1210	170	20

PLOT 6 (RUN 2)	TYPE: CT				FILTER LENGTH: 45'					
time (sec)	volume (ml) sampler slot number									
	1	2	3	4	5	6	7	8	9	10
720	600	480	360	80	50	90	240	190	200	-
1620	190*	160*	600	270	70*	70	130	180	220	2100
2520	510	650	600	90	90	80	120	180	140	1140
3420	250	830	930	130	80	50	140	110	250	640
4320	250	690	1180	100	80	30	160	170	210	590
5220	310	660	1230	240	70	40	220	130	290	650
6120	370	960	900	220	70	40	260	150	330	650
7020	420	910	1100	200	100	40	140	220	360	530

* sample volume is questionable

APPENDIX C

Aggregate Particle Size Distributions

PLOT 1	FILTER STRIP LENGTH (ft): 30					
	Fraction Finer					
Particle Size	RUN 1			RUN 2		
(microns)	a	b	c	a	b	c
	EROSION PLOT					
500.0	0.972	0.888		0.668	0.572	0.699
250.0	0.939	0.837		0.510	0.413	0.530
125.0	0.911	0.798		0.432	0.337	0.427
63.0	0.878	0.759		0.375	0.294	0.370
50.0	0.861	0.752		0.371	0.292	0.367
20.0	0.817	0.752		0.240	0.218	0.259
10.0	0.562	0.494		0.139	0.124	0.167
5.0	0.378	0.380		0.105	0.091	0.111
2.0	0.211	0.228		0.052	0.047	0.067
1.0	0.149	0.137		0.034	0.032	0.041
0.5	0.070	0.068		0.019	0.018	0.026
	FILTER STRIP					
500.0				0.992	0.965	
250.0				0.986	0.962	
125.0				0.979	0.958	
63.0				0.972	0.955	
50.0				0.962	0.945	
20.0				0.962	0.945	
10.0				0.943	0.668	
5.0				0.777	0.477	
2.0				0.437	0.277	
1.0				0.224	0.153	
0.5				0.087	0.067	

PLOT 2	FILTER STRIP LENGTH (ft): 30					
	Fraction Finer					
Particle Size (microns)	RUN 1			RUN 2		
	a	b	c	a	b	c
	EROSION PLOT					
500.0	0.954	0.875		0.804	0.755	0.779
250.0	0.906	0.825		0.705	0.63	0.655
125.0	0.87	0.788		0.623	0.559	0.562
63.0	0.844	0.757		0.559	0.503	0.487
50.0	0.835	0.75		0.554	0.498	0.482
20.0	0.481	0.53		0.229	0.161	0.175
10.0	0.295	0.341		0.145	0.116	0.117
5.0	0.219	0.257		0.106	0.086	0.088
2.0	0.118	0.114		0.05	0.05	0.049
1.0	0.101	0.068		0.034	0.035	0.039
0.5	0.068	0.038		0.022	0.025	0.024
	FILTER STRIP					
no filter strip aggregate particle size data						

PLOT 3	FILTER STRIP LENGTH (ft): 45					
	Fraction Finer					
Particle Size (microns)	RUN 1			RUN 2		
	a	b	c	a	b	c
	EROSION PLOT					
500.0	0.997	0.996		0.93	0.937	
250.0	1.004	0.992		0.941	0.894	
125.0	0.995	0.987		0.9	0.87	
63.0	0.947	0.982		0.836	0.818	
50.0	0.938	0.972		0.827	0.809	
20.0	0.815	0.815		0.618	0.613	
10.0	0.54	0.569		0.401	0.409	
5.0	0.407	0.432		0.301	0.294	
2.0	0.189	0.236		0.142	0.123	
1.0	0.104	0.118		0.084	0.057	
0.5	0.076	0.069		0.05	0.049	
	FILTER STRIP					
no filter strip aggregate particle size data						

PLOT 4	FILTER STRIP LENGTH (ft): 15					
	Fraction Finer					
Particle Size (microns)	RUN 1			RUN 2		
	a	b	c	a	b	c
	EROSION PLOT					
500.0	0.784	0.827	0.826	0.853	0.767	0.802
250.0	0.661	0.703	0.711	0.724	0.622	0.667
125.0	0.576	0.622	0.635	0.622	0.543	0.576
63.0	0.543	0.568	0.581	0.548	0.49	0.512
50.0	0.538	0.562	0.575	0.542	0.485	0.507
20.0	0.435	0.431	0.459	0.378	0.358	0.364
10.0	0.261	0.261	0.279	0.219	0.196	0.215
5.0	0.185	0.187	0.18	0.142	0.137	0.154
2.0	0.098	0.085	0.087	0.06	0.069	0.077
1.0	0.071	0.051	0.052	0.033	0.034	0.041
0.5	0.038	0.034	0.029	0.027	0.02	0.031
	FILTER STRIP					
500.0	0.996	0.989		0.973	0.655	
250.0	0.994	0.987		0.969	0.602	
125.0	0.986	0.984		0.965	0.584	
63.0	0.969	0.975		0.95	0.571	
50.0	0.96	0.965		0.94	0.565	
20.0	0.931	0.897		0.855	0.565	
10.0	0.65	0.614		0.56	0.326	
5.0	0.456	0.439		0.38	0.228	
2.0	0.223	0.224		0.171	0.103	
1.0	0.126	0.127		0.104	0.091	
0.5	0.058	0.059		0.038	0.029	

PLOT 5	FILTER STRIP LENGTH (ft): 15					
	Fraction Finer					
Particle Size	RUN 1			RUN 2		
(microns)	a	b	c	a	b	c
	EROSION PLOT					
500.0	0.724	0.681			0.887	0.736
250.0	0.583	0.54			0.492	0.589
125.0	0.496	0.458			0.429	0.471
63.0	0.43	0.4			0.377	0.391
50.0	0.426	0.396			0.373	0.383
20.0	0.241	0.136			0.151	0.129
10.0	0.159	0.1			0.109	0.094
5.0	0.116	0.08			0.087	0.074
2.0	0.052	0.052			0.045	0.047
1.0	0.034	0.036			0.026	0.031
0.5	0.017	0.02			0.015	0.031
	FILTER STRIP					
500.0	1.036			0.388	0.476	
250.0	1.032			0.279	0.363	
125.0	1.008			0.234	0.299	
63.0	0.964			0.205	0.246	
50.0	0.954			0.202	0.243	
20.0	0.877			0.055	0.091	
10.0	0.636			0.045	0.071	
5.0	0.53			0.037	0.054	
2.0	0.289			0.02	0.032	
1.0	0.154			0.016	0.025	
0.5	0.067			0.01	0.02	

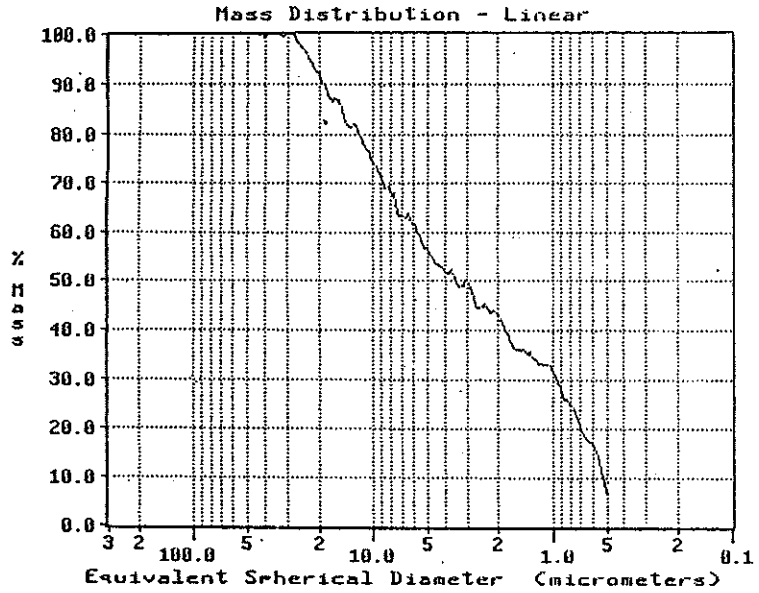
PLOT 6	FILTER STRIP LENGTH (ft): 45					
	Fraction Finer					
Particle Size	RUN 1			RUN 2		
(microns)	a	b	c	a	b	c
	EROSION PLOT					
500.0	0.819	0.651	0.96	0.821	0.828	0.818
250.0	0.726	0.534	0.951	0.659	0.682	0.691
125.0	0.665	0.473	0.947	0.581	0.559	0.595
63.0	0.618	0.431	0.944	0.567	0.488	0.529
50.0	0.612	0.426	0.934	0.561	0.483	0.524
20.0	0.346	0.362	0.793	0.442	0.39	0.423
10.0	0.229	0.233	0.5	0.244	0.215	0.228
5.0	0.167	0.172	0.293	0.17	0.137	0.153
2.0	0.074	0.099	0.189	0.091	0.078	0.09
1.0	0.049	0.069	0.123	0.062	0.049	0.064
0.5	0.025	0.039	0.047	0.028	0.024	0.037
	FILTER STRIP					
500.0	0.995	0.995		0.989	0.968	
250.0	0.986	0.994		0.986	0.963	
125.0	0.981	0.993		0.985	0.958	
63.0	0.942	0.992		0.98	0.956	
50.0	0.932	0.982		0.971	0.946	
20.0	0.932	0.982		0.971	0.946	
10.0	0.904	0.892		0.814	0.736	
5.0	0.659	0.496		0.441	0.43	
2.0	0.132	0.228		0.196	0.229	
1.0	0.104	0.159		0.118	0.143	
0.5	0.056	0.069		0.059	0.067	

APPENDIX D

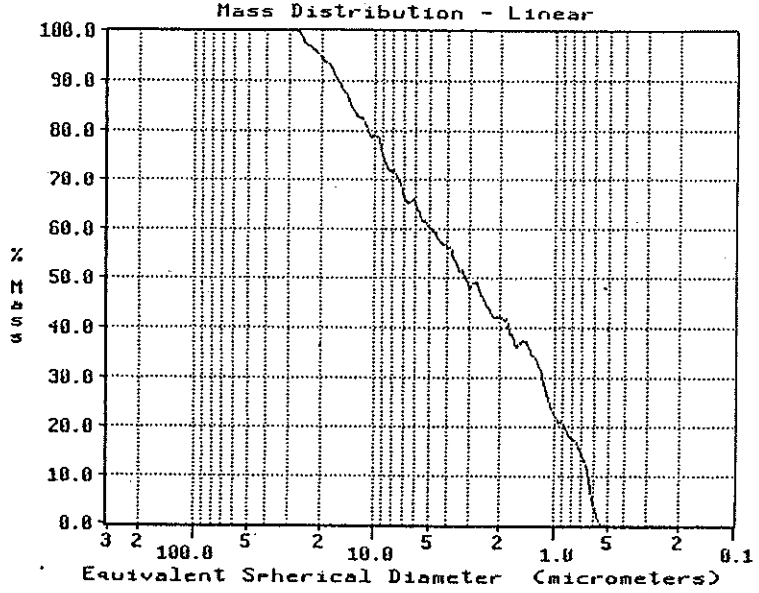
Primary Particle Size Distributions

Primary Particle Size Distributions

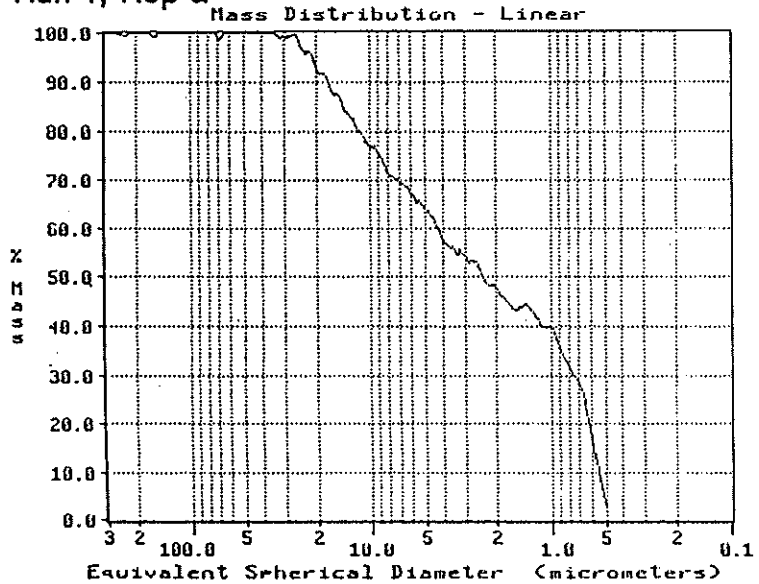
PLOT 1



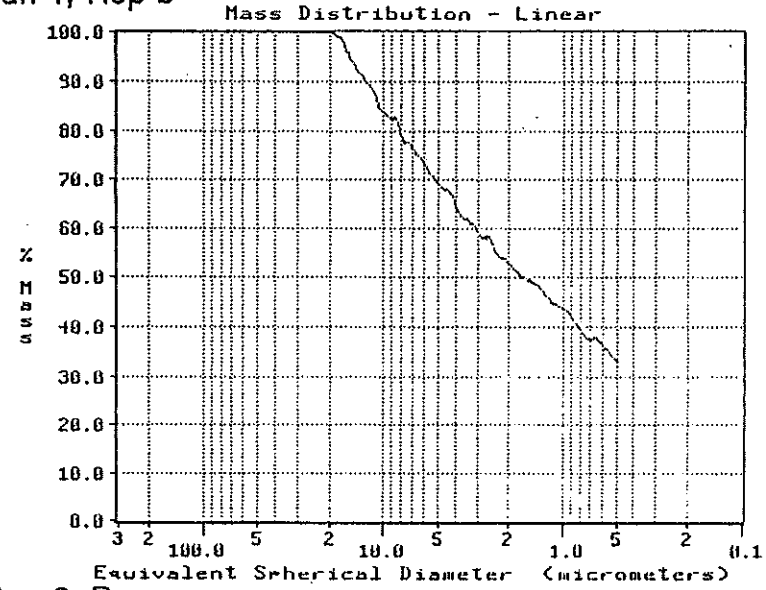
EP Run 1, Rep a



EP Run 1, Rep b



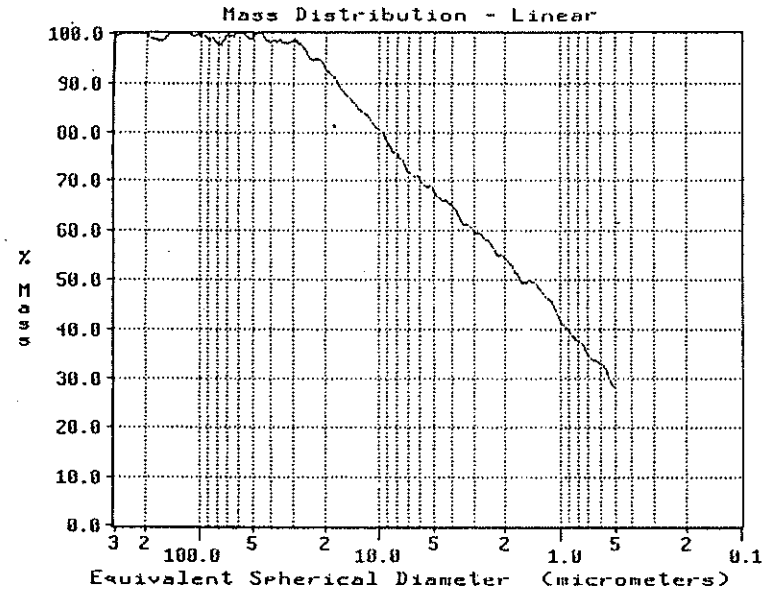
EP Run 1, Rep c



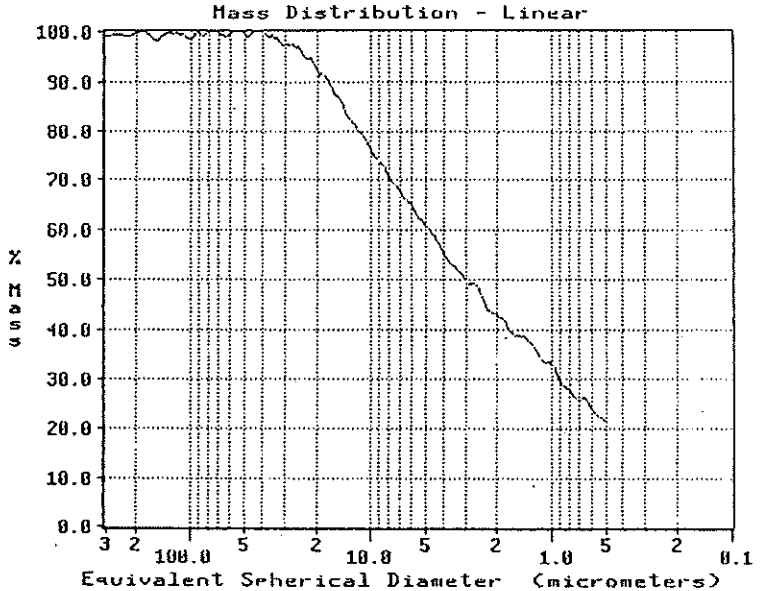
EP Run 2, Rep a

Primary Particle Size Distributions

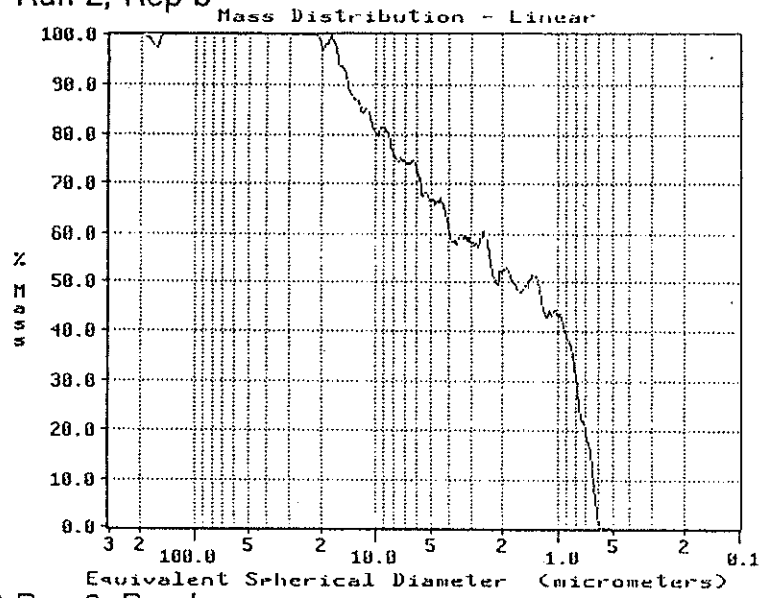
PLOT 1



EP Run 2, Rep b

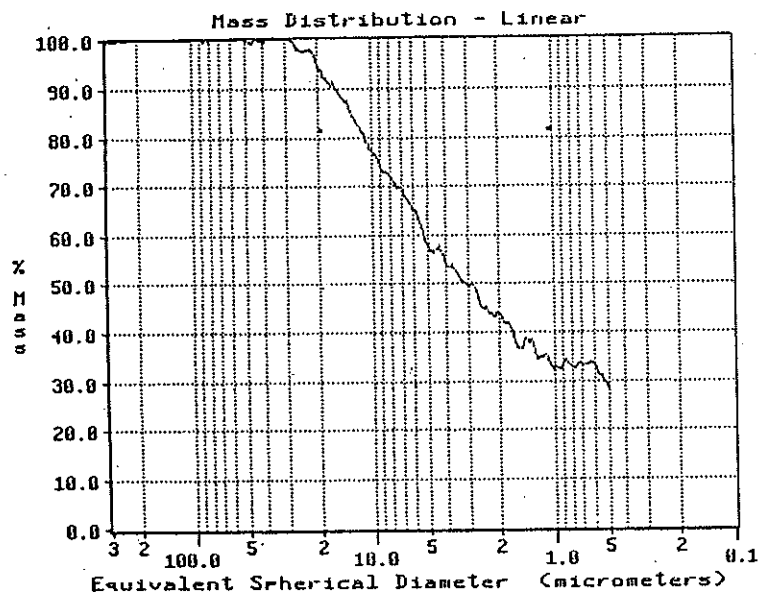


EP Run 2, Rep c

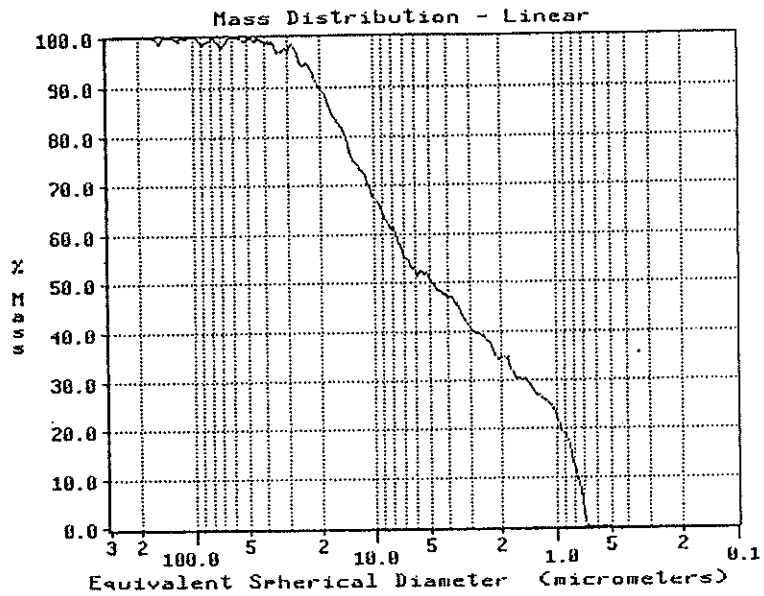


FS Run 2, Rep b

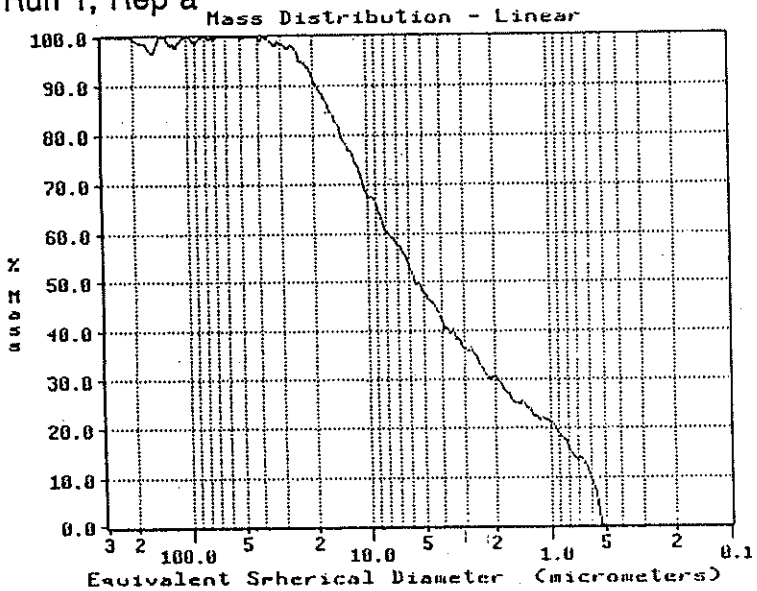
Primary Particle Size Distributions
PLOT 2



