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The SHRP Materials Reference Library Aggregates: Chemical, Mineralogical, and Sorption Analyses

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oxide composition
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stripper
Teton stone
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Watsonville granite
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The SHRP Aggregates: Interim Report

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Characterization of the SHRP Aggregates

Introduction

This report summarizes data for the SHRP aggregates, which were collected to serve as reference materials for the Strategic Highway Research Program (SHRP). The eleven aggregates represent a geographically and lithologically diverse collection of materials spanning the more commonly utilized bituminous aggregates. The aggregate collection consists of two limestones (samples RC and RD), two granites (RA, RB), a basalt (RK), a calcareous sandstone (RG) a graywacke (RH) and four gravels (RE, RF, RJ, RL) which range in nature from a glacial till to a cherty conglomerate.

The Center for Applied Energy Research (CAER) conducted a series of physical and chemical tests on the materials as part of a larger characterization effort conducted by the Asphalt Institute. The purpose of this report is to present a summary of the results from this effort.

Sample Processing and Handling.

The aggregates were preblended and homogenized by the Asphalt Institute. The original mixture proportion and particle sizes, as received, are summarized in Appendix A of this report. Approximately 1 to 1.5 kg of each of the aggregates were received in 1 gal paint tins. The aggregates were originally prepared with a nominal -3/4-inch topsize and were reduced to -1/2 inch to facilitate riffle splitting. Two fractions were split out and processed further. One was reduced to approximately 1 mm (-12 mesh) by staged roller crushing and then blended; a second was roller milled and then pulverized for 5 minutes in a ring and puck mill (Figure 1). These fractions were then utilized to perform the various test series which are described below.

Hand Specimen Description and Mineralogic Determinations.

The samples of aggregate were examined in hand specimen with the aid of a hand lens (X14) and in thin section using a research quality petrographic microscope. Petrographic analysis involved study of rock chips mounted with blue epoxy resin on 30 micron thick polished glass slides (4.5 cm

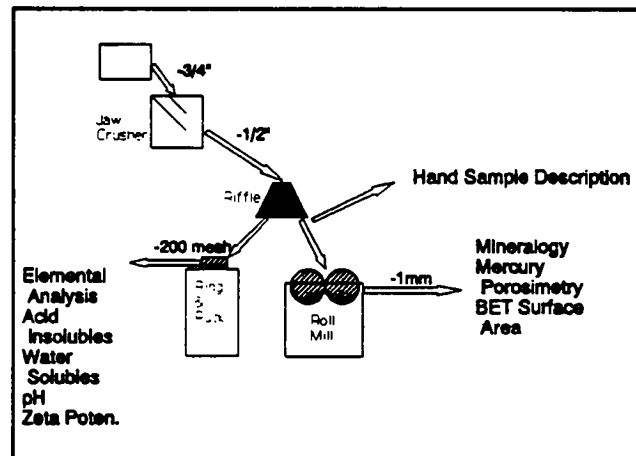


Figure 1. Sample preparation procedures for SHRP Aggregates.

X 2.5 cm). Two thin sections per sample were examined in both plain and polarized light at magnifications ranging from X15 to X400. Minerals were identified by standard petrographic techniques and rock-type abundances and mineral abundances in each rock-type were determined by point counting using a digital point counter (n=500 per sample). In the case of limestones and sandstones, samples were stained with alizarine red in order to distinguish dolomite from calcite. Porosity of individual rock types was determined by counting areas of epoxy resin.

Rock names, size classification and terminology used are similar to that recommended by the American Society of Testing Materials (ASTM) Standard Descriptive Nomenclature for Constituents of Natural Mineral Aggregates (C 294-86) and the ASTM Standard Practice for Petrographic Examination of Aggregates for Concrete (C 295-85). Other terms and abbreviations used are defined in the Notes to Tables 3 and 4 of this report.

The results are presented in two forms: as pie charts indicating the percentage of each rock type (Figures 2 to 7) and individual minerals in each sample, and in tabular form (Tables 2.1 to 2.11). Included in the tables are information on the percentages of abundance and porosity of each rock type in each sample, the percentage of each mineral in each rock type, whether the mineral is primary or secondary, and the texture, shape and size of each mineral.

Mercury Porosimetry and BET Surface Area. Eleven aggregate blends were analyzed using the BET method (surface area calculated from nitrogen adsorption) and mercury intrusion to determine surface area and porosity. The largest possible sample size was analyzed in each case to provide the optimum accuracy.

Prior to nitrogen adsorption/desorption the samples were outgassed at 100 °C and <50 mtorr for at least 12 hours. Twenty point adsorption points were taken at relative pressures less than 0.3 mtorr. The relatively low surface areas of the aggregates place the measurements below the acceptable range of experimental error, therefore these data should not be considered absolute.

Mercury porosimetry was performed following outgassing at ambient temperature to approximately 30 microns of Hg. Intrusion/extrusion measurement were made from ambient to 60,000 psi. A small volume of mercury penetrated the sample in each case, with some being retained in the sample following extrusion, presumably indicating an initial irreversible crushing of the structure. The greatest contribution to total pore volume in all cases came from larger pores ranging from 500 to 30,000 Å in diameter. The contribution from larger pores varies from sample to sample and very little pore volume is provided by pores smaller than 500 Å. However mercury intrusion is considered to

be a better measure of meso-and macroporosity than of microporosity. In addition to porosity Rootare-Prenzlów surface area is calculated from the mercury intrusion data.

The porosimetry data is summarized in Table 5 and the complete listing of the mercury data is present in Appendix B of this report.

Acid insoluble, water soluble and pH. Acid insoluble measurements for the sample were carried out on the aggregates using ASTM D 3042-72. The procedure was conducted on the crushed and pulverized material with replicated samples. The ASTM procedure calls for measurement on a series of graded samples, which was not feasible with the sample size available. It is noted here that the procedure is considered archaic and has been dropped from the ASTM methods in compilations later than 1987.

Water soluble measurements were made using a procedure obtained from the Asphalt Institute. The -200 mesh material was stirred at room temperature for 30 minutes and the mixture passed through a no 44 filter which was dried at 100 °C. The amount of sample retained was used to calculate the percent of sample dissolved. The pH of the aggregate was determined using method ASTM C110.

Zeta Potential. Zeta-Potential (ζ , or electrokinetic potential), is the potential difference across the interface between a moving liquid and a fixed liquid layer attached to a particle. The zeta-potential for the sample was determined using ASTM procedure D 4187-82 (Blue-White Light--Method B). The instrument used was Zeta Meter Inc. Model 3. The sample was suspended in a 10^{-4} m NaCl solution and 10 counts were made for each sample. The data are presented in Table 7.

Major Element Oxide. The major element composition of the aggregates were determined by X-ray fluorescence using Phillips AX2 system. The samples were fused with lithium tetraborate disks and determined using calibrations made from the appropriate international rock and mineral standards. Loss on ignition (LOI) was performed at 1000 °C.

Presentation of the Data.

A summary table of the information generated for each sample is presented in Tables 1.1 to 1.11. Tables with additional details and appropriate figures follow in subsequent sections. Appendices are presented with a complete compilation of the size distribution for each aggregate blend as determined by the Asphalt Institute in Appendix A. A list of all the Mercury porosimetry data are presented in Appendix B.

Table 1. Informational Summaries for the SHRP Aggregates

Table 1.1 Summary Information for the SHRP Aggregates; RA Lithonia Granite (Stripper); Vulcan Materials

Major Element Oxide

SiO ₂	70.50
TiO ₂	0.29
Al ₂ O ₃	15.77
Fe ₂ O ₃	2.13
CaO	1.32
MgO	0.42
Na ₂ O	4.05
K ₂ O	4.63
LOI	<u>0.43</u>
Total	99.54

Lithologic and Major Mineralogic Composition

<u>Lithology %</u>		<u>Mineralogical Composition %</u>	
Granite	98.6	Quartz	55.9
		K-feldspar	25.2
		Plagioclase	10.4
		Biotite	6.4
		Muscovite	1.7
Basalt	1.4	Fe Oxide	38.0
		Plagioclase	35.0
		Augite	17.0
		Muscovite	10.0

Mercury Porosimetry Data

<u>Pore Size Å</u>	<u>Pore Volume cc/g</u>
>3,000	0.0045
500-3000	0.0100
<500	0.0000

BET Surface Area, 0.19 m²/g

Acid Insolubles, 94.6%

Water Solubles, 11.7%

Zeta Potential, -28.1 @pH = 7.71

Table 1.2 Summary Information for the SHRP Aggregates; RB Watsonville Granite (Non-Stripper); Granite Rock Company.

Major Element Oxide

SiO ₂	56.12
TiO ₂	0.52
Al ₂ O ₃	20.14
Fe ₂ O ₃	7.96
CaO	8.63
MgO	2.98
Na ₂ O	2.31
K ₂ O	0.46
LOI	<u>2.76</u>
Total	101.88

Lithologic and Major Mineralogic Composition

<u>Lithology %</u>	<u>Mineralogical Composition %</u>
Granite 100	Quartz 38.0
	Plagioclase 17.1
	Hornblende 16.8
	K-feldspar 15.3
	Epidote 5.8
	Chlorite 3.6
	Muscovite 1.5

Mercury Porosimetry Data

<u>Pore Size Å</u>	<u>Pore Volume cc/g</u>
>3,000	0.0106
500-3000	0.0344
<500	0.0017

BET Surface Area, 1.62 m²/g

Acid Insolubles, 87.9%

Water Solubles, 8.1%

Zeta Potential, -17.1 @pH = 9.12

Table 1.3 Summary Information for the SHRP Aggregates; RC Limestone (High Absorption); McAdams Limestone Products

Major Element Oxide

SiO ₂	5.58
TiO ₂	0.06
Al ₂ O ₃	1.18
Fe ₂ O ₃	0.76
CaO	48.92
MgO	2.35
Na ₂ O	0.17
K ₂ O	0.18
LOI	<u>40.62</u>
Total	99.82

Lithologic and Major Mineralogic Composition

<u>Lithology %</u>	<u>Mineralogical Composition %</u>	
Limestone 100%	Calcite	97.1
	Organics	2.9

Mercury Porosimetry Data

<u>Pore Size Å</u>	<u>Pore Volume cc/g</u>
>3,000	0.0099
500-3000	0.1085
<500	0.0045

BET Surface Area, 2.90 m²/g

Acid Insolubles, 7.9%

Water Solubles, 8.1%

Zeta Potential, -6.1 @pH = 9.82

Table 1.4 Summary Information for the SHRP Aggregates; RD Limestone (Low Absorption); Genstar Stone Products

Major Element Oxide

SiO ₂	16.68
TiO ₂	0.13
Al ₂ O ₃	3.31
Fe ₂ O ₃	1.20
CaO	38.80
MgO	3.47
Na ₂ O	0.12
K ₂ O	1.56
LOI	<u>33.96</u>

Total 99.23

Lithologic and Major Mineralogic Composition

<u>Lithology %</u>		<u>Mineralogical Composition %</u>	
Shaly	53.3%	Calcite	99.5
Limestone		Organics	0.5
Limestone	26.8%	Calcite	77.0
		Organics	19.0
		Quartz	4.0
Arenaceous	19.7%	Calcite	61.5
Limestone		Quartz	37.5
		Organics	0.5

Mercury Porosimetry Data

<u>Pore Size Å</u>	<u>Pore Volume cc/g</u>
>3,000	0.0013
500-3000	0.0301
<500	0.0003

BET Surface Area, 0.72 m²/g

Acid Insolubles, 23.5%

Water Solubles, 5.1%

Zeta Potential, -13.6 @pH = 9.87

**Table 1.5 Summary Information for the SHRP Aggregates; RE
Piedmont Gravel; Genstar Stone Products**

Major Element Oxide

SiO ₂	94.60
TiO ₂	0.15
Al ₂ O ₃	2.15
Fe ₂ O ₃	1.54
CaO	0.25
MgO	0.38
Na ₂ O	0.26
K ₂ O	0.42
LOI	<u>0.45</u>

Total 100.20

Lithologic and Major Mineralogic Composition

Lithology % Mineralogical Composition %

Misc.	100 %	Quartz	90.0
		K-feldspar	3.0
		Muscovite	2.1
		Hornblende	1.1
		Biotite	1.1
		Chlorite	1.1
		Opauques	0.5

Mercury Porosimetry Data

<u>Pore Size Å</u>	<u>Pore Volume cc/g</u>
>3,000	0.0031
500-3000	0.0098
<500	0.0004

BET Surface Area, 0.95 m²/g

Acid Insolubles, 96.1%

Water Solubles, 6.6%

Zeta Potential, -24.2 @pH = 8.08

Table 1.6 Summary Information for the SHRP Aggregates; RF Glacial Gravel; Vulcan Materials
Page 1

Major Element Oxide

SiO ₂	25.97
TiO ₂	0.12
Al ₂ O ₃	2.37
Fe ₂ O ₃	1.38
CaO	22.62
MgO	14.10
Na ₂ O	0.5
K ₂ O	0.57
LOI	<u>33.26</u>
Total	100.89