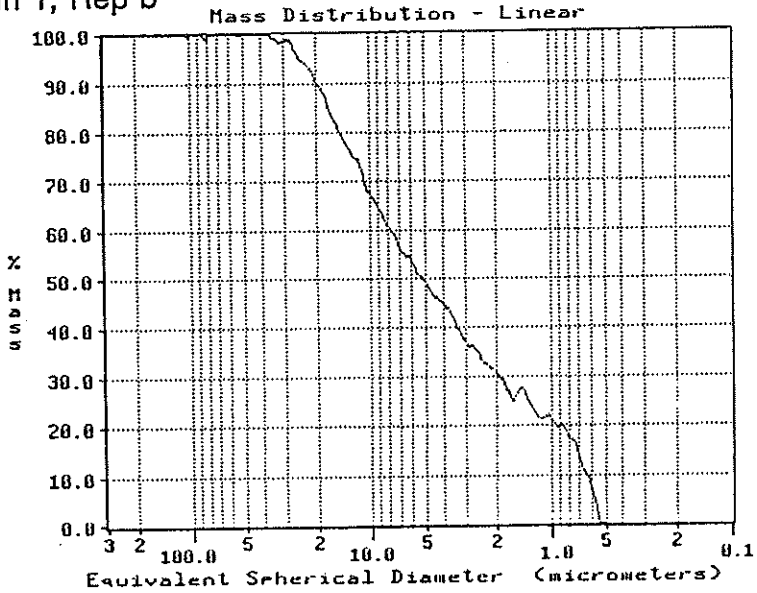
EP Run 1, Rep a



EP Run 1, Rep b

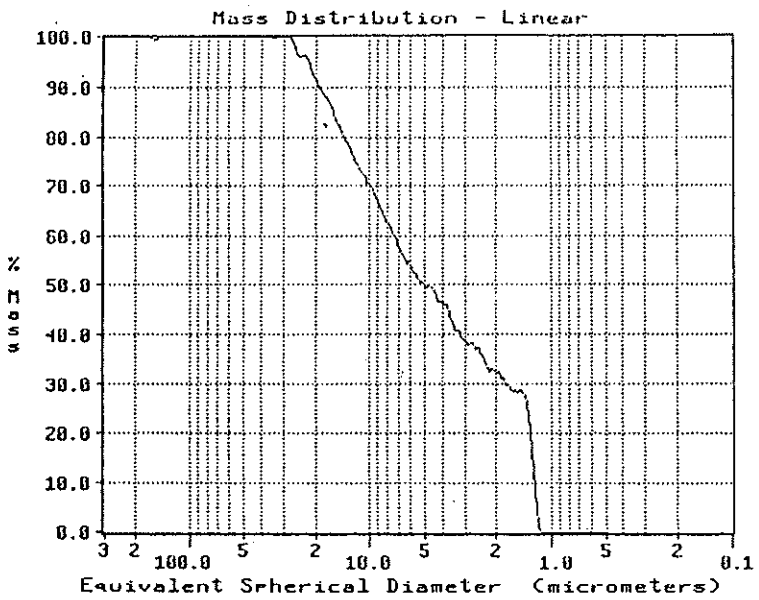


EP Run 2, Rep a



EP Run 2, Rep b

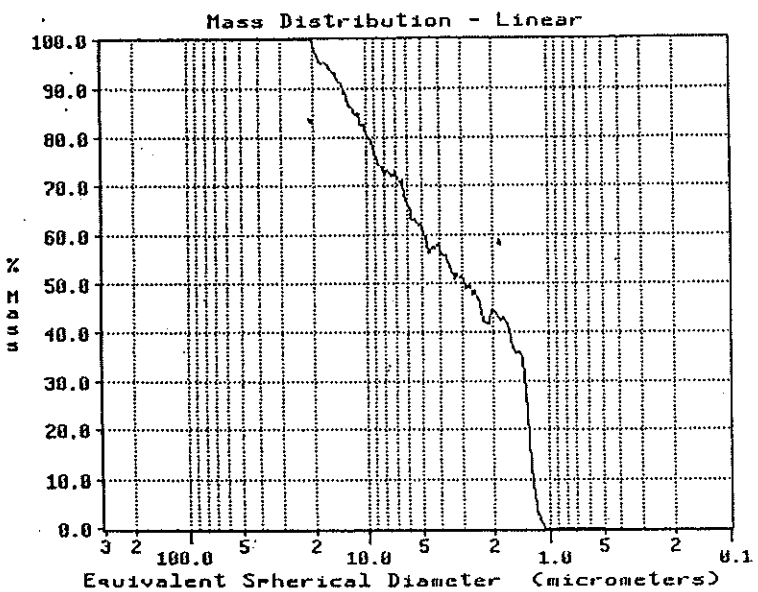
Primary Particle Size Distributions
PLOT 2