Lithologic and Major Mineralogic Composition

<u>Lithology %</u>		<u>Mineralogical Composition %</u>	
Limestone	72.6%	Calcite	93.5
		Chert	2.7
		Organics	0.3
		Quartz	0.2
		Dolomite	0.6
Misc.	10.8%	Quartz	63.0
		K-feldspar	30.5
		Plagioclase	3.7
		Opagues	2.8
Graywacke	5.9%	Quartz	52.0
		K-feldspar	19.0
		Lithic frag.	7.5
		Chlorite	7.0
		Plagioclase	6.0
		Chert	4.0
		Biotite	3.5
		Opagues	2.0
		Muscovite	1.0
		Dolomite	1.0
Chert	4.4%	Quartz	99.0

Table 1.6 Summary Information for the SHRP Aggregates
Aggregate: RF Glacial Gravel; Vulcan Materials
Page 2

Lithologic and Major Mineralogic Composition, Continued

<u>Lithology %</u>		<u>Mineralogical Composition %</u>	
Granodiorite	3.7%	Quartz	29.0
		Plagioclase	29.0
		Hornblende	17.0
		Biotite	9.5
		Opagues	7.0
		Muscovite	5.0
		K-feldspar	3.5
Basalt	2.6%	Fe Oxide	40.0
		Plagioclase	35.0
		Augite	15.0
		Muscovite	10.0

Mercury Porosimetry Data

<u>Pore Size Å</u>	<u>Pore Volume cc/g</u>
>3,000	0.0019
500-3000	0.0172
<500	0.0018

BET Surface Area, 1.66 m²/g

Acid Insolubles, 28.2%

Water Solubles, 5.0%

Zeta Potential, -5.8 @pH = 9.51

Table 1.7 Summary Information for the SHRP Aggregates; RG Sandstone; Commercial Stone

Major Element Oxide

SiO ₂	51.79
TiO ₂	0.15
Al ₂ O ₃	3.37
Fe ₂ O ₃	0.93
CaO	23.12
MgO	0.25
Na ₂ O	0.16
K ₂ O	0.84
LOI	<u>19.07</u>

Total 99.68

Lithologic and Major Mineralogic Composition

Lithology % Mineralogical Composition %

Calcareous Sandstone	100 %	Calcite	49.1
		Quartz	47.2
		K-feldspar	2.6
		Opagues	0.6
		Plagioclase	0.3

Mercury Porosimetry Data

<u>Pore Size Å</u>	<u>Pore Volume cc/g</u>
>3,000	0.0170
500-3000	0.0482
<500	0.0018

BET Surface Area, 1.99 m²/g

Acid Insolubles, 55.7%

Water Solubles, 4.9%

Zeta Potential, -9.4 @pH = 9.76

Table 1.8 Summary Information for the SHRP Aggregates; RH Greywacke; Kaiser Sand and Gravel
Page 1

Major Element Oxide

SiO ₂	75.91
TiO ₂	0.46
Al ₂ O ₃	10.68
Fe ₂ O ₃	4.83
CaO	1.84
MgO	2.28
Na ₂ O	2.76
K ₂ O	0.74
LOI	<u>2.41</u>

Total 101.91

Lithologic and Major Mineralogic Composition

<u>Lithology %</u>		<u>Mineralogical Composition %</u>	
Micaceous Sandstone	71.3%	Quartz	56.0
		Chlorite	19.6
		K-feldspar	5.0
		Chert	5.0
		Muscovite	3.0
		Leucoxene	1.0
		Opagues	1.0
		Plagioclase	0.2
		Biotite	0.2
Misc.	11.2%	Quartz	84.8
		K-feldspar	6.2
		Muscovite	4.5
		Chlorite	1.8
		Calcite	0.9
		Plagioclase	0.9
		Opagues	0.9
Granite	10.9%	Chlorite	51.0
		Quartz	26.3
		K-feldspar	22.5
		Hornblende	4.1
		Plagioclase	1.8
		Opagues	1.6
Chert	6.6%	Quartz	100.0

Table 1.8 Summary Information for the SHRP Aggregates
Aggregate: RH Greywacke; Kaiser Sand and Gravel
Page 2

Mercury Porosimetry Data

<u>Pore Size Å</u>	<u>Pore Volume cc/g</u>
>3,000	0.0128
500-3000	0.0905
<500	0.0023

BET Surface Area, 2.74 m²/g

Acid Insolubles, 92.1%

Water Solubles, 9.7%

Zeta Potential, -20.5 @pH = 8.27

Table 1.9 Summary Information for the SHRP Aggregates; RJ Mountain Gravel Conglomerate; Teton Stone Company Products
Page 1

Major Element Oxide

SiO ₂	75.40
TiO ₂	0.15
Al ₂ O ₃	12.88
Fe ₂ O ₃	2.01
CaO	1.73
MgO	0.39
Na ₂ O	3.4
K ₂ O	3.31
LOI	1.13

Total 100.40

Lithologic and Major Mineralogic Composition

<u>Lithology %</u>		<u>Mineralogical Composition %</u>	
Sandstone	47.4%	Quartz	76.3
		K-feldspar	11.2
		Muscovite	3.9
		Chlorite	4.2
		Plagioclase	1.4
		Epidote	1.0
		Opagues	0.6
		Biotite	0.2
Granite	28.4%	K-feldspar	37.7
		Quartz	36.6
		Muscovite	12.9
		Plagioclase	7.3
		Chlorite	6.9
		Epidote	1.8
		Opagues	0.5
		Hornblende	0.5
		Biotite	0.4
Misc.	23.7%	Leucoxene	0.3
		K-feldspar	48.4
		Quartz	36.5
		Plagioclase	10.1
		Chlorite	2.2
		Opagues	1.8
		Muscovite	0.9
		Calcite	1.0
Basalt	0.4 %		

Table 1.9 Summary Information for the SHRP Aggregates
Aggregate: RJ Mountain Gravel Conglomerate; Teton Stone Company
Products

Page 2

Mercury Porosimetry Data

<u>Pore Size Å</u>	<u>Pore Volume cc/g</u>
>3,000	0.0026
500-3000	0.0071
<500	0.0002

BET Surface Area, 1.32 m²/g

Acid Insolubles, 96.2%

Water Solubles, 6.3%

Zeta Potential, -27.5 @pH = 9.45

Table 1.10 Summary Information for the SHRP Aggregates; RK Basalt; Blue Mountain Asphalt Company

Major Element Oxide

SiO ₂	53.54
TiO ₂	1.53
Al ₂ O ₃	14.94
Fe ₂ O ₃	11.68
CaO	9.70
MgO	5.62
Na ₂ O	2.49
K ₂ O	0.77
LOI	<u>1.13</u>

Total 101.46

Lithologic and Major Mineralogic Composition

<u>Lithology %</u>		<u>Mineralogical Composition %</u>	
Basalt	94.4%	Fe Oxide	38.3
		Plagioclase	35.9
		Augite	13.0
		Muscovite	9.4
		Olivine	1.4
		Iddingsite	1.4
Misc.	4.5%	Quartz	77.8
		K-feldspar	11.1
		Plagioclase	10.0
		Chert	1.0
Sandstone	0.6%	Quartz	100.0

Mercury Porosimetry Data

<u>Pore Size Å</u>	<u>Pore Volume cc/g</u>
>3,000	0.0079
500-3000	0.0289
<500	0.0031

BET Surface Area, 15.73 m²/g

Acid Insolubles, 90.1%

Water Solubles, 7.4%

Zeta Potential, -23.4 @pH = 7.6

Table 1.11 Summary Information for the SHRP Aggregates; RL Gulf States Chert; Fordyce Incorp.
Page 1

Major Element Oxide

SiO ₂	76.08
TiO ₂	0.12
Al ₂ O ₃	5.04
Fe ₂ O ₃	1.85
CaO	6.47
MgO	0.00
Na ₂ O	0.91
K ₂ O	1.48
LOI	<u>6.12</u>
Total	98.07

Lithologic and Major Mineralogic Composition

<u>Lithology %</u>		<u>Mineralogical Composition %</u>	
Chert	59.1%	Quartz	80.2
		Ilmenite	8.2
		Chalcedony	5.5
		Calcite	4.7
		Dolomite	0.7
		Opagues	0.3
Arenaceous Limestone	18.2%	Calcite	74.2
		Quartz	15.6
		Dolomite	5.0
		Organics	2.6
		K-feldspar	1.3
		Plagioclase	0.5
Granite	11%	Quartz	45.0
		Ilmenite	32.0
		K-feldspar	12.5
		Leucoxene	7.0
		Plagioclase	4.0
		Muscovite	3.5
Misc.	5.8%	Quartz	55.2
		Fe Oxide	38.0
		K-feldspar	3.4
		Plagioclase	3.4

Table 1.11 Summary Information for the SHRP Aggregates
Aggregate: RL Gulf States Chert; Fordyce Incorp.
Page 2

Lithologic and Major Mineralogic Composition, Continued

<u>Lithology %</u>		<u>Mineralogical Composition %</u>	
Sandstone	5.6%	Quartz	55.5
		Calcite	31.0
		K-feldspar	7.0
		Opagues	2.5
		Plagioclase	2.0
Basalt	0.2%		

Mercury Porosimetry Data

<u>Pore Size Å</u>	<u>Pore Volume cc/g</u>
>3,000	0.0010
500-3000	0.0104
<500	0.0012

BET Surface Area, 2.41 m²/g

Acid Insolubles, 85.3%

Water Solubles, 9.3%

Zeta Potential, -21.2 @pH = 9.66

Table 2. Major Element Oxide Composition of the SHRP Aggregates.

Sam. No.	RA	RB	RC	RD	RE	
SiO ₂	70.50	56.12	5.58	16.68	94.60	
TiO ₂	0.29	0.52	0.06	0.13	0.15	
Al ₂ O ₃	15.77	20.14	1.18	3.31	2.15	
Fe ₂ O ₃	2.13	7.96	0.76	1.20	1.54	
CaO	1.32	8.63	48.92	38.80	0.25	
MgO	0.42	2.98	2.35	3.47	0.38	
Na ₂ O	4.05	2.31	0.17	0.12	0.26	
K ₂ O	4.63	0.46	0.18	1.56	0.42	
LOI	<u>0.43</u>	<u>2.76</u>	<u>40.62</u>	<u>33.96</u>	<u>0.45</u>	
Total	99.54	101.88	99.82	99.23	100.20	
	RF	RG	RH	RJ	RK	RL
SiO ₂	25.97	51.79	75.91	75.40	53.54	76.08
TiO ₂	0.12	0.15	0.46	0.15	1.53	0.12
Al ₂ O ₃	2.37	3.37	10.68	12.88	14.94	5.04
Fe ₂ O ₃	1.38	0.93	4.83	2.01	11.68	1.85
CaO	22.62	23.12	1.84	1.73	9.76	6.47
MgO	14.10	0.25	2.28	0.39	5.62	0.00
Na ₂ O	0.50	0.16	2.76	3.40	2.49	0.91
K ₂ O	0.57	0.84	0.74	3.31	0.77	1.48
LOI	<u>33.26</u>	<u>19.07</u>	<u>2.41</u>	<u>1.13</u>	<u>1.13</u>	<u>6.12</u>
Total	100.89	99.68	101.91	100.40	101.46	98.07

Table 3. Hand Sample Descriptions of SHRP AGGREGATES:

Table 3.1 RA Lithonia Granite

Quartz
Biotite
Muscovite
Feldspar
Basalt fragments

This is a fine to medium-grained granite composed mostly of quartz, biotite and feldspar. Overall appearance is white-light gray.

Quartz: White and various shades of gray in color. 1-2 mm grain aggregates.

Biotite: Small (<1mm) flakes are oriented in a parallel manner as a foliation.

Muscovite: Small (<1mm) flakes, more scarce than biotite grains.

Feldspar: Off-white to slightly tan in color. 1-2mm in size and fractured along cleavage.

Table 3.2 RB Watsonville Granite

Quartz
Chlorite
Feldspar
Muscovite
Hornblende

This medium-grained granite is white and mottled dark gray.

Quartz: 1-2 mm grains that are white, clear and light gray.

Hornblende: Angular grains and up to 6mm in length that are often broken along cleavage planes.

Biotite: Usually associated with hornblende, these flakes are 1-2 mm and very friable.

Feldspar: White to slightly tan in color. 1-2 mm.

Table 3.3 RC Limestone (higher absorption)
2 distinctive shades of limestone.

Brownish-gray vuggy limestone: vugs (<1mm). Some vugs filled with calcite, others empty. Skeletal fragments present (trilobite, gastropod).

Light gray: Micrite(?) with very light veining (veins <0.5 mm wide). Veins filled with calcite grains, some in crystal form. There are also some dark brown bands of organic material <0.5 mm wide.

Table 3.4 RD Limestone (low absorption)
Composed of 2 different rock types.

Dark gray/black micrite: closely packed, mud supported grains. Possible fossil fragments. Very small calcite veins cut rock.

Quartz (aggregates): medium-sized quartz grains, well rounded and cemented. Dark gray/glassy black.

A minor amount of white vein quartz is present.