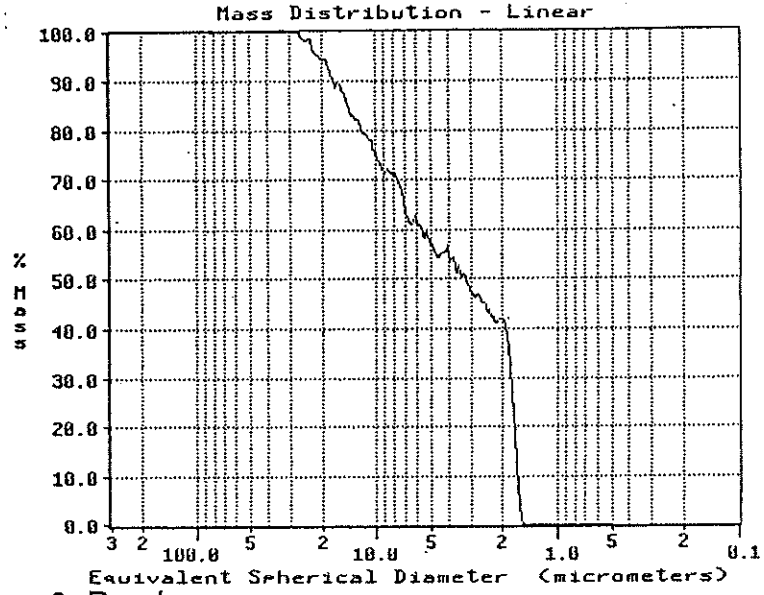
EP Run 2, Rep c

Primary Particle Size Distributions

PLOT 3



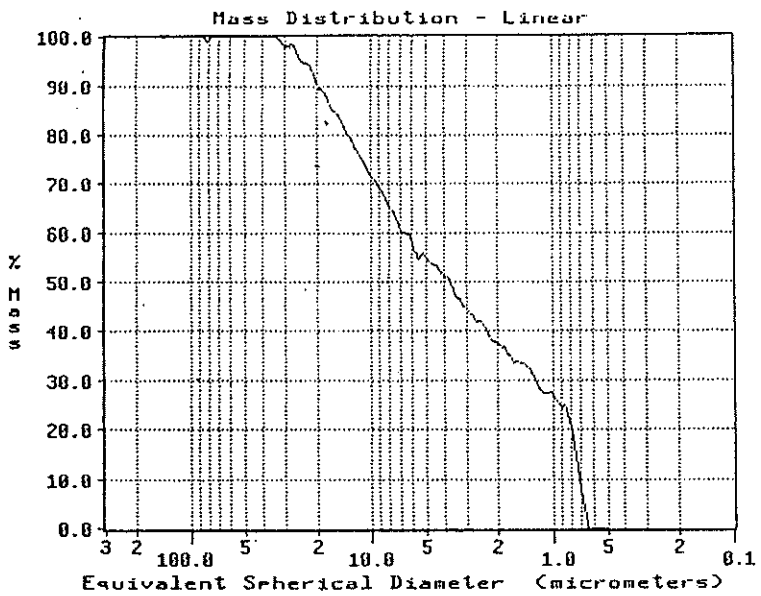
EP Run 2, Rep a



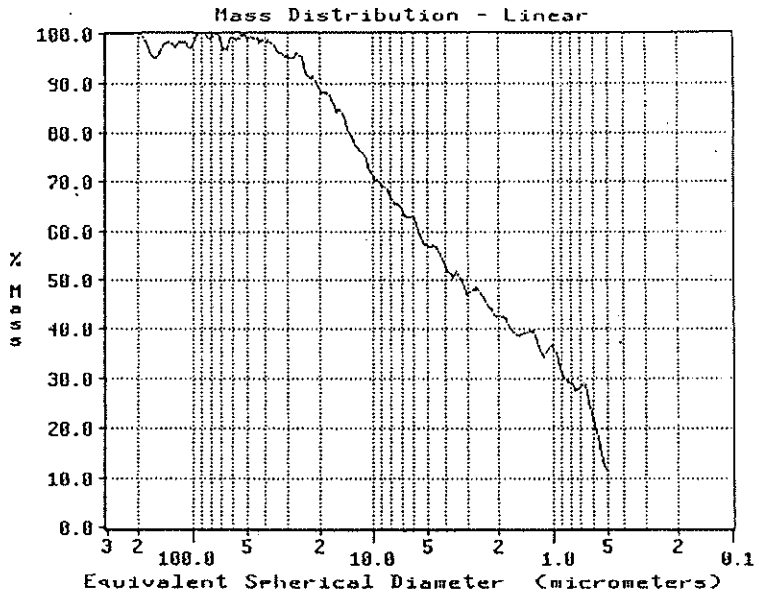
EP Run 2, Rep b

Primary Particle Size Distributions

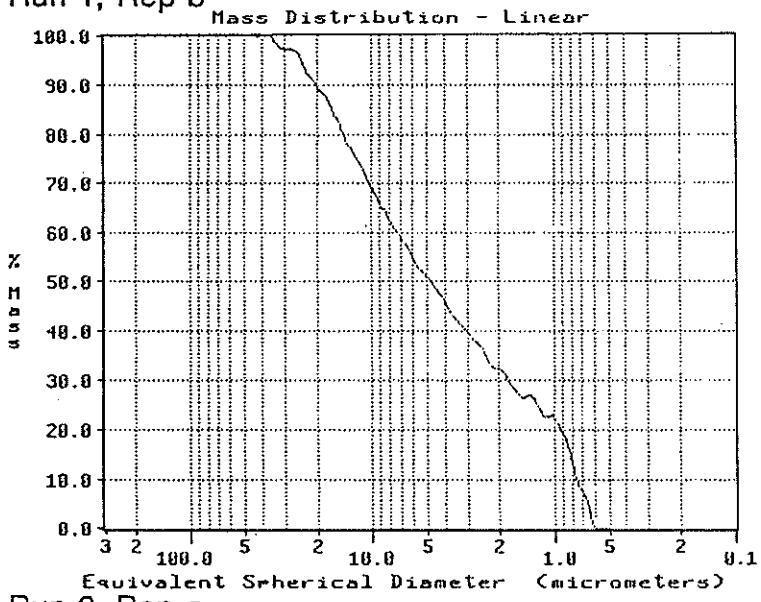
PLOT 4



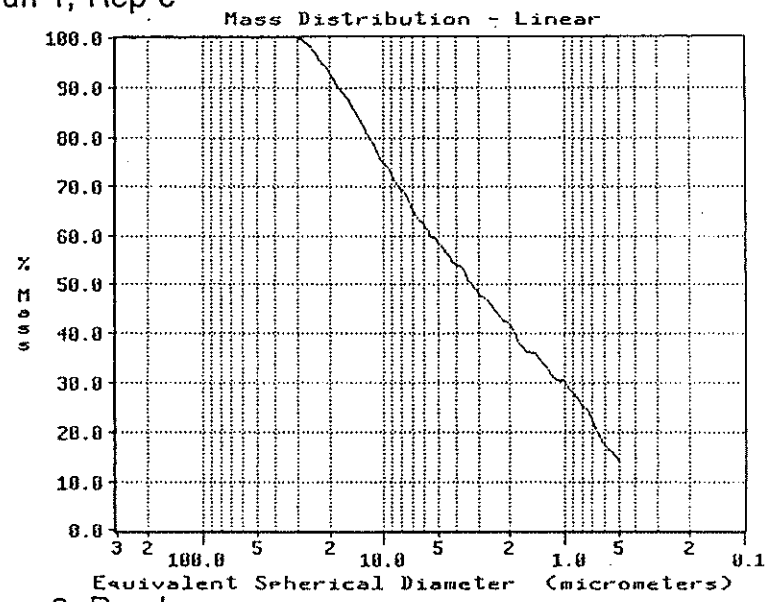
EP Run 1, Rep b



EP Run 1, Rep c



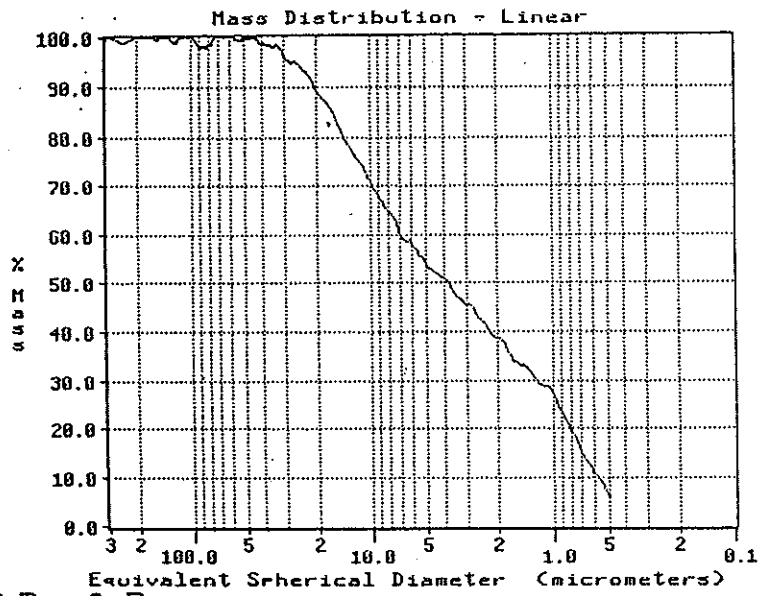
EP Run 2, Rep a



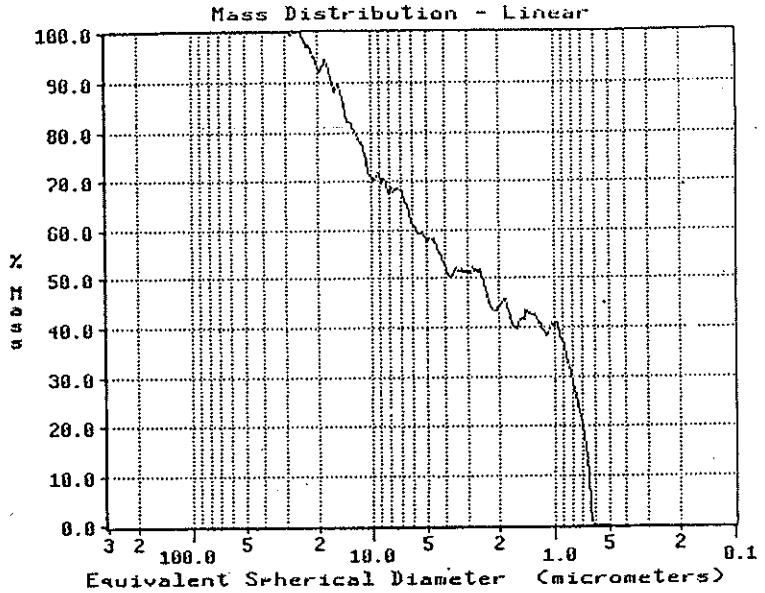
EP Run 2, Rep b

Primary Particle Size Distributions

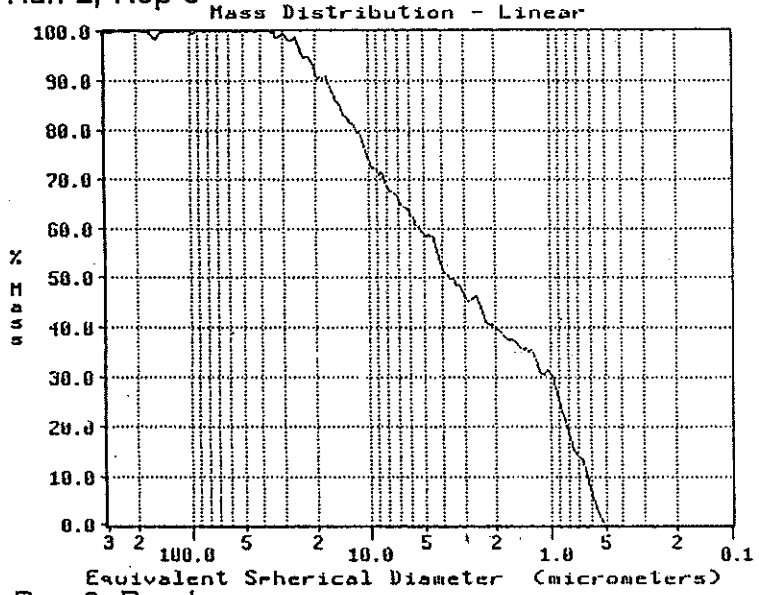
PLOT 4



EP Run 2, Rep c



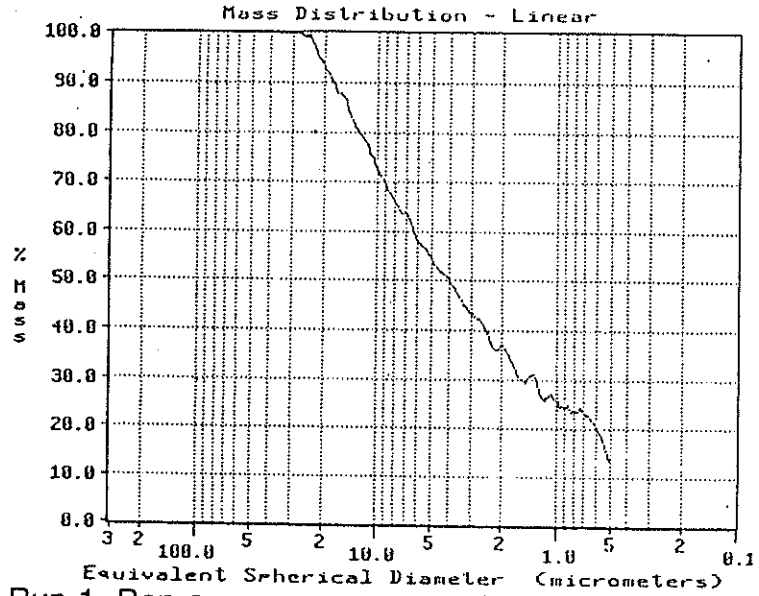
FS Run 2, Rep a



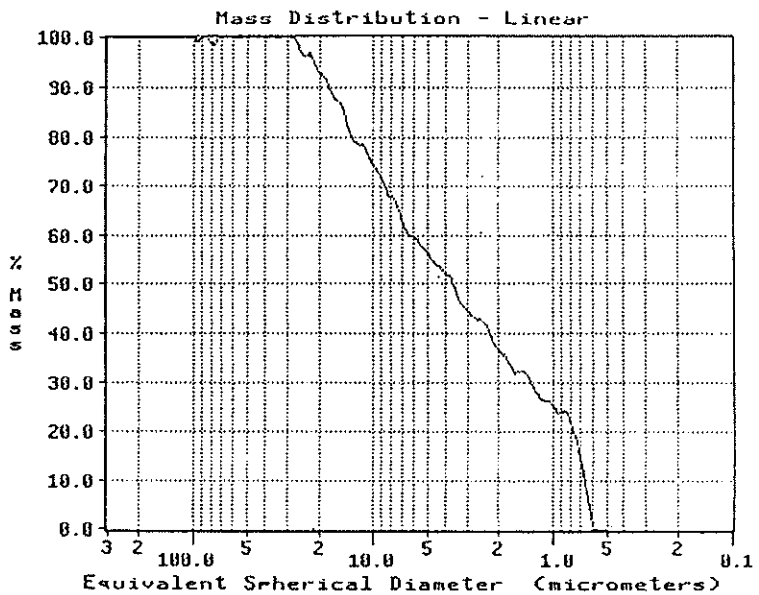
EP Run 2, Rep b

Primary Particle Size Distributions

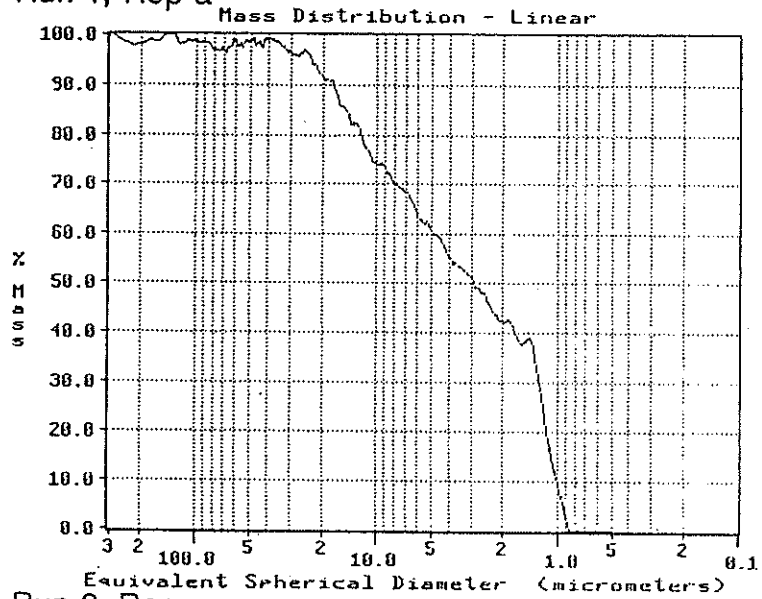
PLOT 5



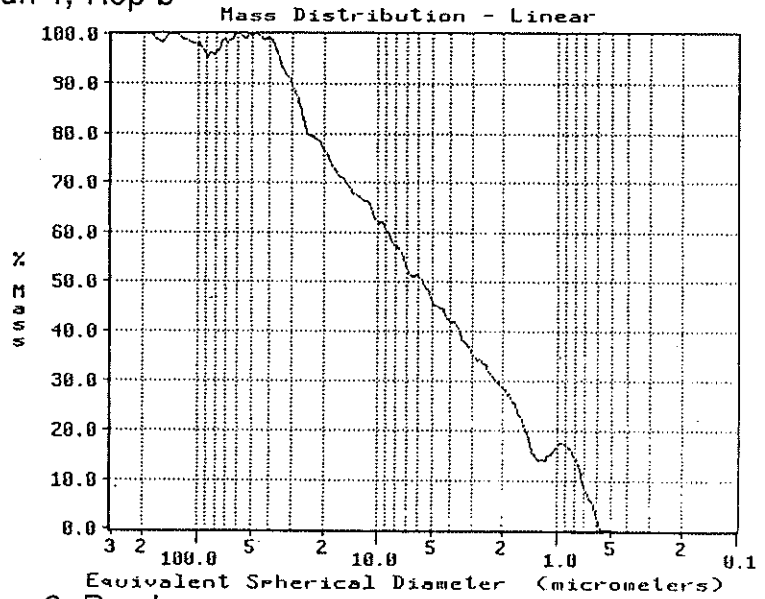
EP Run 1, Rep a



EP Run 1, Rep b

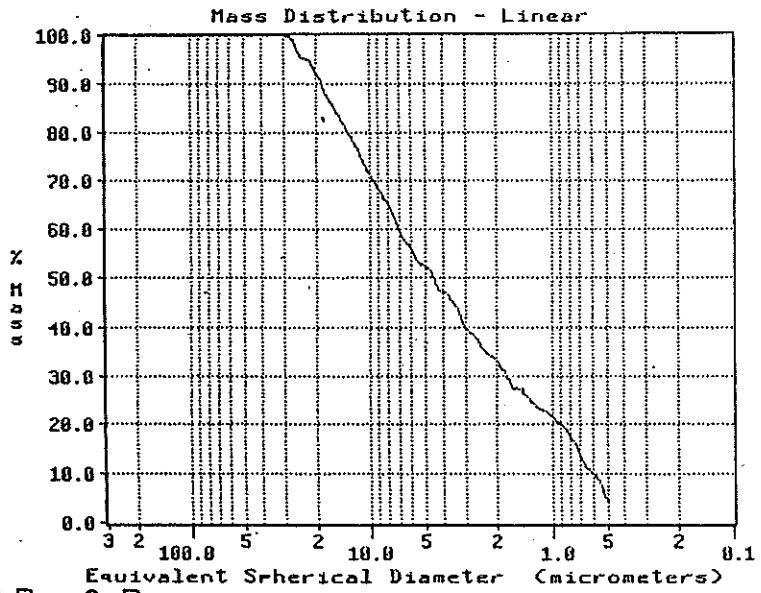


EP Run 2, Rep a

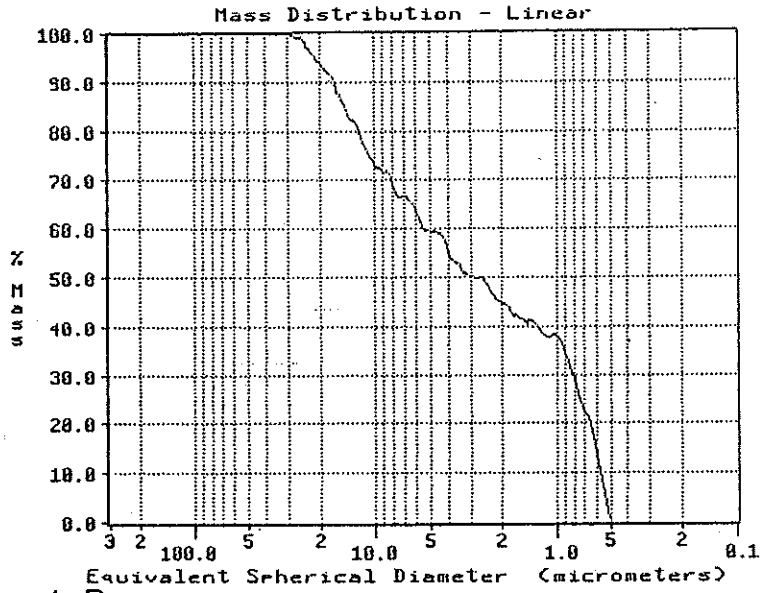


EP Run 2, Rep b

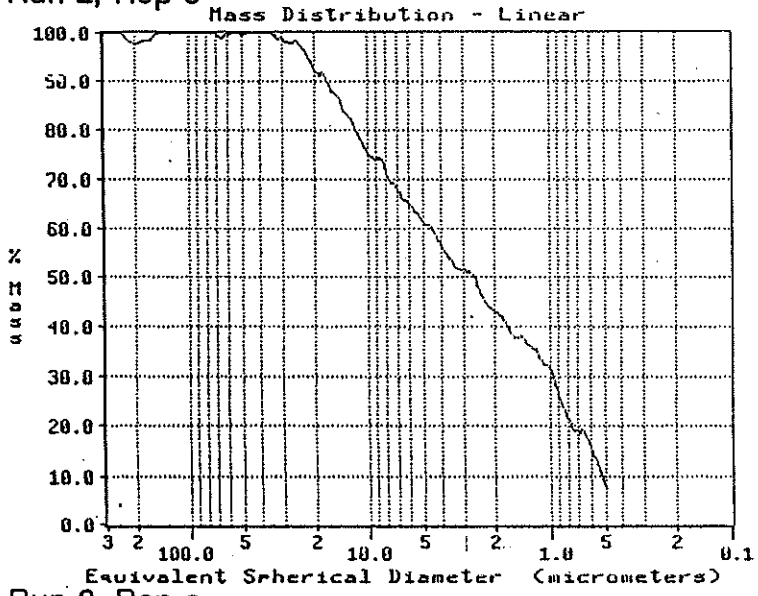
Primary Particle Size Distributions
PLOT 5



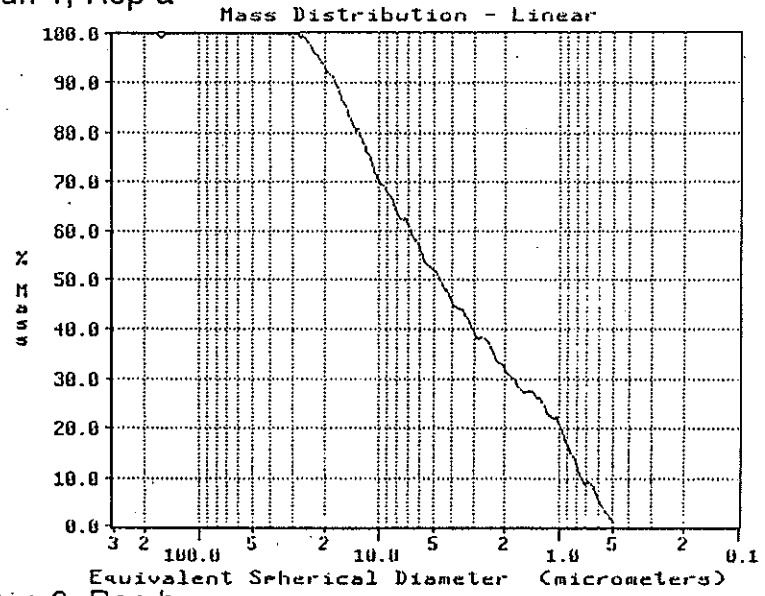
EP Run 2, Rep c



FS Run 1, Rep a

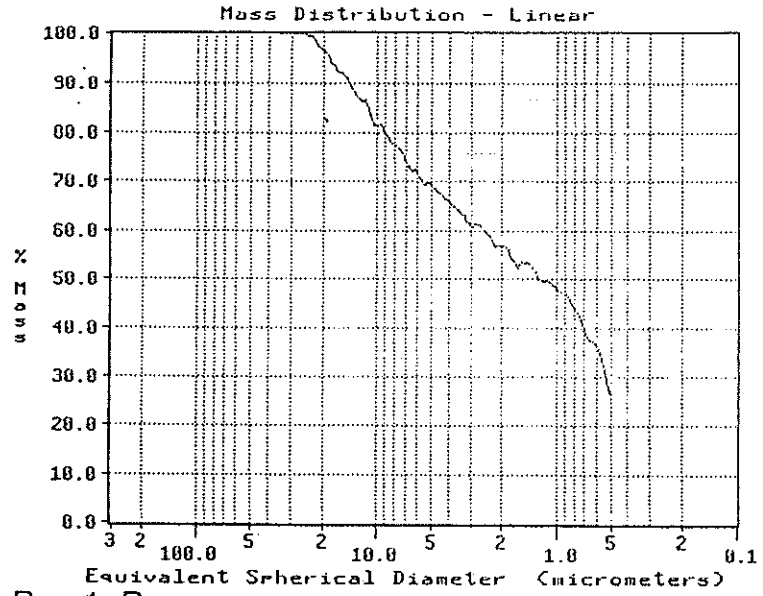


FS Run 2, Rep a

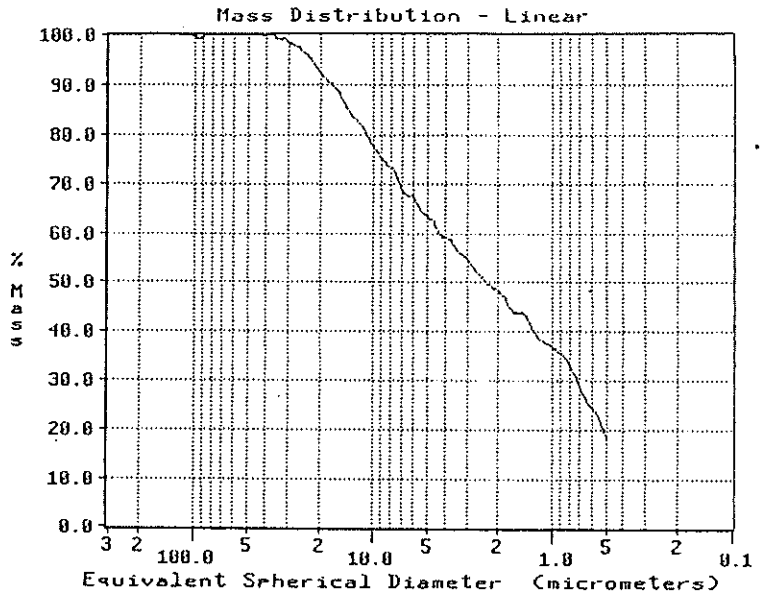


FS Run 2, Rep b

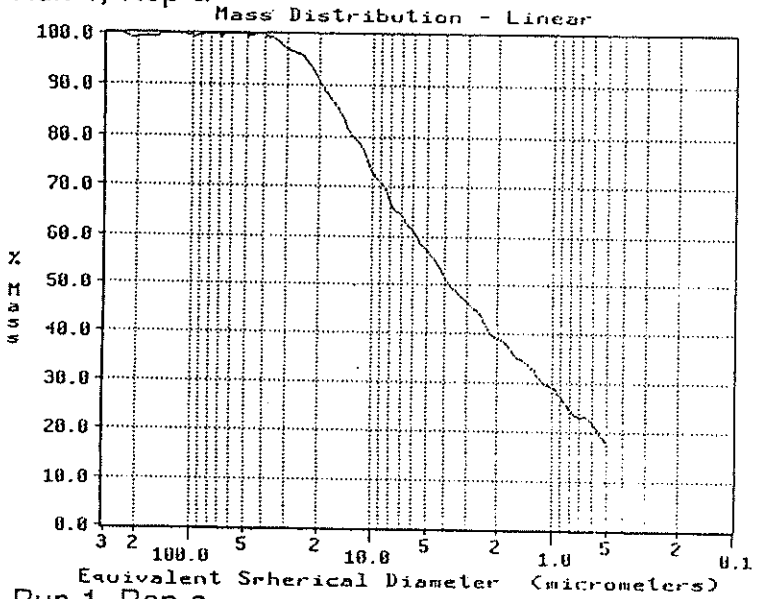
Primary Particle Size Distributions
PLOT 6



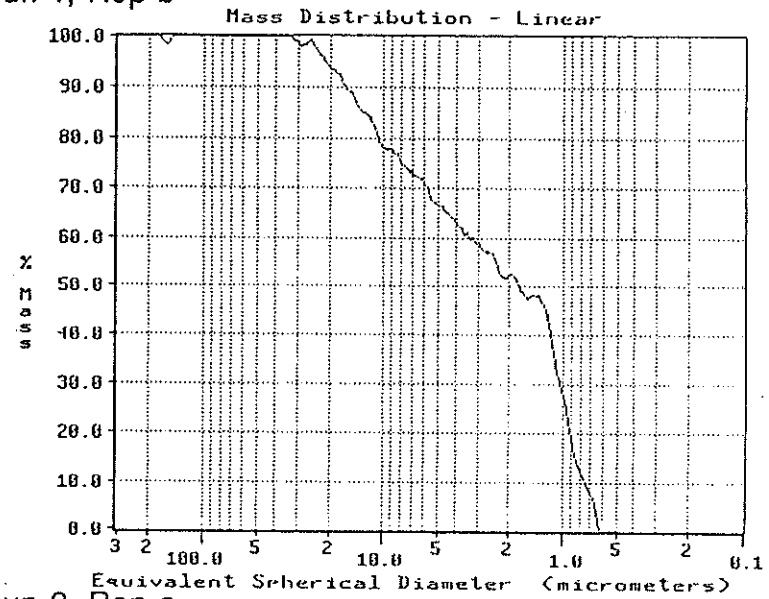
EP Run 1, Rep a



EP Run 1, Rep b

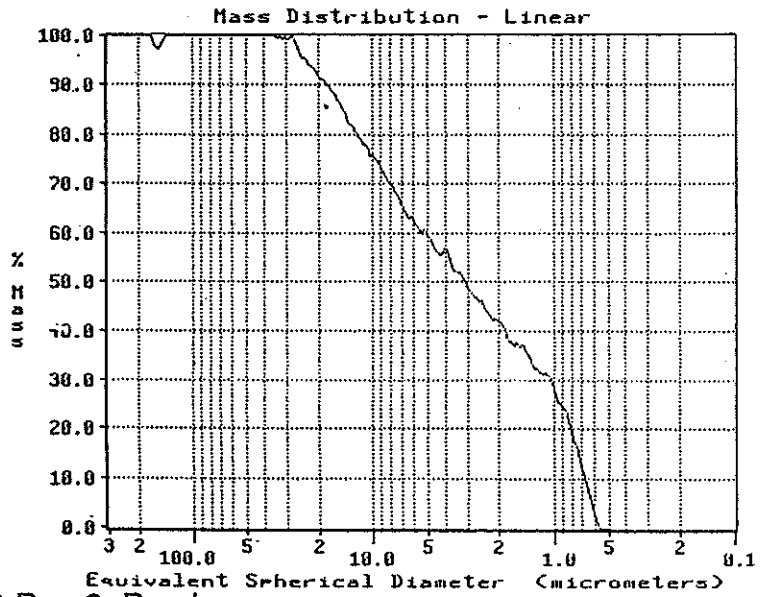


EP Run 1, Rep c

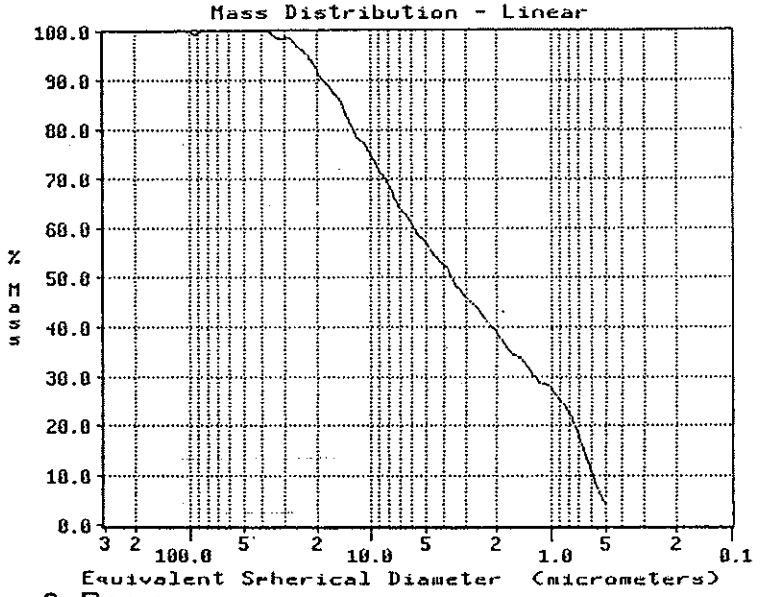


EP Run 2, Rep a

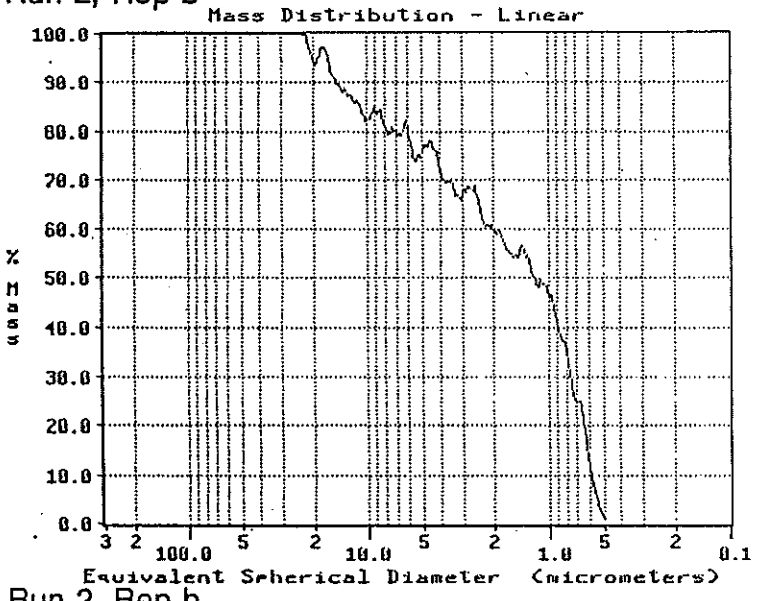
Primary Particle Size Distributions
PLOT 6



EP Run 2, Rep b



EP Run 2, Rep c



FS Run 2, Rep b

APPENDIX E

Microtopography Data

Odd numbered tables - left half of plot
Even numbered tables - right half of plot

FILTER STRIP MICROTOPOGRAPHY DATA

Plot #1 Pass 1

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	99.675	99.690	99.690	99.710	99.750	99.700	99.690	99.665	99.650	99.640	99.635	99.650	99.630	99.655
2	99.590	99.590	99.625	99.600	99.610	99.610	99.615	99.620	99.630	99.590	99.570	99.585	99.570	99.550
3	99.505	99.505	99.545	99.505	99.515	99.520	99.500	99.505	99.515	99.510	99.520	99.545	99.520	99.490
4	99.380	99.420	99.435	99.430	99.445	99.440	99.410	99.420	99.430	99.430	99.440	99.435	99.405	99.410
5	99.355	99.350	99.355	99.360	99.390	99.410	99.395	99.385	99.370	99.355	99.345	99.360	99.355	99.345
6	99.370	99.370	99.365	99.390	99.390	99.395	99.380	99.380	99.385	99.350	99.365	99.370	99.390	99.365
7	99.305	99.300	99.305	99.325	99.340	99.320	99.310	99.330	99.330	99.350	99.380	99.365	99.340	99.325
8	99.225	99.235	99.225	99.240	99.255	99.270	99.235	99.260	99.285	99.295	99.300	99.295	99.265	99.250
9	99.175	99.150	99.155	99.180	99.205	99.210	99.190	99.240	99.255	99.230	99.235	99.230	99.210	99.195
10	99.090	99.100	99.090	99.110	99.135	99.135	99.130	99.130	99.115	99.125	99.085	99.110	99.130	99.120
11	98.980	99.005	99.030	99.060	99.050	99.060	99.030	99.075	98.965	99.035	99.060	99.025	99.025	99.040
12	98.940	98.950	98.955	98.980	98.950	98.975	98.955	99.020	98.975	99.005	99.015	98.990	98.990	99.015
13	98.915	98.890	98.900	98.885	98.905	98.895	98.900	98.925	98.910	98.940	98.940	98.945	98.960	98.940
14	98.835	98.805	98.810	98.790	98.820	98.835	98.840	98.840	98.855	98.855	98.870	98.865	98.860	98.895
15	98.775	98.755	98.780	98.745	98.760	98.770	98.765	98.785	98.795	98.810	98.810	98.805	98.800	98.805
16	98.835	98.775	98.810	98.785	98.760	98.745	98.735	98.670	98.705	98.710	98.720	98.735	98.710	98.765
17	98.755	98.740	98.740	98.760	98.745	98.740	98.765	98.720	98.690	98.650	98.650	98.660	98.655	98.685
18	98.685	98.700	98.690	98.660	98.675	98.690	98.660	98.660	98.635	98.650	98.640	98.625	98.620	98.630
19	98.590	98.620	98.585	98.615	98.650	98.620	98.635	98.615	98.605	98.625	98.625	98.625	98.605	98.575
20	98.495	98.490	98.495	98.520	98.585	98.555	98.570	98.545	98.540	98.530	98.510	98.535	98.520	98.490
21	98.340	98.345	98.335	98.360	98.410	98.410	98.405	98.435	98.450	98.460	98.440	98.435	98.450	98.410
22	98.240	98.215	98.235	98.265	98.290	98.295	98.310	98.320	98.340	98.360	98.375	98.375	98.330	98.330
23	98.125	98.150	98.130	98.140	98.165	98.210	98.200	98.185	98.265	98.270	98.280	98.245	98.205	98.280
24	98.025	98.050	98.060	98.055	98.105	98.130	98.140	98.165	98.210	98.190	98.170	98.150	98.135	98.085
25	97.940	97.975	97.990	98.035	98.065	98.090	98.115	98.120	98.135	98.090	98.060	98.025	98.005	97.965
26	97.915	97.870	97.885	97.920	97.935	97.990	98.015	98.000	97.980	97.935	97.900	97.910	97.900	97.930
27	97.800	97.800	97.800	97.820	97.845	97.845	97.855	97.840	97.835	97.820	97.855	97.830	97.885	97.905
28	97.750	97.705	97.730	97.725	97.730	97.735	97.750	97.730	97.740	97.755	97.770	97.770	97.820	97.855

FILTER STRIP MICROTOPOGRAPHY DATA

Plot #1 Pass 1

Table 2

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	99.625	99.660	99.665	99.650	99.635	99.610	99.620	99.635	99.645	99.660	99.650	99.645	99.620	99.605	99.535
2	99.560	99.565	99.560	99.570	99.560	99.575	99.565	99.560	99.590	99.605	99.580	99.595	99.590	99.560	99.500
3	99.510	99.510	99.505	99.515	99.510	99.515	99.555	99.545	99.475	99.485	99.505	99.530	99.555	99.525	99.510
4	99.420	99.395	99.395	99.425	99.450	99.450	99.450	99.440	99.425	99.460	99.525	99.520	99.505	99.510	99.465
5	99.350	99.340	99.370	99.400	99.410	99.400	99.420	99.395	99.400	99.420	99.465	99.485	99.470	99.460	99.425
6	99.370	99.350	99.385	99.370	99.355	99.380	99.385	99.385	99.400	99.375	99.405	99.400	99.400	99.385	99.400
7	99.335	99.350	99.365	99.375	99.390	99.370	99.365	99.395	99.420	99.385	99.345	99.360	99.340	99.350	99.360
8	99.260	99.300	99.310	99.285	99.310	99.315	99.300	99.335	99.335	99.405	99.365	99.365	99.405	99.370	99.395
9	99.185	99.205	99.210	99.260	99.260	99.260	99.270	99.280	99.290	99.330	99.365	99.365	99.410	99.440	99.425
10	99.140	99.195	99.170	99.205	99.215	99.230	99.210	99.220	99.255	99.290	99.345	99.400	99.390	99.375	99.360
11	99.085	99.105	99.120	99.165	99.190	99.180	99.185	99.215	99.220	99.240	99.285	99.300	99.300	99.280	99.245
12	99.005	99.020	98.985	99.055	99.070	99.065	99.095	99.130	99.115	99.210	99.140	99.175	99.175	99.175	99.210
13	98.975	98.955	98.960	98.975	98.980	98.990	98.995	98.975	98.990	98.995	99.010	99.055	99.055	99.060	99.055
14	98.930	98.940	98.920	98.910	98.890	98.890	98.895	98.895	98.865	98.925	98.925	98.955	98.950	98.935	98.945
15	98.850	98.855	98.875	98.845	98.825	98.850	98.865	98.845	98.835	98.850	98.855	98.885	98.880	98.855	98.855
16	98.760	98.780	98.775	98.780	98.780	98.795	98.810	98.815	98.815	98.805	98.805	98.805	98.745	98.735	98.700
17	98.685	98.720	98.735	98.730	98.725	98.760	98.745	98.770	98.770	98.740	98.710	98.695	98.655	98.665	98.635
18	98.640	98.630	98.680	98.680	98.695	98.685	98.690	98.705	98.665	98.630	98.625	98.605	98.590	98.585	98.535
19	98.545	98.560	98.585	98.600	98.585	98.590	98.595	98.585	98.575	98.585	98.530	98.520	98.530	98.530	98.555
20	98.500	98.495	98.495	98.555	98.560	98.520	98.540	98.515	98.505	98.500	98.505	98.505	98.520	98.530	98.600
21	98.400	98.405	98.425	98.480	98.505	98.490	98.460	98.500	98.525	98.520	98.490	98.520	98.510	98.540	98.575
22	98.320	98.300	98.320	98.360	98.385	98.410	98.435	98.415	98.430	98.460	98.480	98.485	98.470	98.485	98.480
23	98.230	98.210	98.250	98.280	98.370	98.305	98.350	98.365	98.350	98.355	98.370	98.375	98.400	98.365	98.400
24	98.085	98.095	98.165	98.185	98.245	98.245	98.265	98.255	98.260	98.265	98.265	98.265	98.280	98.310	98.310
25	98.015	98.040	98.090	98.200	98.210	98.130	98.155	98.210	98.160	98.115	98.105	98.150	98.130	98.220	98.260
26	97.965	98.005	98.050	98.065	98.080	98.090	98.055	98.045	98.050	98.030	98.020	98.010	98.010	98.010	98.045
27	97.945	97.980	98.030	98.030	98.020	97.995	98.000	97.995	97.985	97.970	97.935	97.950	97.920	97.970	98.010
28	97.880	97.940	97.930	97.905	97.900	97.900	97.885	97.915	97.895	97.875	97.850	97.860	97.895	97.925	97.955

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 1 Pass 2

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	99.755	99.780	99.830	99.845	99.885	99.840	99.870	99.750	99.710	99.700	99.680	99.665	99.660	99.695
2	99.610	99.610	99.735	99.725	99.710	99.670	99.655	99.630	99.635	99.620	99.610	99.615	99.595	99.595
3	99.540	99.565	99.570	99.550	99.555	99.575	99.575	99.555	99.570	99.540	99.540	99.545	99.515	99.510
4	99.435	99.475	99.485	99.475	99.485	99.490	99.450	99.455	99.460	99.445	99.450	99.460	99.445	99.450
5	99.355	99.385	99.400	99.385	99.420	99.430	99.420	99.400	99.405	99.410	99.385	99.365	99.355	99.375
6	99.380	99.360	99.355	99.375	99.380	99.375	99.380	99.395	99.360	99.345	99.350	99.345	99.370	99.355
7	99.360	99.335	99.325	99.330	99.345	99.335	99.325	99.330	99.335	99.355	99.375	99.345	99.340	99.330
8	99.265	99.285	99.280	99.280	99.305	99.285	99.280	99.300	99.315	99.295	99.340	99.325	99.295	99.305
9	99.190	99.215	99.215	99.210	99.240	99.265	99.240	99.235	99.280	99.270	99.280	99.265	99.245	99.210
10	99.120	99.110	99.125	99.150	99.185	99.175	99.170	99.180	99.195	99.190	99.185	99.205	99.190	99.170
11	99.040	99.010	99.050	99.070	99.095	99.100	99.075	99.085	99.070	99.080	99.060	99.040	99.075	99.105
12	98.955	98.985	98.985	99.015	99.005	99.025	99.020	99.050	99.025	99.035	99.030	99.020	99.000	99.045
13	98.930	98.910	98.910	98.915	98.920	98.920	98.930	98.940	98.950	98.955	99.010	98.975	98.970	98.960
14	98.905	98.860	98.850	98.835	98.845	98.860	98.860	98.860	98.865	98.900	98.915	98.905	98.890	98.915

FILTER STRIP MICROTOPOGRAPHY DATA
Plot 1 Pass 2
Table 2

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	99.700	99.705	99.715	99.685	99.635	99.635	99.660	99.685	99.675	99.685	99.685	99.655	99.625	99.615	99.515
2	99.600	99.595	99.615	99.630	99.600	99.605	99.580	99.605	99.600	99.595	99.605	99.585	99.605	99.545	99.500
3	99.555	99.525	99.535	99.550	99.555	99.560	99.585	99.550	99.505	99.525	99.535	99.530	99.560	99.520	99.480
4	99.455	99.445	99.450	99.485	99.475	99.470	99.505	99.465	99.435	99.490	99.490	99.500	99.525	99.515	99.480
5	99.385	99.400	99.410	99.425	99.420	99.410	99.420	99.405	99.395	99.460	99.485	99.470	99.485	99.450	99.430
6	99.350	99.350	99.355	99.365	99.390	99.400	99.405	99.430	99.415	99.415	99.455	99.465	99.465	99.430	99.425
7	99.350	99.360	99.345	99.370	99.400	99.370	99.380	99.385	99.390	99.350	99.345	99.360	99.360	99.350	99.390
8	99.300	99.320	99.330	99.345	99.355	99.360	99.355	99.375	99.400	99.400	99.370	99.390	99.365	99.345	99.370
9	99.220	99.255	99.265	99.295	99.300	99.300	99.290	99.310	99.330	99.385	99.365	99.365	99.420	99.450	99.420
10	99.170	99.175	99.170	99.230	99.220	99.220	99.245	99.255	99.255	99.240	99.355	99.375	99.380	99.395	99.390
11	99.145	99.135	99.165	99.195	99.195	99.170	99.195	99.220	99.225	99.250	99.250	99.210	99.365	99.325	99.295
12	99.035	99.070	99.065	99.090	99.120	99.155	99.145	99.170	99.190	99.205	99.255	99.260	99.250	99.220	99.215
13	98.975	98.985	98.990	99.010	98.995	99.015	99.030	99.065	99.065	99.040	99.060	99.095	99.120	99.105	99.090
14	98.935	98.960	98.940	98.915	98.935	98.930	98.930	98.930	98.910	98.915	98.980	99.000	98.985	98.960	98.975

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 1 Pass 3

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	99.870	99.855	99.915	99.940	99.930	99.930	99.940	99.890	99.795	99.730	99.825	99.790	99.820	99.810
2	99.755	99.810	99.830	99.840	99.835	99.810	99.825	99.800	99.750	99.720	99.695	99.720	99.670	99.655
3	99.645	99.710	99.715	99.705	99.665	99.695	99.715	99.680	99.645	99.570	99.545	99.560	99.535	99.530
4	99.645	99.690	99.670	99.650	99.615	99.600	99.530	99.485	99.475	99.465	99.455	99.480	99.460	99.455
5	99.630	99.610	99.630	99.600	99.570	99.485	99.440	99.425	99.420	99.415	99.395	99.395	99.375	99.370
6	99.575	99.555	99.575	99.570	99.550	99.510	99.455	99.410	99.370	99.345	99.370	99.375	99.385	99.370
7	99.540	99.540	99.550	99.545	99.515	99.495	99.455	99.405	99.350	99.365	99.380	99.355	99.350	99.340
8	99.495	99.495	99.480	99.510	99.485	99.450	99.400	99.350	99.320	99.330	99.330	99.325	99.315	99.310
9	99.415	99.415	99.450	99.425	99.425	99.370	99.270	99.255	99.280	99.275	99.280	99.275	99.250	99.210
10	99.245	99.255	99.275	99.280	99.210	99.190	99.180	99.180	99.200	99.190	99.195	99.220	99.200	99.175
11	99.095	99.105	99.075	99.080	99.100	99.100	99.085	99.085	99.090	99.085	99.070	99.055	99.085	99.110
12	98.995	98.985	98.995	99.025	99.015	98.990	99.025	99.055	99.045	99.055	99.030	99.015	99.010	99.050
13	98.940	98.915	98.910	98.940	98.935	98.930	98.940	98.945	98.960	98.970	99.010	98.985	98.975	98.970
14	98.920	98.855	98.840	98.845	98.855	98.880	98.880	98.880	98.885	98.895	98.940	98.935	98.890	98.925

FILTER STRIP MICROTOPOGRAPHY DATA
Plot 2 Pass 1
Table 2

FILTER STRIP MICROTOPOGRAPHY DATA
Plot 1 Pass 3
Table 2

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	99.710	99.720	99.725	99.690	99.650	99.655	99.655	99.700	99.685	99.690	99.690	99.680	99.690	99.750	99.730
2	99.630	99.610	99.625	99.635	99.605	99.620	99.590	99.595	99.605	99.600	99.605	99.590	99.610	99.610	99.655
3	99.560	99.535	99.540	99.570	99.560	99.560	99.595	99.560	99.530	99.520	99.535	99.540	99.565	99.525	99.570
4	99.465	99.465	99.460	99.500	99.480	99.475	99.505	99.475	99.440	99.470	99.485	99.505	99.520	99.515	99.535
5	99.400	99.395	99.425	99.425	99.445	99.415	99.420	99.430	99.400	99.455	99.485	99.475	99.490	99.460	99.480
6	99.355	99.360	99.380	99.360	99.390	99.465	99.420	99.430	99.430	99.415	99.455	99.455	99.465	99.435	99.455
7	99.355	99.380	99.355	99.370	99.405	99.380	99.390	99.400	99.395	99.350	99.355	99.365	99.355	99.365	99.395
8	99.315	99.350	99.345	99.360	99.355	99.365	99.360	99.375	99.410	99.415	99.380	99.420	99.415	99.370	99.375
9	99.230	99.260	99.265	99.290	99.300	99.305	99.300	99.315	99.325	99.380	99.385	99.365	99.420	99.450	99.430
10	99.175	99.180	99.185	99.235	99.220	99.230	99.250	99.260	99.265	99.325	99.360	99.380	99.390	99.395	99.380
11	99.145	99.145	99.175	99.205	99.205	99.175	99.200	99.220	99.230	99.255	99.315	99.355	99.375	99.330	99.300
12	99.040	99.085	99.070	99.100	99.145	99.160	99.150	99.185	99.200	99.210	99.260	99.265	99.255	99.225	99.210
13	98.990	98.995	99.020	99.015	99.000	99.020	99.040	99.070	99.060	99.050	99.080	99.105	99.125	99.115	99.115
14	98.950	98.965	98.950	98.920	98.935	98.935	98.945	98.945	98.935	98.935	98.985	99.015	98.990	98.970	98.990

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 2 Pass 1

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	99.515	99.490	99.500	99.480	99.490	99.475	99.485	99.480	99.520	99.505	99.555	99.515	99.535	99.510
2	99.390	99.395	99.405	99.415	99.425	99.390	99.405	99.410	99.410	99.445	99.450	99.450	99.450	99.455
3	99.295	99.365	99.315	99.330	99.330	99.330	99.310	99.300	99.310	99.305	99.280	99.330	99.365	99.380
4	99.205	99.180	99.230	99.205	99.265	99.255	99.215	99.175	99.210	99.200	99.190	99.225	99.280	99.295
5	99.155	99.165	99.180	99.160	99.150	99.140	99.135	99.100	99.145	99.110	99.110	99.105	99.130	99.190
6	99.080	99.065	99.080	99.080	99.070	99.060	99.060	99.065	99.050	99.065	99.050	99.080	99.085	99.120
7	99.020	98.960	98.955	98.945	98.930	98.955	98.985	99.000	99.005	99.025	99.020	99.025	99.085	99.110
8	98.965	98.925	98.905	98.880	98.900	98.945	98.905	98.950	99.005	98.985	99.010	98.975	99.030	99.040
9	98.915	98.935	98.945	98.935	98.940	98.970	98.990	99.010	99.000	99.005	99.030	99.000	99.025	99.090
10	98.865	98.885	98.885	98.865	98.880	98.940	98.910	98.900	98.905	98.910	98.940	98.965	99.005	99.010
11	98.810	98.810	98.840	98.825	98.825	98.825	98.815	98.855	98.825	98.815	98.850	98.870	98.905	98.905
12	98.675	98.680	98.690	98.700	98.775	98.775	98.770	98.750	98.735	98.750	98.765	98.765	98.780	98.790
13	98.545	98.565	98.580	98.625	98.625	98.630	98.630	98.675	98.670	98.675	98.635	98.665	98.675	98.675
14	98.530	98.510	98.490	98.525	98.535	98.530	98.570	98.595	98.580	98.580	98.550	98.575	98.565	98.545
15	98.360	98.370	98.380	98.370	98.375	98.380	98.395	98.430	98.440	98.470	98.475	98.470	98.500	98.490