Table 3.5 RE Piedmont Gravel

Quartz
Basalt
Granite
Sandstone/Quartzite

Quartz: Pebbles which are rounded dominate the mixture. Dominantly milky qtz, others flesh tones and gray. 1 cm to 1mm diameter. Some red/brown pebbles.

Basalt: Aphanitic, dark gray. White quartz stringers <1mm wide.

Granite: White quartz, biotite, off-white feldspar. Fine-grained granite with biotite defining foliation.

Sandstone: Medium to fine-grained, mostly quartz and muscovite. Very friable.

Table 3.6 RF Glacial Gravel

Limestone
Quartz
Feldspar
Basalt
Granite/Granodiorite
Chert

Limestone: Off-white, tan, gray, closely packed, no vugs. Also a vuggy variety: vugs localized and some filled with calcite crystals. Vugs <1 mm diameter. Off-white to tan color.

Quartz: Mostly in the form of sand with a minor amount of small pebbles (<2mm).

Feldspar: Mostly pink or yellowish sand-sized grains.

Granite: Quartz, orthoclase, biotite make up this fine-grained granite.

Chert: White and light gray, conchoidal fracture.

Basalt: Aphanitic, black.

Table 3.7 RG Sandstone

Sandstone
Granite

Sandstone: Well-cemented, fine to medium-grained, gray.
calcite cement.

Granite: Quartz, feldspar and hornblende. Hornblende crystals up
to 4 mm, qtz and feldspar smaller.

Table 3.8 RH Graywacke

Chert
Quartz
Granite
Sandstone

Chert: Conchoidal fracture.

Quartz: Dominantly vein quartz.

Granite: Quartz, feldspar, hornblende, fine-grained.

Sandstone: Fine to medium-grained.

Table 3.9 RJ Mountain Gravel Conglomerate

Quartz
Granite
Basalt
Sandstone
Limestone

Quartz: Dominantly vein quartz in a variety of colors; white,
rose, yellow.

Granite: Quartz, k-feldspar, minor chlorite and muscovite, augite

Basalt: Aphanitic, black.

Sandstone: Fine-grained.

Limestone: Micritic.

Table 3.10 RK Basalt

Augite
Plagioclase
Quartz

Difficult to discern anything at hand sample level. Aphanitic, black.

glassy white/clear specks-- quartz?
elongate dark mineral-- augite
white, massive mineral-- plagioclase

Table 3.11 RL Gulf Coast Gravel

Chert
granite
rounded pebbles
limestone
basalt
sandstone

Chert: Various colors, conchoidal fracture.

Granite: Fine-grained granite, white with a few biotite grains.

Sandstone: Fine-grained quartz and feldspar fragments in an off-white, muddy matrix.

Rounded pebbles: Quartz pebbles <.5 cm diameter.

Basalt: Aphanitic, black.

Limestone: Micritic.

Table 4.2 RB Watsonville Granite
LOCALITY: Granite Rock Co., Watsonville CA

Rock Type	%	φ	Minerals/Rock Constituents				Size (mm)	Shape	Texture
			Primary	%	Secondary	%			
Granite	100	0.5	Quartz	38			0.08	Anh	
			Plagioclase	17.1			0.06	Sub	
			Hornblende	16.8			0.05	Sub	
			K-feldspar	15.3			0.06	Sub	
					Epidote	5.8	0.03	Anh	
					Chlorite	3.6	0.02	Tab	
					Muscovite	1.5	0.02	Tab	
					Leucoxene	.06	<0.02		amorp. masses
			Opakes	0.6				Anh	

Table 4.3 RC Limestone (higher absorption)
LOCALITY: McAdam Limestone Prod.; Frederick, MD

[illegible]

Table 4.4 RD Limestone (lower absorption)
LOCALITY: Genstar Stone Prod.; White Marsh, MD

Rock Type	%	% ϕ	Minerals/Rock Constituents			Size (mm)	Shape	Texture
			Primary	%	Secondary	%		
Shaly Limestone	53.3	0	Calcite Cement	87			<0.02	Pelleted or xtalline
			Calcite	12.5			0.15 Hex	c. xtalline
			Organics	0.5			0.02	amorp.masses
Limestone	26.8	0	Calcite Cement	76			<0.02	xtalline
			Organics	19			<0.02	amorp.masses
			Quartz	4			0.1 SR-R	
			Calcite	1			0.2 Hex	c. xtalline
Arenaceous Limestone	19.7	0	Calcite Cement	52			<0.02	xtalline
			Quartz	37.5			0.1 SR-R	
			Calcite	9.5			0.06 Hex	c. xtalline
			Organics	1			<0.02	amorp.masses

Table 4.5 RE Piedmont Gravel
LOCALITY: Genstar Stone Prod.; White Marsh, MD

Rock Type	%	%φ	Minerals/Rock Constituents				Size (mm)	Shape	Texture
			Primary	%	Secondary	%			
Misc.	100	0	Quartz	90			0.4	A-SR;Anh	m. rextal
			K-feldspar	3			0.15	Anh	
			Muscovite	2.1			0.2	Tab	
			Hornblende	1.1			0.1	Tab	
			Biotite	1.1			0.4	Tab	
			Chlorite	1.1			0.05	Tab	
			Opagues	0.5			0.1	A-SA	
			Augite	0.3			0.15	Sub	
			Plagioclase	0.2			0.1	Sub	
					Leucoxene	0.2	<0.02		amorp.masses

Table 4.6 RF Glacial Gravel
LOCALITY: Vulcan Minerals Co.; Crystal Lake, IL
PAGE 1 of 3

Rock Type		%	%φ	Minerals/Rock Constituents			Size (mm)	Shape	Texture	
				Primary	%	Secondary	%			
Limestone		72.6	2.4	Calcite	80.2			0.05	Hex	c. xtalline
				Cement	13.3			<0.02		
						Chert/ Chalcedony	2.7	<0.02		cryptocrystalline fibrous
				Organics	0.3			0.02		amorph. masses
				Fossils	0.3			0.2		
				Quartz	0.2			0.09	SR	
Misc.		10.8	0			Dolomite	0.6	0.05	Rhomb	
				Quartz	63			0.08	SR-R	
				K-feldspar	30.5			0.06	SA-R	
				Plagioclase	3.7			0.05	SA-SR	
				Opakes	2.8			0.03	SA-SR	