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 2 Pass 1

Table 3

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	98.245	98.270	98.270	98.245	98.230	98.260	98.285	98.300	98.325	98.320	98.325	98.335	98.365	98.415
17	98.190	98.190	98.200	98.190	98.150	98.150	98.200	98.210	98.210	98.225	98.245	98.255	98.265	98.280
18	98.095	98.105	98.105	98.105	98.105	98.115	98.100	98.165	98.095	98.125	98.165	98.150	98.165	98.195
19	98.040	98.040	98.000	98.005	98.000	98.000	97.995	98.000	98.025	98.025	98.020	98.035	98.050	98.055
20	97.995	97.990	97.980	97.965	97.950	97.945	97.935	97.930	97.920	97.910	97.920	97.920	97.935	97.945
21	97.905	97.910	97.945	97.945	97.950	97.920	97.900	97.870	97.850	97.815	97.820	97.835	97.840	97.830
22	97.830	97.840	97.860	97.885	97.870	97.855	97.845	97.840	97.815	97.785	97.795	97.775	97.785	97.770
23	97.745	97.755	97.780	97.770	97.765	97.755	97.740	97.760	97.715	97.720	97.730	97.700	97.695	97.675
24	97.625	97.645	97.670	97.650	97.655	97.655	97.655	97.630	97.610	97.615	97.630	97.605	97.585	97.565
25	97.525	97.580	97.565	97.560	97.560	97.575	97.550	97.555	97.545	97.530	97.535	97.515	97.480	97.455
26	97.460	97.480	97.485	97.490	97.480	97.475	97.490	97.460	97.460	97.430	97.410	97.390	97.310	97.295
27	97.395	97.405	97.405	97.390	97.370	97.345	97.335	97.335	97.335	97.285	97.285	97.280	97.235	97.200
28	97.330	97.320	97.270	97.295	97.295	97.280	97.290	97.255	97.245	97.205	97.160	97.165	97.205	97.140
29	97.230	97.220	97.215	97.195	97.165	97.175	97.160	97.180	97.125	97.110	97.095	97.080	97.095	97.050
30	97.135	97.120	97.130	97.110	97.100	97.090	97.080	97.070	97.095	97.070	97.090	97.065	97.080	97.075

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 2 Pass 1

Table 4

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
16	98.405	98.455	98.455	98.490	98.490	98.510	98.500	98.510	98.495	98.510	98.485	98.465	98.480	98.475	98.455
17	98.290	98.315	98.350	98.360	98.365	98.390	98.415	98.390	98.395	98.365	98.380	98.355	98.345	98.350	98.300
18	98.195	98.210	98.210	98.250	98.250	98.255	98.285	98.245	98.230	98.250	98.230	98.230	98.185	98.155	98.130
19	98.075	98.110	98.100	98.110	98.140	98.145	98.125	98.130	98.105	98.060	98.060	98.060	98.030	98.010	98.000
20	97.955	97.955	97.965	97.985	97.965	97.955	97.985	98.000	97.985	97.980	97.960	97.980	97.965	97.935	97.900
21	97.815	97.825	97.845	97.820	97.825	97.830	97.900	97.910	97.895	97.895	97.885	97.890	97.855	97.860	97.795
22	97.770	97.755	97.700	97.695	97.715	97.740	97.815	97.830	97.870	97.880	97.880	97.860	97.840	97.810	97.775
23	97.670	97.625	97.605	97.600	97.620	97.635	97.660	97.730	97.765	97.780	97.770	97.745	97.780	97.700	97.735
24	97.530	97.515	97.515	97.495	97.475	97.500	97.505	97.550	97.615	97.640	97.625	97.635	97.630	97.520	97.575
25	97.425	97.450	97.435	97.415	97.385	97.395	97.400	97.425	97.435	97.505	97.480	97.435	97.445	97.395	97.430
26	97.285	97.315	97.310	97.305	97.285	97.295	97.320	97.355	97.370	97.380	97.430	97.375	97.375	97.330	97.335
27	97.185	97.230	97.205	97.190	97.180	97.230	97.245	97.285	97.330	97.325	97.300	97.285	97.290	97.235	97.235
28	97.120	97.155	97.120	97.130	97.160	97.180	97.250	97.210	97.210	97.240	97.230	97.215	97.220	97.190	97.170
29	97.100	97.100	97.110	97.110	97.110	97.090	97.090	97.090	97.135	97.175	97.180	97.140	97.155	97.145	97.130
30	97.060	97.065	97.065	97.065	97.055	97.040	97.025	97.030	97.035	97.040	97.045	97.035	97.025	97.025	97.005

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 2 Pass 2

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	99.050	99.030	99.035	99.015	99.020	99.015	99.010	99.005	99.030	99.040	99.075	99.045	99.070	99.120
2	99.415	99.435	99.420	99.415	99.445	99.415	99.405	99.430	99.420	99.400	99.460	99.435	99.440	99.460
3	99.325	99.315	99.315	99.335	99.340	99.345	99.315	99.305	99.315	99.315	99.295	99.330	99.360	99.294
4	99.205	99.215	99.240	99.230	99.270	99.295	99.225	99.195	99.215	99.215	99.205	99.275	99.285	99.290
5	99.160	99.165	99.185	99.175	99.160	99.160	99.150	99.120	99.150	99.125	99.120	99.125	99.130	99.190
6	99.090	99.070	99.070	99.090	99.070	99.070	99.055	99.065	99.035	99.065	99.055	99.070	99.100	99.105
7	99.030	98.955	98.950	98.945	98.950	98.980	98.990	99.000	99.000	99.030	99.015	99.020	99.090	99.105
8	98.965	98.915	98.905	98.885	98.900	98.925	98.900	98.930	98.970	98.985	99.010	98.965	99.015	99.035
9	98.905	98.925	98.945	98.930	98.925	98.960	98.990	99.010	98.980	99.000	99.015	99.000	99.010	99.080
10	98.875	98.875	98.875	98.845	98.870	98.935	98.905	98.900	98.900	98.930	98.960	98.935	99.015	99.000
11	98.815	98.815	98.840	98.835	98.825	98.835	98.805	98.850	98.835	98.825	98.850	98.875	98.895	98.910
12	98.670	98.675	98.670	98.700	98.770	98.785	98.750	98.765	98.735	98.750	98.765	98.775	98.790	98.790
13	98.545	98.560	98.575	98.610	98.650	98.645	98.645	98.690	98.660	98.685	98.650	98.665	98.680	98.670
14	98.525	98.510	98.490	98.505	98.535	98.540	98.575	98.585	98.570	98.580	98.550	98.580	98.565	98.545

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 2 Pass 3

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	99.530	99.535	99.605	99.685	99.585	99.510	99.750	99.505	99.530	99.565	99.565	99.510	99.550	99.725
2	99.400	99.415	99.425	99.425	99.455	99.560	99.510	99.430	99.420	99.400	99.455	99.435	99.455	99.460
3	99.305	99.310	99.315	99.335	99.345	99.405	99.320	99.305	99.305	99.310	99.295	99.330	99.360	99.395
4	99.195	99.210	99.240	99.230	99.270	99.275	99.225	99.200	99.215	99.215	99.200	99.240	99.275	99.295
5	99.165	99.165	99.180	99.170	99.160	99.140	99.145	99.115	99.145	99.115	99.120	99.105	99.130	99.190
6	99.080	99.065	99.095	99.090	99.075	99.070	99.065	99.070	99.050	99.070	99.055	99.070	99.100	99.120
7	99.020	98.955	98.950	98.945	98.950	98.970	98.990	98.995	99.010	99.035	99.015	99.020	99.090	99.110
8	98.970	98.930	98.920	98.890	98.905	98.935	98.910	98.935	98.995	98.980	99.005	98.970	99.020	99.035
9	98.915	98.935	98.945	98.945	98.935	98.965	98.990	99.010	98.995	99.000	99.025	99.020	99.035	99.085
10	98.880	98.890	98.890	98.855	98.875	98.945	99.010	98.910	98.910	98.930	98.970	98.955	99.035	99.005
11	98.810	98.810	98.840	98.830	98.825	98.835	98.810	98.855	98.830	98.825	98.850	98.870	98.895	98.905
12	98.675	98.680	98.680	98.700	98.765	98.770	98.765	98.760	98.745	98.750	98.765	98.765	98.785	98.790
13	98.545	98.565	98.585	98.620	98.650	98.640	98.650	98.680	98.665	98.685	98.640	98.670	98.675	98.670
14	98.520	98.505	98.490	98.525	98.535	98.540	98.570	98.600	98.580	98.580	98.550	98.575	98.580	98.560
15	98.365	98.375	98.395	98.385	98.415	98.390	98.420	98.440	98.455	98.480	98.500	98.495	98.495	98.510

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 2 Pass 3

Table 2

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	99.525	99.620	99.660	99.605	99.490	99.505	99.615	99.550	99.505	99.530	99.510	99.455	99.430	99.515	99.345
2	99.440	99.455	99.485	99.510	99.445	99.400	99.435	99.415	99.410	99.385	99.355	99.340	99.310	99.290	99.240
3	99.380	99.365	99.345	99.360	99.360	99.375	99.385	99.375	99.375	99.325	99.300	99.300	99.245	99.215	99.180
4	99.285	99.300	99.275	99.270	99.305	99.310	99.295	99.300	99.305	99.265	99.280	99.250	99.260	99.215	99.165
5	99.220	99.270	99.255	99.235	99.225	99.265	99.255	99.240	99.280	99.255	99.235	99.190	99.165	99.145	99.115
6	99.145	99.145	99.155	99.150	99.150	99.160	99.180	99.235	99.225	99.230	99.195	99.165	99.145	99.095	99.085
7	99.110	99.085	99.120	99.135	99.135	99.195	99.165	99.185	99.165	99.145	99.150	99.155	99.155	99.125	99.115
8	99.050	99.035	99.045	99.060	99.070	99.050	99.040	99.185	99.080	99.075	99.070	99.055	99.045	99.105	99.105
9	99.080	99.125	99.100	99.120	99.125	99.135	99.125	99.125	99.145	99.170	99.160	99.140	99.100	99.040	99.070
10	99.020	99.035	99.055	99.085	99.065	99.085	99.105	99.150	99.075	99.065	99.080	99.095	99.055	98.975	98.955
11	98.920	98.935	98.945	98.975	98.970	99.000	99.000	99.025	99.055	99.035	99.045	99.025	98.955	98.920	98.890
12	98.830	98.815	98.830	98.815	98.830	98.825	98.845	98.870	98.890	98.895	98.930	98.930	98.860	98.795	98.790
13	98.675	98.675	98.695	98.705	98.745	98.780	98.770	98.795	98.815	98.825	98.810	98.815	98.755	98.755	98.745
14	98.580	98.585	98.650	98.625	98.610	98.615	98.650	98.680	98.700	98.710	98.715	98.710	98.670	98.660	98.650
15	98.520	98.545	98.575	98.585	98.580	98.560	98.595	98.590	98.605	98.615	98.610	98.615	98.580	98.560	98.545

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 3 Pass 1

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	99.470	99.430	99.460	99.420	99.440	99.460	99.500	99.560	99.550	99.570	99.580	99.570	99.600	99.580
2	99.360	99.320	99.330	99.340	99.300	99.400	99.420	99.420	99.440	99.450	99.480	99.490	99.520	99.560
3	99.260	99.180	99.200	99.260	99.270	99.300	99.320	99.360	99.370	99.400	99.420	99.410	99.480	99.440
4	99.120	99.140	99.160	99.180	99.160	99.200	99.240	99.260	99.280	99.320	99.260	99.260	99.260	99.240
5	99.080	99.090	99.100	99.120	99.140	99.140	99.140	99.160	99.180	99.180	99.140	99.180	99.180	99.180
6	99.030	99.020	99.060	99.040	99.080	99.050	99.080	99.070	98.980	99.060	99.080	99.070	99.100	99.140
7	98.920	98.940	98.980	99.000	99.000	98.960	98.980	99.000	98.990	99.000	99.040	99.060	99.050	99.000
8	98.950	98.920	98.910	98.930	98.880	98.870	98.900	98.910	98.920	98.920	98.980	98.980	99.000	99.000
9	98.810	98.840	98.840	98.830	98.800	98.820	98.840	98.840	98.860	98.880	98.920	98.940	98.900	98.920
10	98.780	98.750	98.800	98.780	98.780	98.780	98.780	98.770	98.780	98.810	98.790	98.800	98.820	98.840
11	98.760	98.740	98.780	98.800	98.780	98.760	98.760	98.760	98.760	98.730	98.760	98.770	98.800	98.850
12	98.710	98.720	98.720	98.720	98.720	98.740	98.710	98.720	98.720	98.700	98.680	98.720	98.770	98.750
13	98.650	98.680	98.680	98.700	98.680	98.700	98.700	98.700	98.720	98.670	98.700	98.700	98.700	98.680
14	98.490	98.500	98.540	98.580	98.640	98.660	98.660	98.660	98.640	98.630	98.620	98.620	98.630	98.640
15	98.380	98.400	98.350	98.470	98.500	98.550	98.600	98.620	98.600	98.580	98.580	98.560	98.560	98.610
16	98.240	98.200	98.200	98.220	98.270	98.320	98.360	98.440	98.460	98.480	98.460	98.440	98.420	98.400
17	98.080	98.080	98.120	98.140	98.180	98.200	98.260	98.340	98.360	98.370	98.380	98.360	98.340	98.340
18	97.980	97.940	98.020	98.060	98.080	98.140	98.200	98.250	98.270	98.280	98.300	98.300	98.270	98.260
19	97.920	97.860	97.960	97.970	97.990	98.020	98.080	98.100	98.140	98.160	98.160	98.150	98.150	98.140
20	97.840	97.840	97.900	97.880	97.880	97.880	97.940	97.970	98.000	98.030	98.070	98.080	98.050	98.060
21	97.840	97.790	97.780	97.820	97.780	97.830	97.860	97.890	97.930	97.960	97.940	97.940	97.940	97.900
22	97.740	97.760	97.740	97.740	97.760	97.760	97.770	97.790	97.830	97.850	97.840	97.860	97.860	97.840

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 3 Pass 1

Table 2

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	99.580	99.600	99.620	99.600	99.660	99.670	99.670	99.620	99.630	99.640	99.620	99.600	99.620	99.620	99.720
2	99.540	99.520	99.500	99.530	99.540	99.480	99.530	99.550	99.580	99.530	99.540	99.500	99.540	99.560	99.580
3	99.440	99.380	99.440	99.470	99.460	99.460	99.450	99.480	99.500	99.460	99.450	99.460	99.440	99.420	99.480
4	99.260	99.270	99.300	99.300	99.280	99.280	99.300	99.340	99.350	99.320	99.340	99.310	99.290	99.300	99.340
5	99.200	99.200	99.180	99.200	99.210	99.220	99.220	99.200	99.220	99.270	99.270	99.240	99.220	99.240	99.240
6	99.180	99.180	99.170	99.140	99.140	99.130	99.140	99.160	99.160	99.140	99.160	99.160	99.180	99.160	99.150
7	99.040	99.060	99.110	99.120	99.100	99.120	99.120	99.110	99.080	99.110	99.120	99.120	99.140	99.120	99.120
8	98.970	99.020	99.060	99.070	99.060	99.080	99.100	99.080	99.120	99.120	99.080	99.060	99.040	99.020	99.050
9	98.940	98.970	99.000	99.040	99.040	99.010	99.040	99.070	99.040	99.060	99.030	99.010	99.000	99.020	99.040
10	98.850	98.900	98.900	98.920	98.950	98.960	98.960	98.930	98.960	99.000	98.940	98.930	98.960	98.980	98.970
11	98.860	98.860	98.870	98.880	98.880	98.860	98.880	98.840	98.850	98.860	98.890	98.880	98.900	98.920	98.900
12	98.740	98.790	98.820	98.800	98.800	98.830	98.810	98.800	98.750	98.680	98.690	98.670	98.660	98.680	98.720
13	98.660	98.680	98.690	98.740	98.740	98.740	98.750	98.720	98.690	98.660	98.640	98.640	98.600	98.580	98.560
14	98.640	98.660	98.640	98.620	98.610	98.640	98.650	98.650	98.650	98.640	98.640	98.620	98.660	98.660	98.640
15	98.550	98.540	98.540	98.540	98.550	98.560	98.560	98.560	98.580	98.580	98.580	98.580	98.570	98.580	98.580
16	98.380	98.400	98.400	98.410	98.390	98.440	98.410	98.410	98.420	98.400	98.430	98.450	98.460	98.470	98.450
17	98.310	98.270	98.280	98.290	98.300	98.280	98.300	98.300	98.300	98.280	98.260	98.280	98.330	98.300	98.310
18	98.200	98.200	98.180	98.180	98.160	98.140	98.140	98.130	98.120	98.130	98.120	98.150	98.160	98.160	98.180
19	98.060	98.060	98.080	98.080	98.060	98.020	98.020	98.040	98.050	98.020	97.980	97.980	98.000	98.020	98.040
20	98.050	98.060	98.040	98.020	97.970	97.980	97.940	97.920	97.910	97.940	97.920	97.920	97.940	97.930	97.910
21	97.920	97.930	97.910	97.910	97.880	97.860	97.860	97.860	97.820	97.780	97.750	97.780	97.800	97.800	97.840
22	97.820	97.790	97.770	97.780	97.760	97.770	97.780	97.770	97.780	97.760	97.760	97.760	97.740	97.700	97.720

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 3 Pass 1

Table 3

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
23	97.680	97.700	97.700	97.690	97.700	97.700	97.700	97.740	97.760	97.770	97.760	97.780	97.770	97.740
24	97.620	97.640	97.620	97.620	97.610	97.600	97.600	97.640	97.660	97.670	97.680	97.650	97.660	97.660
25	97.580	97.610	97.640	97.580	97.560	97.520	97.540	97.540	97.550	97.580	97.560	97.560	97.550	97.570
26	97.480	97.540	97.550	97.500	97.460	97.480	97.480	97.480	97.470	97.460	97.480	97.480	97.480	97.480
27	97.380	97.410	97.400	97.380	97.350	97.390	97.400	97.400	97.400	97.360	97.360	97.350	97.360	97.340
28	97.260	97.280	97.340	97.360	97.330	97.320	97.320	97.300	97.280	97.280	97.280	97.260	97.300	97.290
29	97.140	97.200	97.240	97.310	97.300	97.260	97.240	97.200	97.200	97.220	97.200	97.200	97.220	97.200
30	97.040	97.070	97.120	97.150	97.200	97.180	97.180	97.140	97.140	97.120	97.100	97.110	97.080	97.100
31	96.980	97.000	97.010	97.020	97.040	97.080	97.100	97.120	97.100	97.060	97.040	97.040	97.000	96.990
32	96.910	96.930	96.920	96.910	96.960	96.970	96.960	97.000	96.980	97.000	96.980	96.980	96.980	96.980
33	96.820	96.820	96.820	96.800	96.840	96.880	96.860	96.870	96.840	96.900	96.920	96.920	96.890	96.860
34	96.740	96.720	96.700	96.800	96.860	96.820	96.760	96.800	96.870	96.880	96.820	96.770	96.740	96.740
35	96.650	96.630	96.660	96.710	96.760	96.760	96.720	96.740	96.720	96.740	96.700	96.680	96.650	96.620
36	96.620	96.590	96.590	96.630	96.640	96.660	96.660	96.640	96.640	96.630	96.600	96.580	96.580	96.540
37	96.520	96.520	96.520	96.530	96.560	96.520	96.560	96.570	96.540	96.530	96.500	96.500	96.420	96.360
38	96.480	96.440	96.440	96.460	96.460	96.470	96.480	96.470	96.470	96.460	96.440	96.420	96.380	96.280
39	96.360	96.340	96.340	96.320	96.320	96.330	96.390	96.410	96.400	96.340	96.290	96.260	96.240	96.190
40	96.140	96.140	96.180	96.180	96.180	96.240	96.300	96.270	96.220	96.220	96.170	96.140	96.120	96.140
41	96.050	96.000	96.040	96.100	96.120	96.130	96.140	96.120	96.140	96.120	96.120	96.040	96.020	96.060
42	95.940	95.940	95.940	95.960	95.980	96.010	95.960	96.040	96.040	96.040	96.000	95.980	95.970	95.960
43	95.850	95.840	95.860	95.880	95.890	95.940	95.970	95.950	95.960	95.940	95.920	95.900	95.880	95.920
44	95.760	95.740	95.820	95.860	95.810	95.810	95.840	95.840	95.810	95.830	95.800	95.780	95.780	95.780
45	95.700	95.700	95.760	95.800	95.790	95.780	95.750	95.720	95.720	95.720	95.710	95.680	95.730	95.740

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 3 Pass 1

Table 4

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
23	97.740	97.720	97.700	97.700	97.690	97.710	97.720	97.720	97.690	97.680	97.690	97.680	97.670	97.700	97.700
24	97.640	97.610	97.590	97.620	97.620	97.660	97.640	97.620	97.600	97.630	97.620	97.620	97.610	97.630	97.620
25	97.540	97.540	97.520	97.570	97.580	97.600	97.580	97.580	97.550	97.540	97.560	97.550	97.560	97.540	97.540
26	97.460	97.430	97.460	97.520	97.510	97.500	97.520	97.510	97.560	97.530	97.540	97.560	97.550	97.550	97.530
27	97.330	97.360	97.420	97.440	97.480	97.460	97.440	97.430	97.510	97.520	97.490	97.480	97.480	97.510	97.500
28	97.270	97.300	97.310	97.340	97.350	97.340	97.380	97.400	97.410	97.460	97.420	97.400	97.420	97.440	97.420
29	97.210	97.200	97.220	97.210	97.250	97.270	97.280	97.300	97.320	97.320	97.340	97.300	97.330	97.320	97.310
30	97.060	97.080	97.080	97.110	97.100	97.160	97.120	97.160	97.160	97.160	97.170	97.180	97.180	97.190	97.180
31	96.960	96.980	96.980	97.000	96.980	97.000	97.020	97.020	97.040	97.040	97.020	97.020	97.080	97.060	97.070
32	96.940	96.910	96.940	96.930	96.910	96.920	96.920	96.960	96.930	96.920	96.940	96.910	96.920	96.940	96.910
33	96.810	96.780	96.790	96.820	96.840	96.790	96.820	96.810	96.840	96.820	96.820	96.810	96.830	96.840	96.830
34	96.710	96.700	96.710	96.720	96.740	96.720	96.720	96.700	96.710	96.650	96.690	96.760	96.740	96.760	96.780
35	96.630	96.660	96.650	96.570	96.600	96.610	96.600	96.620	96.640	96.590	96.540	96.650	96.620	96.620	96.680
36	96.500	96.520	96.500	96.500	96.510	96.510	96.540	96.510	96.500	96.500	96.540	96.540	96.540	96.540	96.580
37	96.350	96.340	96.350	96.330	96.370	96.410	96.390	96.360	96.420	96.430	96.450	96.440	96.460	96.480	96.520
38	96.220	96.190	96.220	96.180	96.220	96.220	96.280	96.300	96.290	96.280	96.300	96.320	96.340	96.400	96.460
39	96.150	96.140	96.110	96.100	96.120	96.120	96.180	96.200	96.180	96.170	96.200	96.220	96.240	96.340	96.400
40	96.100	96.070	96.070	96.060	96.060	96.220	96.140	96.130	96.100	96.100	96.120	96.140	96.170	96.250	96.300
41	96.060	96.050	96.040	96.040	96.080	96.100	96.080	96.120	96.080	96.090	96.080	96.060	96.100	96.150	95.940
42	95.970	96.000	96.000	95.990	96.000	96.000	96.020	96.000	96.000	96.020	96.020	96.040	96.100	96.110	96.180
43	95.930	95.940	95.940	95.940	95.940	95.920	95.940	95.920	95.900	95.920	95.940	95.960	95.960	96.030	96.050
44	95.810	95.810	95.840	95.850	95.860	95.860	95.850	95.830	95.860	95.840	95.860	95.820	95.870	95.950	95.960
45	95.760	95.760	95.740	95.740	95.750	95.760	95.780	95.860	95.760	95.740	95.760	95.800	95.830	95.830	95.840

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 3 Pass 2

Table 1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	99.475	99.485	99.430	99.465	99.465	99.450	99.475	99.500	99.555	99.555	99.555	99.560	99.595	99.605
2	99.325	99.335	99.290	99.320	99.315	99.415	99.400	99.430	99.430	99.425	99.440	99.480	99.495	99.500
3	99.240	99.250	99.200	99.215	99.260	99.270	99.320	99.330	99.350	99.380	99.370	99.405	99.420	99.415
4	99.090	99.125	99.155	99.175	99.185	99.180	99.200	99.230	99.275	99.290	99.295	99.325	99.280	99.280
5	99.100	99.075	99.070	99.090	99.115	99.145	99.150	99.150	99.150	99.165	99.155	99.120	99.165	99.180
6	99.060	99.015	99.035	99.060	99.040	99.080	99.045	99.080	99.060	99.075	99.050	99.070	99.075	99.100
7	99.000	98.925	98.945	98.980	98.990	98.995	98.960	98.980	98.995	98.975	98.990	99.035	99.080	99.055
8	99.015	98.930	98.910	98.900	98.910	98.880	98.880	98.885	98.915	98.905	98.920	98.940	98.985	99.005
9	98.860	98.805	98.840	98.840	98.835	98.810	98.820	98.840	98.840	98.855	98.865	98.920	98.940	98.900
10	98.795	98.785	98.765	98.790	98.795	98.785	98.785	98.795	98.775	98.790	98.815	98.800	98.805	98.830
11	98.745	98.765	98.765	98.795	98.815	98.790	98.780	98.765	98.765	98.755	98.730	98.770	98.775	98.810
12	98.705	98.730	98.690	98.730	98.735	98.740	98.740	98.725	98.740	98.725	98.700	98.690	98.750	98.775
13	98.620	98.650	98.655	98.675	98.690	98.690	98.695	98.695	98.690	98.720	98.665	98.675	98.700	98.680
14	98.475	98.480	98.505	98.535	98.585	98.635	98.645	98.655	98.650	98.640	98.605	98.625	98.605	98.625
15	98.360	98.370	98.395	98.440	98.465	98.505	98.540	98.585	98.605	98.575	98.570	98.560	98.540	98.545

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 3 Pass 2 .

Table 2

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	99.600	99.580	99.605	99.605	99.630	99.660	99.670	99.680	99.655	99.645	99.670	99.630	99.655	99.665	99.675	99.740
2	99.520	99.560	99.550	99.520	99.505	99.545	99.530	99.545	99.560	99.590	99.530	99.555	99.510	99.560	99.570	99.590
3	99.460	99.415	99.445	99.450	99.425	99.485	99.455	99.465	99.470	99.495	99.455	99.470	99.450	99.455	99.430	99.500
4	99.265	99.245	99.265	99.300	99.325	99.315	99.300	99.305	99.345	99.355	99.325	99.340	99.325	99.305	99.310	99.350
5	99.190	99.205	99.200	99.220	99.210	99.220	99.235	99.210	99.195	99.235	99.265	99.280	99.245	99.240	99.240	99.245
6	99.135	99.180	99.175	99.165	99.140	99.150	99.140	99.145	99.170	99.145	99.140	99.160	99.170	99.185	99.170	99.150
7	99.015	99.040	99.070	99.110	99.125	99.105	99.115	99.110	99.115	99.085	99.110	99.115	99.125	99.125	99.125	99.115
8	99.000	98.970	99.025	99.055	99.070	99.065	99.085	99.095	99.070	99.085	99.100	99.100	99.065	99.045	99.020	99.055
9	98.905	98.935	98.975	98.990	98.995	99.010	98.985	99.040	99.040	99.030	99.025	99.015	98.985	98.985	98.995	99.025
10	98.865	98.870	98.905	98.880	98.915	98.920	98.935	98.940	98.915	98.945	98.970	98.915	98.935	98.960	98.945	98.950
11	98.870	98.870	98.865	98.865	98.860	98.850	98.845	98.850	98.845	98.830	98.835	98.860	98.865	98.890	98.900	98.885
12	98.770	98.760	98.800	98.800	98.805	98.795	98.810	98.790	98.785	98.720	98.685	98.680	98.660	98.635	98.665	98.685
13	98.665	98.655	98.660	98.660	98.715	98.730	98.730	98.740	98.705	98.680	98.645	98.640	98.630	98.575	98.570	98.560
14	98.625	98.635	98.650	98.625	98.625	98.605	98.645	98.655	98.650	98.650	98.635	98.660	98.635	98.660	98.660	98.645
15	98.590	98.550	98.530	98.540	98.525	98.535	98.545	98.560	98.545	98.570	98.565	98.580	98.590	98.575	98.580	98.590

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 3 Pass 3

Table 1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	99.485	99.500	99.510	99.480	99.485	99.485	99.490	99.515	99.560	99.580	99.640	99.650	99.660	99.685
2	99.305	99.335	99.280	99.320	99.310	99.315	99.405	99.425	99.410	99.430	99:450	99.480	99.490	99.500
3	99.215	99.215	99.200	99.205	99.255	99.260	99.310	99.330	99.335	99.375	99.380	99.405	99.420	99.405
4	99.090	99.125	99.145	99.160	99.170	99.185	99.190	99.225	99.265	99.265	99.280	99.320	99.270	99.270
5	99.085	99.070	99.070	99.080	99.100	99.140	99.145	99.145	99.160	99.165	99.155	99.125	99.160	99.170
6	99.065	99.015	99.030	99.060	99.040	99.085	99.045	99.080	99.055	99.075	99.045	99.075	99.090	99.105
7	99.010	98.930	98.955	98.995	98.990	98.995	98.965	98.985	99.000	98.985	98.990	99.045	99.080	99.060
8	99.045	98.940	98.915	98.905	98.915	98.885	98.875	98.885	98.930	98.900	98.930	98.950	98.980	99.005
9	98.875	98.825	98.845	98.845	98.840	98.815	98.825	98.845	98.845	98.890	98.880	98.935	98.945	98.910
10	98.785	98.760	98.760	98.760	98.790	98.780	98.780	98.785	98.785	98.780	98.810	98.785	98.795	98.805
11	98.745	98.760	98.745	98.805	98.800	98.775	98.775	98.755	98.755	98.760	98.735	98.760	98.775	98.760
12	98.700	98.715	98.735	98.705	98.720	98.730	98.725	98.710	98.720	98.725	98.690	98.685	98.730	98.705
13	98.620	98.650	98.655	98.675	98.680	98.680	98.675	98.680	98.685	98.710	98.665	98.670	98.705	98.700
14	98.480	98.480	98.495	98.530	98.580	98.625	98.645	98.650	98.640	98.630	98.605	98.625	98.595	98.620
15	98.370	98.370	98.405	98.440	98.470	98.505	98.535	98.595	98.600	98.600	98.570	98.570	98.540	98.550

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 3 Pass 3

Table 2

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	99.640	99.705	99.720	99.735	99.790	99.775	99.805	99.800	99.765	99.795	99.745	99.830	99.795	99.770	99.795	99.820
2	99.515	99.565	99.550	99.520	99.500	99.540	99.550	99.560	99.620	99.660	99.555	99.555	99.515	99.550	99.560	99.595
3	99.465	99.415	99.450	99.445	99.445	99.475	99.455	99.465	99.470	99.505	99.455	99.455	99.455	99.450	99.430	99.505
4	99.250	99.240	99.265	99.300	99.320	99.305	99.290	99.300	99.335	99.365	99.340	99.350	99.310	99.300	99.310	99.350
5	99.190	99.195	99.190	99.220	99.195	99.215	99.230	99.205	99.190	99.230	99.265	99.275	99.225	99.235	99.230	99.255
6	99.135	99.185	99.185	99.170	99.160	99.150	99.140	99.155	99.180	99.145	99.145	99.160	99.180	99.190	99.165	99.165
7	99.025	99.045	99.085	99.115	99.115	99.150	99.125	99.120	99.120	99.110	99.105	99.120	99.130	99.130	99.125	99.110
8	98.990	98.970	99.025	99.060	99.070	99.060	99.090	99.100	99.090	99.125	99.100	99.095	99.060	99.050	99.030	99.055
9	98.905	98.940	98.985	99.000	99.000	99.020	98.990	99.045	99.045	99.035	99.030	99.015	98.990	98.990	99.005	99.045
10	98.850	98.860	98.900	98.880	98.910	98.925	98.935	98.935	98.915	98.940	98.975	98.920	98.940	98.960	98.950	98.945
11	98.850	98.855	98.860	98.865	98.860	98.875	98.840	98.855	98.845	98.820	98.845	98.870	98.875	98.885	98.900	98.890
12	98.755	98.745	98.785	98.800	98.810	98.795	98.810	98.800	98.780	98.735	98.675	98.655	98.655	98.640	98.670	98.675
13	98.660	98.670	98.670	98.670	98.730	98.730	98.730	98.740	98.705	98.680	98.645	98.645	98.615	98.580	98.560	98.555
14	98.625	98.630	98.635	98.615	98.615	98.600	98.635	98.640	98.635	98.645	98.630	98.630	98.620	98.635	98.645	98.630
15	98.600	98.535	98.520	98.535	98.530	98.530	98.550	98.550	98.540	98.570	98.570	98.570	98.580	98.570	98.570	98.570

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 4 Pass 1

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	99.000	99.060	99.115	99.135	99.185	99.180	99.185	99.215	99.230	99.245	99.290	99.290	99.275	99.265
2	98.900	98.970	99.055	99.055	99.090	99.075	99.140	99.165	99.190	99.210	99.175	99.145	99.150	99.205
3	98.895	98.985	98.995	98.985	98.985	98.980	99.000	99.010	99.035	99.040	99.040	99.050	99.060	99.100
4	98.910	98.955	98.970	98.945	98.905	98.865	98.925	98.960	98.980	99.020	99.000	99.010	98.995	98.990
5	98.915	98.890	98.905	98.875	98.830	98.835	98.890	98.910	98.915	98.880	98.885	98.910	98.930	98.940
6	98.850	98.820	98.830	98.815	98.790	98.825	98.810	98.840	98.840	98.805	98.820	98.810	98.810	98.805
7	98.830	98.760	98.770	98.790	98.795	98.760	98.740	98.780	98.750	98.755	98.745	98.770	98.770	98.760
8	98.670	98.675	98.685	98.685	98.670	98.700	98.740	98.690	98.630	98.660	98.665	98.650	98.655	98.645
9	98.575	98.595	98.575	98.620	98.645	98.675	98.665	98.660	98.585	98.585	98.570	98.585	98.620	98.585
10	98.500	98.450	98.465	98.520	98.555	98.545	98.540	98.520	98.510	98.475	98.460	98.465	98.490	98.520
11	98.350	98.405	98.410	98.425	98.475	98.470	98.485	98.470	98.455	98.425	98.435	98.440	98.420	98.445
12	98.305	98.285	98.215	98.250	98.330	98.355	98.360	98.380	98.385	98.380	98.375	98.375	98.335	98.325
13	98.145	98.160	98.115	98.135	98.175	98.235	98.195	98.220	98.220	98.240	98.250	98.215	98.180	98.155
14	98.040	98.040	98.030	98.070	98.090	98.095	98.120	98.110	98.100	98.110	98.110	98.060	98.030	98.035

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 4 Pass 1

Table 2

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	99.300	99.300	99.305	99.305	99.290	99.335	99.325	99.325	99.350	99.335	99.330	99.345	99.380	99.360	99.370
2	99.240	99.240	99.210	99.195	99.140	99.150	99.180	99.230	99.270	99.245	99.285	99.245	99.220	99.230	99.230
3	99.180	99.195	99.145	99.135	99.110	99.110	99.095	99.090	99.085	99.095	99.095	99.110	99.130	99.140	99.105
4	98.960	98.930	98.900	98.940	98.970	98.955	98.950	98.955	98.945	98.940	98.955	98.955	99.005	98.965	98.970
5	98.935	98.920	98.910	98.880	98.885	98.920	98.915	98.900	98.860	98.860	98.860	98.835	98.835	98.840	98.815
6	98.805	98.840	98.790	98.795	98.815	98.825	98.830	98.835	98.825	98.820	98.780	98.740	98.730	98.715	98.710
7	98.775	98.780	98.785	98.805	98.805	98.800	98.795	98.785	98.775	98.765	98.760	98.715	98.720	98.725	98.685
8	98.710	98.705	98.730	98.695	98.725	98.730	98.740	98.720	98.710	98.695	98.675	98.645	98.660	98.685	98.670
9	98.585	98.615	98.610	98.610	98.640	98.655	98.630	98.615	98.605	98.620	98.605	98.615	98.620	98.615	98.590
10	98.500	98.530	98.550	98.560	98.560	98.555	98.550	98.540	98.535	98.535	98.545	98.530	98.525	98.500	98.445
11	98.435	98.435	98.465	98.460	98.480	98.425	98.455	98.445	98.450	98.440	98.455	98.430	98.400	98.390	98.335
12	98.340	98.325	98.330	98.335	98.345	98.325	98.305	98.285	98.265	98.265	98.250	98.245	98.075	98.195	98.190
13	98.140	98.130	98.160	98.170	98.160	98.175	98.155	98.155	98.115	98.130	98.130	98.095	98.070	98.070	98.080
14	98.010	98.045	98.025	98.005	98.035	98.040	98.040	98.035	98.005	98.000	98.010	98.000	97.980	97.955	98.015

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 4 Pass 2

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	98.940	99.000	99.020	99.080	99.080	99.035	99.090	99.125	99.180	99.230	99.150	99.160	99.200	99.225
2	99.005	98.995	99.010	99.015	99.075	99.025	99.035	99.080	99.135	99.125	99.120	99.105	99.055	98.985
3	99.010	98.970	98.970	99.010	98.995	98.995	99.000	99.080	99.025	99.035	99.015	98.990	98.985	98.950
4	98.915	98.915	98.955	98.975	98.965	98.955	98.945	98.945	98.910	98.845	98.830	98.825	98.815	98.825
5	98.850	98.880	98.890	98.905	98.905	98.925	98.895	98.895	98.860	98.800	98.740	98.770	98.775	98.765
6	98.760	98.790	98.800	98.830	98.840	98.840	98.840	98.820	98.805	98.795	98.770	98.675	98.660	98.660
7	98.665	98.690	98.705	98.745	98.760	98.785	98.785	98.740	98.725	98.675	98.655	98.625	98.630	98.590
8	98.560	98.590	98.605	98.645	98.650	98.655	98.655	98.640	98.615	98.595	98.580	98.545	98.530	98.535
9	98.445	98.490	98.505	98.510	98.495	98.490	98.510	98.490	98.475	98.460	98.440	98.475	98.430	98.450
10	98.365	98.345	98.300	98.335	98.335	98.365	98.380	98.390	98.400	98.395	98.400	98.400	98.355	98.370
11	98.190	98.200	98.150	98.155	98.200	98.235	98.220	98.230	98.355	98.280	98.260	98.250	98.205	98.185
12	98.065	98.080	98.035	98.085	98.115	98.140	98.150	98.135	98.155	98.150	98.130	98.090	98.075	98.050

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 4 Pass 2

Table 2

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	99.210	99.215	99.205	99.180	99.215	99.170	99.110	99.085	99.105	99.120	99.155	99.185	99.235	99.255	99.205	99.155
2	98.965	98.945	99.015	99.015	99.030	98.965	98.955	98.970	98.950	98.950	99.020	99.025	99.050	99.090	99.055	99.040
3	98.930	98.920	98.915	98.885	98.880	98.925	98.910	98.910	98.885	98.855	98.905	98.850	98.880	98.920	98.950	98.915
4	98.815	98.840	98.805	98.805	98.820	98.845	98.840	98.840	98.840	98.820	98.795	98.760	98.750	98.755	98.735	98.795
5	98.780	98.765	98.765	98.795	98.810	98.805	98.785	98.780	98.770	98.760	98.765	98.725	98.720	98.730	98.710	98.735
6	98.715	98.715	98.740	98.715	98.730	98.735	98.765	98.735	98.720	98.705	98.695	98.665	98.680	98.690	98.680	98.690
7	98.595	98.620	98.605	98.625	98.625	98.660	98.640	98.630	98.610	98.630	98.610	98.630	98.630	98.630	98.600	98.595
8	98.515	98.550	98.555	98.570	98.580	98.565	98.570	98.545	98.545	98.555	98.560	98.560	98.545	98.515	98.460	98.475
9	98.440	98.450	98.465	98.475	98.475	98.470	98.460	98.450	98.455	98.455	98.470	98.435	98.400	98.395	98.360	98.350
10	98.360	98.355	98.350	98.370	98.360	98.355	98.315	98.290	98.285	98.280	98.265	98.265	98.250	98.215	98.220	98.205
11	98.165	98.355	97.980	98.200	98.165	98.175	98.180	98.175	98.130	98.155	98.135	98.110	98.090	98.090	98.075	98.110
12	98.050	98.080	98.050	98.020	98.030	98.040	98.040	98.035	98.030	98.015	98.015	98.005	98.005	97.975	98.020	98.010