Table 4.6 Sample RF
PAGE 2 of 3

Rock Type		%	%φ	Minerals/Rock Constituents			Size (mm)	Shape	Texture
				Primary	%	Secondary	%		
Graywacke		5.9	0	Quartz	52			0.3	SA-R
				K-feldspar	19			0.2	SA-SR
				Lithic frag.	7.5			0.3	SR
				Chlorite	7			0.6	Tab
				Plagioclase	6			0.05	SA-SR
				Chert	4			<0.02	cryptocrystalline
				Biotite	3.5			0.02	Tab
Chert		4.4	0	Opales	2			0.04	A-SR
				Muscovite	1			0.04	Tab
						Dolomite	1	0.08	Rhomb
				Quartz	95			<0.02	cryptocrystalline
				Chalcedony	5			0.03	acicular fibrous

Table 4.6 Sample RF
PAGE 3 of 3

Rock Type	%	%φ	Minerals/Rock Constituents				Size (mm)	Shape	Texture
			Primary	%	Secondary	%			
Granodiorite	3.7	0	Quartz	29			0.15	Anh	
			Plagioclase	29			0.2	Sub	
			Hornblende	17			0.08	Sub	
			Biotite	9.5			0.03	Tab	
			Opagues	7			0.03	Anh	
					Muscovite	5	0.04	Tab	
			K-feldspar	3.5			0.2	Anh	
Basalt	2.6	0	Fe Oxide	40			<0.02		amorp.masses
			Plagioclase	35			0.1	Euh	
			Augite	15			0.06	Sub	
					Muscovite	10	0.1	Tab	

Table 4.7 RG Sandstone
LOCALITY: Commercial Stone Co.; Connellsville, PA

33

Table 4.8 Sample RH
PAGE 2 of 2

Rock Type	%	% ϕ	Minerals/Rock Constituents				Size (mm)	Shape	Texture
			Primary		%	Secondary	%		
Misc.	11.2	0	Quartz	84.8				0.1	SA-SR
			K-feldspar	6.2				0.07	SA-SR
			Muscovite	4.5				0.05	Tab
			Chlorite	1.8				0.05	Tab
			Calcite	0.9				0.04	Hex
			Plagioclase	0.9				0.05	SA-SR
			Opakes	0.9				0.06	SA-SR
Granite	10.9	0				Chlorite	51	0.5	Tab
			Quartz	26.3				0.1	Anh
			K-feldspar	22.5				0.09	Anh
			Hornblende	4.1				0.14	Sub
			Plagioclase	1.8				0.06	Sub
			Opakes	1.6				0.07	Anh
Chert	6.6	0	Quartz	100				<0.02	cryptocrystalline

Table 4.9 RJ Mountain Gravel Conglomerate;
LOCATION:Teton Stone Co.; Cheyenne WY
PAGE 1 of 3

Rock Type	%	% ϕ	Minerals/Rock Constituents				Size (mm)	Shape	Texture
			Primary	%	Secondary	%			
Sandstone	47.4	0	Quartz	76.3			0.1	SA-R	m. rextal
			K-feldspar	11.2			0.08	SA-SR	
			Muscovite	3.9	Muscovite	1	0.06	Tab	
			Chlorite	4.2			0.08	Tab	
			Plagioclase	1.4			0.06	SA-SR	
					Epidote	1	0.03	SR	
			Opauques	0.6			0.05	SA-SR	
			Biotite	0.2			0.02	Tab	

Table 4.9 Sample RJ
PAGE 2 of 3

Rock Type		%	%φ	Minerals/Rock Constituents			Size (mm)	Shape	Texture
				Primary	%	Secondary	%		
Granite		28.4	0	K-feldspar	37.7			0.1	Sub
				Quartz	36.6			0.1	Anh
						Muscovite	12.9	0.04	Tab
				Plagioclase	7.3			0.08	Sub
						Chlorite	6.9	0.08	Tab
						Epidote	1.8	0.05	Anh
								0.07	Anh
				Opakes	0.5			0.05	Anh
				Hornblende	0.5			0.04	Tab
				Biomite	0.4			<0.02	amorp.masses
						Leucocoxene	0.3		

Table 4.10 RK Basalt
LOCALITY: Blue Mountain Asphalt Co.; Hermiston, OR

Rock Type		%	% ϕ	Minerals/Rock Constituents			Size (mm)	Shape	Texture
		Primary		%	Secondary	%			
Basalt		94.4	0	Fe Oxide		38.3	<0.02		amorp. masses
				Plagioclase		35.9	0.13	Euh	
				Augite		13	0.06	Sub	
					Muscovite	9.4	0.04	Sub	
				Olivine		1.4	0.06	Anh	
Misc.		4.5	0		Iddingsite	1.4	0.06	acicular	fibrous
				Quartz		77.8	0.06	SR-R	
				K-feldspar		11.1	0.04	SA-SR	
				Plagioclase		10	0.06	SA-SR	
				Chert		2	<0.02		cryptocrystalline
Sandstone		0.6	0	Silica Cement		60	<0.02		
Micrite		0.5	0	Calcite			<0.02		mud

Table 4.11 RL Gulf Coast Gravel
LOCALITY: Fordyce, Inc.; Sullivan City, TX

Rock Type		%	%φ	Minerals/Rock Constituents			Size (mm)	Shape	Texture
				Primary	%	Secondary	%		
Chert		59.1	0.2	Quartz	80.2			<0.02	cryptocrystalline
				Ilmenite	8.2			<0.02	amorph. masses
				Chalcedony	5.5			0.05	Acicular fibrous
						Calcite	4.7	0.08	Hex
						Dolomite	0.7	0.06	Rhomb
Arenaceous Limestone				Opales	0.3			0.04	Anh
		18.2	1.1	Calcite	74.2			<0.02	cement
				Quartz	15.6			0.02	SA-SR
						Dolomite	5	0.02	Rhomb
				Organics	2.6			<0.02	amorph. masses
				K-feldspar	1.3			0.06	SR
				Plagioclase	0.5			0.04	SR

Table 4.11 Sample RL

Rock Type	%	%φ	Minerals/Rock Constituents				Size (mm)	Shape	Texture
			Primary	%	Secondary	%			
Granite	11	0	Quartz	45			0.08	Anh	
			Ilmenite	32			<0.02		amorp.masses
			K-feldspar	12.5			0.06	Anh	
					Leucoxene	7	<0.02		amorp.masses
			Plagioclase	4			0.04	Anh	
Misc.	5.8	0			Muscovite	3.5	0.02	Tab	
			Quartz	55.2			0.05	SA-SR	
			Fe Oxide	38			<0.02		amorp.masses
			K-feldspar	3.4			0.06	SA-SR	
			Plagioclase	3.4			0.06	SA-SR	

Table 4.11 Sample RL
PAGE 3 of 3

Rock Type		%	% ϕ	Minerals/Rock Constituents			Size (mm)	Shape	Texture
				Primary	%	Secondary	%		
Sandstone		5.6	0	Quartz	55.5		0.05	SA-SR	
				Calcite	31		<0.02		cement
				K-feldspar	7		0.05	SA-SR	
				Opakes	2.5		0.04	SA-SR	
				Plagioclase	2		0.04	SR	
Basalt		0.2	0						

Figure 2. Aggregate Lithologic Composition for Samples RA and RB.