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 4 Pass 3

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	99.255	99.245	99.250	99.240	99.245	99.245	99.265	99.265	99.275	99.280	99.265	99.270	99.300	99.285
2	99.200	99.195	99.190	99.200	99.175	99.175	99.220	99.215	99.215	99.210	99.215	99.170	99.170	99.095
3	99.185	99.160	99.135	99.155	99.110	99.135	99.120	99.145	99.115	99.115	99.105	99.100	99.080	98.990
4	99.135	99.065	99.065	99.085	99.035	99.060	99.050	99.035	98.975	99.000	98.970	98.950	98.920	98.875
5	99.010	98.990	98.970	99.010	99.020	98.995	98.995	98.985	98.945	98.875	98.845	98.825	98.820	98.775
6	98.945	98.895	98.885	98.925	98.960	98.970	98.925	98.890	98.900	98.860	98.790	98.755	98.705	98.670
7	98.845	98.745	98.805	98.820	98.820	98.840	98.845	98.830	98.805	98.740	98.720	98.670	98.635	98.605
8	98.750	98.660	98.680	98.680	98.650	98.685	98.715	98.695	98.690	98.665	98.635	98.630	98.545	98.510
9	98.620	98.580	98.580	98.565	98.520	98.500	98.500	98.495	98.485	98.490	98.465	98.490	98.445	98.465
10	98.435	98.470	98.395	98.400	98.370	98.375	98.385	98.405	98.400	98.410	98.405	98.405	98.350	98.325
11	98.310	98.265	98.265	98.260	98.235	98.245	98.225	98.245	98.250	98.290	98.275	98.240	98.210	98.185
12	98.145	98.130	98.165	98.155	98.155	98.130	98.155	98.145	98.150	98.160	98.135	98.095	98.065	98.060

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 4 Pass 3

Table 2

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	99.230	99.220	99.285	99.275	99.260	99.250	99.280	99.125	99.150	99.155	99.165	99.230	99.255	99.270	99.240
2	99.040	99.095	99.150	99.150	99.155	99.080	98.990	99.010	98.975	98.975	99.010	99.050	99.065	99.090	99.080
3	98.955	99.000	99.030	99.045	99.045	99.000	98.955	98.890	98.880	98.855	98.890	98.850	98.875	98.905	98.945
4	98.835	98.855	98.850	98.895	98.860	98.855	98.860	98.855	98.840	98.845	98.815	98.780	98.765	98.750	98.745
5	98.780	98.780	98.785	98.815	98.820	98.810	98.800	98.790	98.790	98.770	98.770	98.740	98.725	98.740	98.725
6	98.715	98.730	98.735	98.725	98.730	98.740	98.735	98.730	98.715	98.695	98.680	98.660	98.675	98.700	98.685
7	98.620	98.610	98.605	98.630	98.650	98.660	98.635	98.625	98.610	98.630	98.620	98.645	98.635	98.630	98.545
8	98.510	98.545	98.535	98.570	98.560	98.565	98.545	98.550	98.545	98.545	98.545	98.550	98.535	98.495	98.455
9	98.445	98.455	98.465	98.475	98.490	98.465	98.460	98.450	98.450	98.460	98.470	98.430	98.415	98.400	98.365
10	98.375	98.345	98.350	98.355	98.345	98.340	98.320	98.295	98.285	98.290	98.275	98.265	98.280	98.220	98.215
11	98.175	98.150	98.180	98.205	98.170	98.190	98.185	98.170	98.140	98.150	98.140	98.110	98.100	98.090	98.080
12	98.045	98.065	98.055	98.030	98.045	98.060	98.050	98.045	98.035	98.020	98.020	98.015	97.995	97.980	98.015

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 5 Pass 1

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	98.955	99.010	99.090	99.070	98.865	98.905	98.935	98.945	98.925	98.960	98.975	99.070	99.065	99.075
2	98.815	98.810	98.840	98.880	98.865	98.905	98.935	98.945	98.925	98.960	98.975	99.000	98.990	98.960
3	98.635	98.730	98.795	98.845	98.850	98.885	98.875	98.930	98.860	98.870	98.880	98.880	98.880	98.905
4	98.665	98.690	98.735	98.730	98.780	98.790	98.800	98.830	98.810	98.815	98.780	98.840	98.850	98.845
5	98.630	98.620	98.670	98.645	98.655	98.710	98.735	98.745	98.730	98.760	98.755	98.765	98.805	98.805
6	98.560	98.600	98.620	98.670	98.665	98.680	98.635	98.630	98.595	98.640	98.660	98.665	98.690	98.685
7	98.475	98.460	98.520	98.565	98.580	98.580	98.590	98.500	98.490	98.490	98.570	98.570	98.610	98.625
8	98.375	98.415	98.435	98.470	98.485	98.510	98.465	98.425	98.395	98.410	98.440	98.480	98.545	98.530
9	98.365	98.390	98.375	98.365	98.430	98.440	98.405	98.400	98.390	98.350	98.400	98.400	98.380	98.410
10	98.335	98.340	98.370	98.350	98.350	98.325	98.355	98.335	98.315	98.300	98.345	98.345	98.370	98.400
11	98.340	98.390	98.315	98.310	98.250	98.265	98.270	98.295	98.285	98.275	98.310	98.335	98.335	98.340
12	98.200	98.230	98.250	98.245	98.240	98.250	98.225	98.230	98.200	98.200	98.225	98.260	98.275	98.265
13	98.065	98.080	98.145	98.165	98.165	98.135	98.135	98.125	98.160	98.145	98.190	98.185	98.190	98.210
14	98.040	98.095	98.075	98.035	98.030	98.020	98.030	98.050	98.050	98.070	98.150	98.130	98.130	98.130
15	98.015	98.025	98.045	98.010	97.965	97.960	97.960	97.950	97.915	97.890	97.925	97.970	97.990	97.980

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 5 Pass 1

Table 2

	16	17	18	19	20	21	22	23	24	25	26	27	28
1	99.080	99.090	99.050	99.025	99.015	99.030	99.025	99.005	99.010	98.995	99.020	99.050	99.095
2	98.975	98.955	98.935	98.970	98.990	98.985	98.985	99.010	99.040	99.020	99.050	99.020	99.025
3	98.895	98.900	98.895	98.890	98.910	98.920	98.920	98.915	98.905	98.925	98.935	98.960	98.975
4	98.855	98.825	98.815	98.840	98.840	98.835	98.830	98.860	98.855	98.865	98.855	98.870	98.825
5	98.790	98.745	98.735	98.705	98.690	98.695	98.725	98.735	98.735	98.750	98.760	98.780	98.775
6	98.685	98.650	98.630	98.660	98.670	98.665	98.655	98.665	98.695	98.715	98.710	98.720	98.725
7	98.645	98.655	98.665	98.630	98.565	98.565	98.585	98.605	98.610	98.635	98.655	98.620	98.580
8	98.530	98.550	98.580	98.605	98.585	98.565	98.530	98.535	98.560	98.565	98.560	98.570	98.540
9	98.420	98.460	98.500	98.560	98.545	98.495	98.455	98.455	98.480	98.510	98.490	98.500	98.500
10	98.370	98.420	98.450	98.445	98.435	98.440	98.405	98.390	98.410	98.435	98.430	98.430	98.390
11	98.340	98.340	98.365	98.385	98.350	98.315	98.310	98.295	98.325	98.350	98.355	98.360	98.370
12	98.290	98.300	98.305	98.305	98.270	98.270	98.225	98.165	98.165	98.205	98.195	98.215	98.245
13	98.220	98.190	98.215	98.220	98.205	98.200	98.165	98.110	98.105	98.080	98.050	98.080	98.070
14	98.135	98.160	98.185	98.155	98.145	98.095	98.045	98.040	98.015	98.020	97.975	97.975	97.975
15	97.995	98.000	97.980	97.975	97.960	97.955	97.955	97.950	97.975	97.955	97.935	97.940	97.930

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 5 Pass 2

Table 1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	99.075	99.075	99.075	99.075	99.075	99.075	99.075	99.075	99.075	99.075	99.125	99.145	99.130	99.170
2	98.735	98.825	98.870	98.815	98.865	98.905	98.885	98.990	98.985	99.040	99.015	98.960	99.005	100.065
3	98.625	98.660	98.750	98.745	98.825	98.835	98.845	98.870	98.930	98.885	98.835	98.840	98.845	98.840
4	98.575	98.610	98.630	98.690	98.680	98.735	98.765	98.775	98.795	98.785	98.785	98.745	98.795	98.790
5	98.530	98.580	98.560	98.615	98.580	98.595	98.665	98.705	98.710	98.720	98.715	98.710	98.735	98.775
6	98.505	98.505	98.555	98.565	98.615	98.605	98.640	98.595	98.590	98.565	98.590	98.610	98.620	98.650
7	98.445	98.425	98.355	98.475	98.520	98.560	98.545	98.560	98.485	98.525	98.465	98.485	98.535	98.585
8	97.505	97.530	97.505	97.490	97.520	97.530	97.560	97.525	97.485	97.455	97.470	97.495	97.540	97.620
9	97.440	97.460	97.460	97.425	97.400	97.495	97.500	97.465	97.465	97.450	97.445	97.435	97.445	97.450
10	97.410	97.395	97.400	97.405	97.395	97.405	97.375	97.400	97.400	97.370	97.360	97.395	97.395	97.430
11	97.340	97.385	97.350	97.355	97.365	97.305	97.305	97.350	97.350	97.340	97.325	97.350	97.385	97.385
12	97.285	97.255	97.290	97.315	97.310	97.320	97.320	97.280	97.295	97.265	99.885	99.905	99.945	99.950
13	97.175	97.125	97.145	97.210	97.220	97.225	97.195	97.195	97.195	97.220	99.825	99.850	99.860	99.875
14	97.090	97.100	97.155	97.135	97.095	97.085	97.075	97.090	97.110	97.105	99.770	99.805	99.820	99.810
15	97.080	97.090	97.080	97.105	97.065	97.035	97.030	97.035	97.005	96.990	99.590	99.615	99.645	99.670

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 5 Pass 2

Table 2

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	99.160	99.120	99.160	99.120	99.105	99.105	99.105	99.195	99.170	99.180	99.105	99.150	99.175	99.115	99.155	99.160
2	99.030	99.030	99.005	98.935	98.950	98.940	98.970	98.970	99.035	99.065	99.050	99.030	99.000	99.010	99.015	99.045
3	98.865	98.855	98.880	98.850	98.860	98.880	98.890	98.895	98.895	98.900	98.905	98.905	98.945	98.950	98.915	98.965
4	98.795	98.830	98.785	98.785	98.810	98.810	98.810	98.805	98.830	98.830	98.830	98.840	98.840	98.805	98.770	98.765
5	98.770	98.755	98.720	98.690	98.670	98.660	98.665	98.685	98.705	98.715	98.725	98.735	98.755	98.755	98.745	98.730
6	98.645	98.640	98.615	98.605	98.630	98.655	98.645	98.620	98.630	98.655	98.680	98.675	98.690	98.690	98.665	98.690
7	98.595	98.635	98.625	98.625	98.600	98.530	98.545	98.560	98.580	98.580	98.605	98.615	98.590	98.555	98.535	98.570
8	97.615	97.605	97.625	97.660	97.690	97.655	97.645	97.635	97.615	97.635	97.645	97.635	97.640	97.620	97.610	97.650
9	97.470	97.480	97.530	97.570	97.635	97.625	97.575	97.520	97.525	97.560	97.585	97.565	97.540	97.560	97.555	97.560
10	97.460	97.450	97.495	97.520	97.520	97.510	97.510	97.475	97.460	97.450	97.510	97.495	97.510	97.455	97.485	97.510
11	97.405	97.410	97.415	97.440	97.465	97.400	97.375	97.400	97.370	97.415	97.425	97.430	97.425	97.445	97.470	97.460
12	99.950	99.975	99.990	100.005	99.995	99.970	99.955	99.915	99.855	99.865	99.900	99.895	99.915	99.940	99.990	99.955
13	99.890	99.910	99.875	99.905	99.910	99.900	99.890	99.850	99.805	99.800	99.780	99.735	99.775	99.765	99.740	99.775
14	99.810	99.815	99.835	99.875	99.845	99.835	99.770	99.750	99.725	99.715	99.715	99.675	99.670	99.660	99.640	99.655
15	99.675	99.680	99.685	99.660	99.655	99.640	99.640	99.660	99.655	99.675	99.645	99.645	99.645	99.630	99.610	99.595

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 5 Pass 3

Table 1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	98.980	98.980	98.980	98.980	98.980	98.980	98.980	98.980	98.980	98.980	99.065	99.110	99.115	99.120
2	98.655	98.780	98.780	98.825	98.780	98.930	98.790	98.905	98.955	98.980	98.985	98.855	98.940	98.930
3	98.620	98.695	98.740	98.650	98.860	98.855	98.725	98.865	98.885	98.835	98.785	98.735	98.740	98.730
4	98.550	98.505	98.525	98.585	98.580	98.640	98.655	98.660	98.695	98.675	98.680	98.645	98.685	98.700
5	98.485	98.485	98.465	98.515	98.500	98.490	98.565	98.590	98.615	98.635	98.620	98.610	98.625	98.665
6	98.505	98.410	98.445	98.465	98.500	98.510	98.535	98.490	98.495	98.470	98.490	98.505	98.525	98.550
7	98.385	98.340	98.300	98.375	98.440	98.450	98.440	98.450	98.385	98.355	98.355	98.395	98.430	98.480
8	98.340	98.405	98.375	98.305	98.335	98.345	98.375	98.330	98.285	98.260	98.295	98.295	98.355	98.420
9	98.320	98.280	98.260	98.230	98.215	98.305	98.305	98.275	98.275	98.260	98.230	98.255	98.255	98.255
10	98.295	98.330	98.305	98.320	98.205	98.225	98.190	98.220	98.215	98.185	98.190	98.210	98.205	98.230
11	98.230	98.345	98.290	98.270	98.190	98.120	98.125	98.150	98.165	98.150	98.130	98.160	98.205	98.195
12	97.840	97.830	97.815	97.835	97.830	97.840	97.835	97.805	97.815	97.785	97.785	97.810	97.845	97.845
13	97.730	97.680	97.675	97.730	97.745	97.750	97.720	97.720	97.715	97.750	97.730	97.760	97.755	97.770
14	97.695	97.725	97.695	97.655	97.625	97.610	97.600	97.615	97.630	97.645	97.670	97.705	97.710	97.705
15	97.600	97.645	97.605	97.620	97.585	97.550	97.540	97.545	97.525	97.500	97.480	97.515	97.540	97.560

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 5 Pass 3

Table 2

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	99.115	99.080	99.075	99.065	99.095	99.085	99.080	99.145	99.105	99.095	99.065	99.120	99.080	99.085	99.060	99.060
2	98.920	98.920	98.900	98.830	98.775	99.005	98.960	98.960	98.950	99.005	99.000	98.970	98.900	98.895	98.910	98.920
3	98.755	98.750	98.765	98.755	98.755	98.810	98.805	98.800	98.825	98.910	98.945	98.870	98.840	98.845	98.815	98.855
4	98.710	98.720	98.685	98.680	98.695	98.700	98.710	98.720	98.760	98.850	98.780	98.735	98.750	98.715	98.670	98.670
5	98.665	98.655	98.605	98.590	98.575	98.555	98.565	98.595	98.695	98.685	98.635	98.635	98.655	98.650	98.645	98.630
6	98.545	98.545	98.510	98.495	98.535	98.550	98.540	98.530	98.530	98.560	98.580	98.575	98.605	98.595	98.570	98.600
7	98.495	98.515	98.525	98.540	98.505	98.455	98.435	98.455	98.470	98.480	98.510	98.520	98.485	98.455	98.425	98.465
8	98.405	98.395	98.415	98.460	98.465	98.430	98.430	98.410	98.420	98.425	98.445	98.440	98.440	98.145	98.125	98.175
9	98.265	98.285	98.325	98.370	98.425	98.415	98.355	98.320	98.325	98.355	98.380	98.355	98.355	98.080	98.070	98.065
10	98.245	98.240	98.280	98.320	98.300	98.305	98.315	98.270	98.260	98.280	98.295	98.285	98.280	97.975	97.990	97.995
11	98.200	98.195	98.210	98.235	98.250	98.215	98.170	98.180	98.165	98.205	98.215	98.220	98.215	97.965	97.980	97.965
12	97.845	97.870	97.890	97.900	97.890	97.860	97.855	97.805	97.755	97.770	97.785	97.790	97.800	97.830	97.875	97.850
13	97.790	97.805	97.765	97.800	97.800	97.795	97.790	97.745	97.695	97.695	97.665	97.635	97.675	97.650	97.630	97.660
14	97.705	97.710	97.725	97.770	97.740	97.725	97.675	97.645	97.620	97.600	97.610	97.565	97.560	97.550	97.535	97.545
15	97.570	97.575	97.580	97.555	97.550	97.530	97.525	97.555	97.545	97.565	97.520	97.525	97.535	97.515	97.500	97.475

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 6 Pass 1

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	97.690	97.725	97.720	97.760	97.775	97.785	97.810	97.835	97.820	97.825	97.805	97.795	97.820	97.810
2	97.690	97.725	97.720	97.760	97.775	97.785	97.810	97.835	97.820	97.825	97.805	97.795	97.820	97.810
3	97.590	97.650	97.655	97.640	97.635	97.700	97.730	97.765	97.705	97.715	97.725	97.725	97.740	97.685
4	97.565	97.560	97.580	97.570	97.630	97.640	97.685	97.655	97.655	97.640	97.610	97.625	97.600	97.610
5	97.500	97.520	97.520	97.500	97.580	97.540	97.550	97.550	97.600	97.570	97.545	97.545	97.510	97.535
6	97.480	97.485	97.490	97.480	97.465	97.490	97.405	97.460	97.535	97.555	97.550	97.490	97.460	97.520
7	97.490	97.520	97.480	97.490	97.465	97.425	97.410	97.430	97.450	97.470	97.490	97.475	97.420	97.400
8	97.480	97.470	97.470	97.435	97.385	97.410	97.455	97.440	97.425	97.405	97.395	97.405	97.390	97.360
9	97.485	97.445	97.415	97.415	97.340	97.300	97.315	97.340	97.345	97.315	97.320	97.320	97.340	97.335
10	97.375	97.290	97.315	97.315	97.300	97.255	97.240	97.250	97.290	97.265	97.265	97.275	97.265	97.235
11	97.255	97.205	97.220	97.220	97.230	97.220	97.165	97.160	97.190	97.235	97.245	97.190	97.190	97.205
12	97.020	97.080	97.115	97.135	97.150	97.155	97.100	97.095	97.125	97.140	97.130	97.140	97.120	97.100
13	96.905	96.960	96.965	97.010	97.050	97.050	97.035	97.000	96.980	96.935	96.920	96.975	96.930	96.925
14	96.780	96.830	96.865	96.845	96.910	96.950	96.920	96.875	96.855	96.810	96.810	96.795	96.800	96.780
15	96.685	96.675	96.745	96.760	96.785	96.805	96.815	96.795	96.760	96.710	96.695	96.660	96.660	96.670
16	96.565	96.605	96.645	96.675	96.710	96.710	96.700	96.705	96.655	96.620	96.655	96.620	96.570	96.530
17	96.510	96.540	96.545	96.620	96.580	96.565	96.585	96.605	96.595	96.555	96.535	96.495	96.495	96.470
18	96.380	96.425	96.500	96.495	96.480	96.495	96.500	96.460	96.470	96.485	96.450	96.430	96.385	96.355
19	96.350	96.345	96.360	96.390	96.425	96.410	96.390	96.430	96.400	96.385	96.325	96.310	96.280	96.240
20	96.315	96.245	96.245	96.275	96.265	96.295	96.295	96.275	96.260	96.220	96.170	96.160	96.170	96.145
21	96.145	96.140	96.190	96.195	96.225	96.195	96.185	96.155	96.145	96.135	96.120	96.135	96.045	96.095
22	96.080	96.100	96.090	96.090	96.120	96.115	96.145	96.090	96.050	96.080	96.025	96.010	96.045	96.045