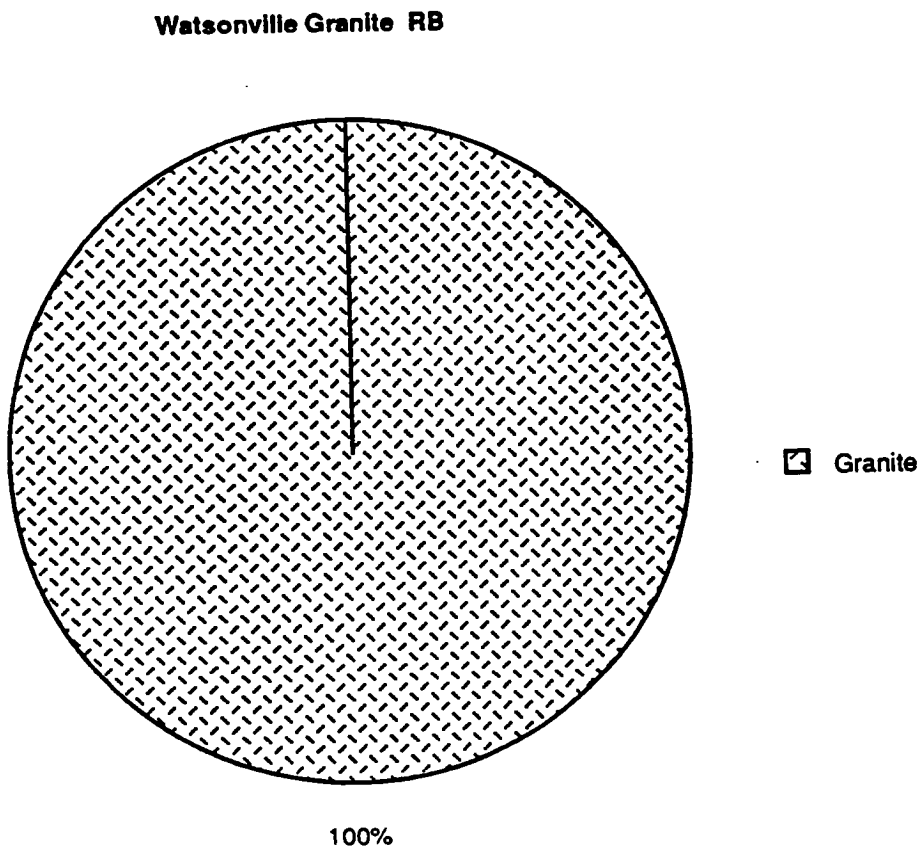
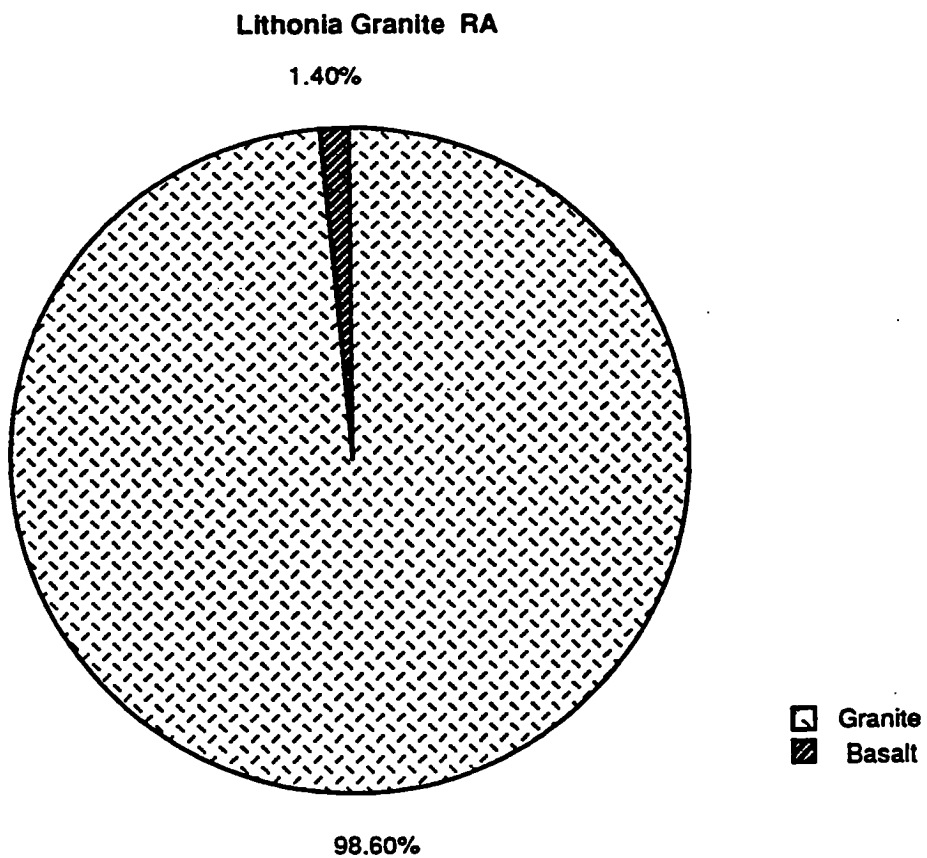
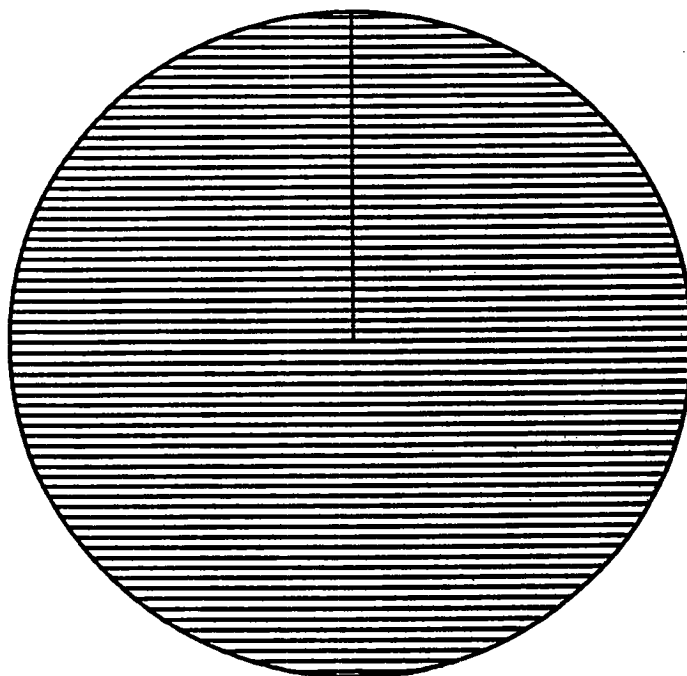


Figure 3. Aggregate Lithologic Composition for Samples RC and RD.