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 6 Pass 1

Table 2

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	97.790	97.790	97.810	97.800	97.800	97.835	97.805	97.795	97.840	97.875	97.830	97.860	98.020	98.035	98.100
2	97.790	97.790	97.810	97.800	97.800	97.835	97.805	97.795	97.840	97.875	97.830	97.860	97.890	97.945	97.950
3	97.655	97.640	97.650	97.690	97.695	97.690	97.680	97.670	97.680	97.700	97.705	97.690	97.755	97.800	97.855
4	97.595	97.625	97.620	97.615	97.600	97.580	97.560	97.545	97.600	97.595	97.600	97.575	97.615	97.655	97.685
5	97.565	97.565	97.550	97.545	97.520	97.520	97.535	97.515	97.520	97.515	97.530	97.535	97.565	97.605	97.620
6	97.550	97.515	97.480	97.490	97.475	97.470	97.470	97.475	97.500	97.455	97.460	97.495	97.520	97.495	97.510
7	97.435	97.430	97.400	97.385	97.375	97.385	97.410	97.365	97.380	97.390	97.390	97.395	97.400	97.420	97.390
8	97.360	97.330	97.305	97.295	97.305	97.310	97.305	97.315	97.325	97.295	97.300	97.310	97.305	97.300	97.270
9	97.300	97.245	97.205	97.255	97.260	97.265	97.260	97.270	97.285	97.300	97.220	97.195	97.195	97.170	97.165
10	97.205	97.180	97.160	97.160	97.220	97.230	97.285	97.280	97.225	97.225	97.185	97.140	97.135	97.165	97.130
11	97.210	97.215	97.190	97.195	97.220	97.205	97.210	97.200	97.195	97.140	97.125	97.095	97.100	97.140	97.120
12	97.100	97.115	97.130	97.130	97.130	97.150	97.165	97.120	97.070	97.065	97.055	97.040	97.050	97.060	97.015
13	96.900	96.870	96.945	96.965	96.950	96.960	96.970	96.975	96.985	96.925	96.930	96.880	96.850	96.870	96.865
14	96.805	96.725	96.745	96.785	96.810	96.850	96.860	96.870	96.875	96.840	96.810	96.790	96.830	96.845	96.835
15	96.635	96.650	96.635	96.690	96.785	96.785	96.785	96.790	96.790	96.800	96.770	96.775	96.805	96.830	96.815
16	96.480	96.500	96.530	96.585	96.635	96.824	96.695	96.705	96.710	96.750	96.745	96.760	96.765	96.785	96.810
17	96.440	96.425	96.410	96.435	96.485	96.545	96.575	96.620	96.620	96.655	96.660	96.655	96.695	96.705	96.695
18	96.360	96.355	96.305	96.315	96.380	96.430	96.580	96.580	96.630	96.615	96.605	96.615	96.625	96.635	96.645
19	96.270	96.260	96.255	96.250	96.280	96.320	96.425	96.475	96.545	96.535	96.525	96.570	96.585	96.510	96.525
20	96.125	96.155	96.180	96.135	96.145	96.165	96.310	96.345	96.425	96.435	96.460	96.470	96.440	96.455	96.465
21	96.095	96.115	96.075	96.080	96.060	96.065	96.100	96.170	96.265	96.340	96.370	96.370	96.390	96.360	96.395
22	96.040	96.095	96.065	96.035	95.970	95.980	95.990	96.040	96.095	96.170	96.220	96.270	96.270	96.310	96.280

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 6 Pass 1

Table 3

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
23	96.020	95.980	96.050	96.060	96.090	96.090	96.060	96.015	95.975	95.950	95.945	95.945	95.965	95.975
24	95.930	95.935	95.940	95.975	96.005	96.025	95.990	95.920	95.920	95.955	95.915	95.865	95.870	95.870
25	95.830	95.845	95.885	95.935	95.945	95.955	95.925	95.885	95.870	95.865	95.855	95.820	95.810	95.795
26	95.800	95.805	95.855	95.885	95.880	95.875	95.870	95.845	95.835	95.810	95.800	95.765	95.770	95.805
27	95.745	95.770	95.795	95.810	95.790	95.790	95.805	95.800	95.800	95.750	95.750	95.730	95.710	95.725
28	95.695	95.725	95.725	95.745	95.745	95.760	95.715	95.730	95.705	95.725	95.675	95.640	95.620	95.640
29	95.630	95.620	95.670	95.695	95.660	95.655	95.640	95.635	95.620	95.600	95.600	95.615	95.620	95.585
30	95.560	95.560	95.560	95.540	95.510	95.545	95.565	95.540	95.530	95.545	95.535	95.525	95.500	95.495
31	95.500	95.525	95.510	95.505	95.510	95.520	95.490	95.505	95.475	95.470	95.435	95.435	95.400	95.385
32	95.495	95.425	95.440	95.455	95.450	95.395	95.400	95.385	95.410	95.360	95.295	95.295	95.290	95.265
33	95.400	95.355	95.420	95.330	95.370	95.385	95.345	95.285	95.280	95.200	95.185	95.820	95.170	95.180
34	95.300	95.260	95.290	95.265	95.245	95.230	95.200	95.165	95.100	95.105	95.135	95.105	95.090	95.105
35	95.190	95.155	95.165	95.135	95.100	95.055	95.060	95.050	95.020	95.005	95.060	95.010	95.030	94.975
36	95.145	95.105	95.105	95.075	95.040	95.045	94.990	94.985	94.980	94.955	94.965	94.995	94.980	94.960
37	95.090	95.085	95.095	95.085	95.030	94.980	94.925	94.930	94.935	94.885	94.880	94.935	94.890	94.900
38	94.985	95.020	95.025	94.970	94.955	94.900	94.895	94.875	94.875	94.875	94.880	94.825	94.850	94.905
39	94.985	94.960	94.970	94.930	94.910	94.870	94.820	94.795	94.800	94.800	94.760	94.770	94.750	94.755
40	94.890	94.855	94.885	94.880	94.875	94.830	94.805	94.765	94.735	94.735	94.680	94.670	94.675	94.670
41	94.820	94.795	94.860	94.770	94.785	94.765	94.725	94.690	94.705	94.650	94.660	94.620	94.640	94.610
42	94.700	94.710	94.650	94.670	94.720	94.720	94.675	94.635	94.645	94.605	94.575	94.555	94.555	94.545
43	94.595	94.620	94.605	94.620	94.585	94.595	94.550	94.545	94.565	94.485	94.490	94.480	94.470	94.490
44	94.535	94.565	94.500	94.515	94.510	94.480	94.500	94.500	94.420	94.395	94.370	94.355	94.370	94.390
45	94.540	94.490	94.475	94.470	94.445	94.375	94.355	94.355	94.335	94.315	94.280	94.280	94.290	94.300

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 6 Pass 1

Table 4

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
23	95.970	95.960	96.000	95.920	95.915	95.895	95.905	95.915	96.015	95.990	96.010	96.070	96.120	96.165	96.185
24	95.855	95.870	95.880	95.870	95.865	95.825	95.825	95.825	95.885	95.875	95.900	95.920	95.985	95.950	95.990
25	95.810	95.815	95.850	95.790	95.800	95.780	95.770	95.785	95.810	95.800	95.775	95.825	95.870	95.860	95.835
26	95.730	95.750	95.705	95.725	95.740	95.720	95.715	95.740	95.770	95.750	95.690	95.695	95.720	95.690	95.690
27	95.680	95.715	95.670	95.680	95.655	95.640	95.700	95.650	95.600	95.625	95.615	95.575	95.585	95.595	95.695
28	95.645	95.680	95.630	95.630	95.575	95.550	95.515	95.530	95.525	95.565	95.515	95.520	95.530	95.540	95.545
29	95.565	95.575	95.535	95.515	95.475	95.435	95.465	95.470	95.460	95.460	95.425	95.415	95.425	95.450	95.495
30	95.465	95.455	95.460	95.420	95.350	95.355	95.375	95.420	95.360	95.345	95.375	95.405	95.375	95.395	95.395
31	95.370	96.375	95.355	95.330	95.310	95.280	95.290	95.305	95.250	95.260	95.285	95.295	95.305	95.310	95.305
32	95.255	95.260	95.280	95.250	95.230	95.215	95.210	95.220	95.235	95.220	95.255	95.220	95.220	95.200	95.180
33	95.215	95.190	95.185	95.175	95.180	95.175	95.140	95.150	95.130	95.170	95.175	95.145	95.140	95.160	95.170
34	95.140	95.125	95.070	95.095	95.065	95.055	95.055	95.055	95.050	95.035	95.070	95.090	95.090	95.080	95.070
35	95.015	95.040	94.955	95.035	95.020	94.985	94.995	94.980	94.965	95.010	95.020	94.995	95.010	95.055	94.980
36	94.990	95.010	94.985	94.975	94.950	94.900	94.915	94.900	94.950	94.930	94.840	94.960	94.950	94.970	94.955
37	94.880	94.900	94.915	94.880	94.875	94.850	94.845	94.850	94.860	94.835	94.870	94.850	94.845	94.845	94.850
38	94.805	94.810	94.800	94.840	94.810	94.805	94.790	94.800	94.780	94.805	94.780	94.755	94.780	94.745	94.770
39	94.740	94.755	94.780	94.760	94.805	94.765	94.790	94.745	94.785	94.770	94.760	94.730	94.800	94.695	94.665
40	94.695	94.670	94.680	94.725	94.730	94.720	94.745	94.680	94.670	94.640	94.695	94.655	94.660	94.650	94.635
41	94.605	94.605	94.605	94.610	94.610	94.610	94.655	94.585	94.605	94.585	94.645	94.575	94.570	94.580	94.770
42	94.560	94.525	94.535	94.550	94.515	94.535	94.510	94.485	94.500	94.495	94.520	94.495	94.495	94.465	94.480
43	94.475	94.455	94.445	94.445	94.445	94.410	94.415	94.410	94.425	94.425	94.460	94.435	94.415	94.400	94.420
44	94.385	94.380	94.375	94.400	94.355	94.370	94.340	94.325	94.325	94.340	94.345	94.330	94.340	94.330	94.295
45	95.290	94.290	94.270	94.270	94.295	94.295	94.260	94.255	94.255	94.250	94.210	94.185	94.220	94.200	94.195

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 6 Pass 2

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.110
2	97.930	97.950	97.940	97.920	97.900	97.870	97.920	97.920	97.900	97.935	97.920	97.880	97.845	97.865
3	97.900	97.895	97.885	97.895	97.845	97.815	97.845	97.830	97.815	97.790	97.815	97.795	97.730	97.690
4	97.850	97.845	97.835	97.825	97.830	97.790	97.815	97.805	97.785	97.735	97.695	97.640	97.600	97.610
5	97.780	97.790	97.780	97.775	97.770	97.775	97.770	97.775	97.695	97.725	97.675	97.565	97.515	97.545
6	97.635	97.635	97.625	97.565	97.605	97.610	97.600	97.585	97.565	97.515	97.595	97.500	97.480	97.520
7	97.590	97.595	97.570	97.575	97.560	97.550	97.545	97.515	97.475	97.410	97.495	97.490	97.430	97.440
8	97.490	97.445	97.475	97.500	97.495	97.515	97.480	97.450	97.390	97.335	97.415	97.415	97.385	97.375
9	97.415	97.325	97.375	97.390	97.400	97.395	97.420	97.400	97.340	97.195	97.335	97.345	97.345	97.335
10	97.345	97.175	97.220	97.300	97.250	97.220	97.225	97.130	97.175	97.160	97.155	97.155	97.160	97.120
11	97.135	97.110	97.100	97.105	97.120	97.110	97.060	97.050	97.065	97.110	97.115	97.085	97.085	97.080
12	96.915	96.960	97.010	97.005	97.035	97.035	96.990	96.980	97.005	96.995	97.015	97.015	97.005	96.980
13	96.905	96.955	96.975	97.005	97.050	97.045	97.025	97.005	96.985	96.930	96.915	96.975	96.930	96.930
14	96.790	96.860	96.885	96.930	96.925	96.945	96.935	96.910	96.885	96.835	96.820	96.820	96.835	96.805
15	96.715	96.740	96.765	96.795	96.830	96.820	96.820	96.805	96.785	96.735	96.725	96.690	96.675	96.665
16	96.590	96.640	96.650	96.700	96.715	96.735	96.725	96.720	96.690	96.645	96.655	96.630	96.600	96.540

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 6 Pass 2

Table 2

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.110	98.160	98.045
2	97.830	97.835	97.860	97.915	97.880	97.920	97.895	97.875	97.900	97.910	97.910	97.935	97.900	97.950	97.950
3	97.665	97.655	97.755	97.805	97.755	97.730	97.715	97.680	97.710	97.710	97.710	97.725	97.770	97.810	97.855
4	97.605	97.630	97.620	97.615	97.600	97.580	97.570	97.550	97.610	97.600	97.595	97.585	97.625	97.655	97.705
5	97.570	97.565	97.550	97.555	97.520	97.525	97.550	97.500	97.520	97.525	97.535	97.535	97.570	97.545	97.620
6	97.555	97.520	97.490	97.495	97.480	97.465	97.475	97.480	97.510	97.460	97.470	97.500	97.520	97.500	97.510
7	97.455	97.435	97.400	97.385	97.380	97.390	97.415	97.375	97.375	97.395	97.390	97.400	97.405	97.425	97.400
8	97.365	97.330	97.305	97.300	97.310	97.315	97.315	97.325	97.340	97.290	97.320	97.315	97.310	97.300	97.270
9	97.295	97.265	97.235	97.260	97.260	97.245	97.250	97.265	97.285	97.290	97.220	97.205	97.200	97.185	97.170
10	97.095	97.060	97.045	97.040	97.100	97.110	97.170	97.145	97.110	97.110	97.070	97.025	96.965	97.040	97.000
11	97.090	97.055	97.065	97.075	97.100	97.095	97.090	97.085	97.075	97.030	97.000	96.990	96.975	97.025	96.990
12	96.980	96.995	97.005	97.005	97.015	97.025	97.040	97.000	96.945	96.955	96.935	96.915	96.905	96.930	96.905
13	96.930	96.855	96.940	96.980	96.950	96.980	96.960	96.970	96.975	96.925	96.920	96.885	96.865	96.870	96.870
14	96.800	96.745	96.760	96.805	96.815	96.860	96.865	96.885	96.895	96.860	96.820	96.800	96.835	96.850	96.840
15	96.655	96.675	96.645	96.700	96.790	96.790	96.790	96.800	96.800	96.815	96.770	96.775	96.805	96.830	96.820
16	96.500	96.535	96.545	96.590	96.645	96.715	96.700	96.705	96.755	96.750	96.750	96.755	96.765	96.790	96.820

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 6 Pass 3

Table 1

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	97.995	98.020	98.035	98.055	98.050	98.020	98.010	98.015	98.005	98.005	98.005	97.965	97.925	97.910
2	97.940	97.980	97.995	97.990	97.985	97.970	97.940	97.925	97.915	97.955	98.005	97.935	97.860	97.810
3	97.920	97.925	97.925	97.910	97.895	97.880	97.900	97.850	97.815	97.835	97.805	97.820	97.775	97.740
4	97.850	97.870	97.835	97.840	97.835	97.820	97.845	97.835	97.800	97.750	97.760	97.735	97.720	97.695
5	97.825	97.810	97.755	97.790	97.745	97.765	97.785	97.770	97.735	97.740	97.740	97.705	97.715	97.690
6	97.810	97.770	97.745	97.770	97.755	97.725	97.710	97.695	97.685	97.660	97.635	97.660	97.620	97.700
7	97.755	97.645	97.710	97.695	97.675	97.645	97.650	97.640	97.620	97.565	97.545	97.565	97.580	97.580
8	97.570	97.495	97.590	97.615	97.645	97.565	97.565	97.560	97.535	97.480	97.490	97.485	97.505	97.515
9	97.430	97.370	97.430	97.490	97.485	97.485	97.465	97.485	97.450	97.420	97.390	97.380	97.370	97.365
10	97.320	97.255	97.285	97.390	97.385	97.415	97.370	97.360	97.350	97.345	97.285	97.265	97.240	97.210
11	97.235	97.130	97.175	97.240	97.275	97.270	97.305	97.250	97.310	97.145	97.135	97.140	97.150	97.135
12	97.120	97.090	97.000	97.040	97.090	97.165	97.070	97.090	97.030	96.965	96.935	96.985	96.940	96.940
13	96.835	96.855	96.890	96.915	96.920	96.950	96.930	96.980	96.935	96.835	96.825	96.830	96.845	96.805
14	96.700	96.730	96.790	96.815	96.800	96.820	96.810	96.805	96.780	96.660	96.715	96.710	96.675	96.675
15	96.620	96.645	96.685	96.700	96.715	96.730	96.720	96.715	96.685	96.615	96.650	96.605	96.575	96.550

FILTER STRIP MICROTOPOGRAPHY DATA

Plot 6 Pass 3

Table 2

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	97.875	97.925	97.935	97.960	97.940	97.945	97.960	98.020	97.970	98.000	97.990	97.985	97.915	97.955	97.960
2	97.775	97.775	97.860	97.870	97.870	97.860	97.835	97.790	97.875	97.870	97.800	97.775	97.775	97.825	97.860
3	97.715	97.690	97.700	97.755	97.805	97.795	97.715	97.715	97.680	97.675	97.655	97.625	97.635	97.655	97.715
4	97.670	97.655	97.580	97.535	97.690	97.665	97.560	97.615	97.570	97.535	97.545	97.545	97.590	97.605	97.625
5	97.675	97.635	97.600	97.580	97.590	97.475	97.505	97.485	97.475	97.480	97.520	97.500	97.500	97.510	97.475
6	97.590	97.550	97.535	97.495	97.455	97.400	97.410	97.385	97.400	97.400	97.410	97.405	97.435	97.405	97.395
7	97.570	97.540	97.510	97.460	97.430	97.360	97.370	97.350	97.295	97.315	97.330	97.320	97.290	97.260	97.370
8	97.480	97.440	97.425	97.390	97.325	97.260	97.275	97.295	97.275	97.315	97.195	97.195	97.170	97.170	97.300
9	97.340	97.330	97.360	97.315	97.240	97.250	97.290	97.265	97.230	97.220	97.165	97.120	97.150	97.160	97.135
10	97.205	97.220	97.210	97.200	97.210	97.230	97.220	97.210	97.185	97.150	97.140	97.115	97.125	97.130	97.130
11	97.120	97.125	97.130	97.115	97.150	97.145	97.145	97.100	97.080	97.060	97.060	97.045	97.055	97.055	97.030
12	96.905	96.910	96.965	96.970	96.970	96.955	96.975	96.945	96.990	96.925	96.955	96.885	96.860	96.925	96.875
13	96.800	96.775	96.815	96.820	96.830	96.865	96.880	96.895	96.890	96.870	96.825	96.810	96.845	96.835	96.845
14	96.645	96.670	96.665	96.755	96.790	96.790	96.805	96.820	96.805	96.820	96.765	96.785	96.800	96.860	96.820
15	96.505	96.555	96.580	96.650	96.660	96.710	96.705	96.705	96.730	96.760	96.765	96.770	96.775	96.800	96.825

APPENDIX F

Dye Trace Data

DYE TRACE DATA				
PLOT # - run #	test no.	dye flow time (hr:min:sec)	injection point(s) (slot #)	outflow conditions
5 - 1	1	00:01:21.5	1,3,5,7,9	outflow observed 5 ft from bottom
	2	00:01:29.0	2	edge along border
	3	00:01:26.0	5	outflow observed 5 ft from left edge
	4	00:01:42.0	9	outflow observed 28 in from left edge
4 - 2	1	00:00:37.0	2	outflow observed 1 ft from left edge
	2	00:00:53.63	4	outflow observed 1.5 ft from left edge
	3	00:00:57.75	6	outflow observed 91 in from left edge
	4	00:01:21.78	8	outflow observed 112 in from left edge
5 - 2	1	00:02:39.0	5	outflow observed 6 ft from left edge
	2	00:00:41.9	2	outflow observed along left border
	3	00:00:17.0	4	outflow observed along left border
	4	00:01:15.0	8	outflow observed 3.5 ft from right edge
6 - 2	1	00:03:34.47	2	outflow observed 1 ft from left edge
	2	00:04:42.38	4	outflow observed 2.5 ft from left edge
	3	00:05:45.75	6	outflow observed 2 ft from left edge