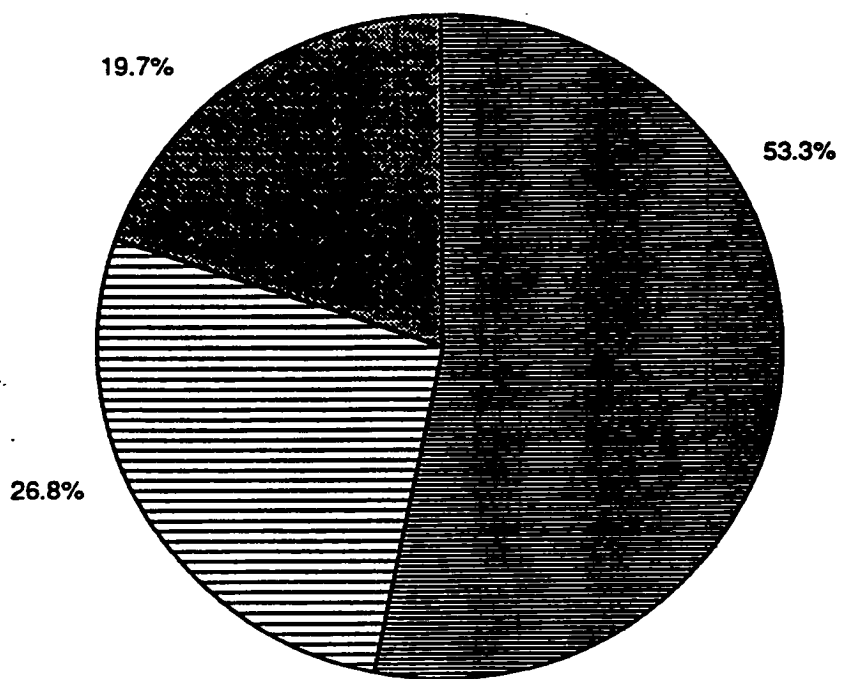
Limestone (higher absorption) RC



 Limestone

100%

Limestone (lower absorption) RD






 Shaly Limestone
 Limestone
 Arenaceous Limestone

Figure 4. Aggregate Lithologic Composition for Samples RE and RF.

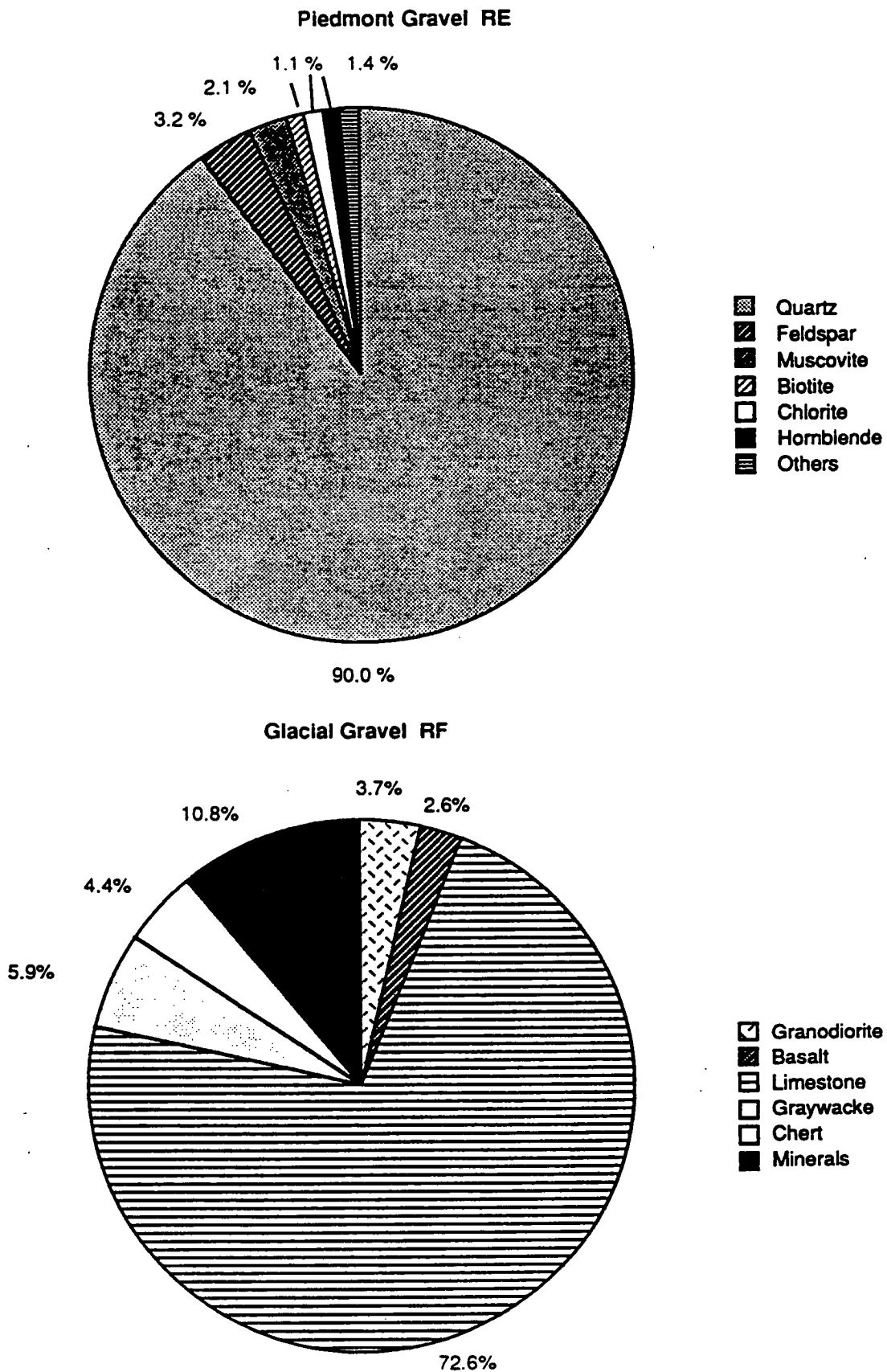
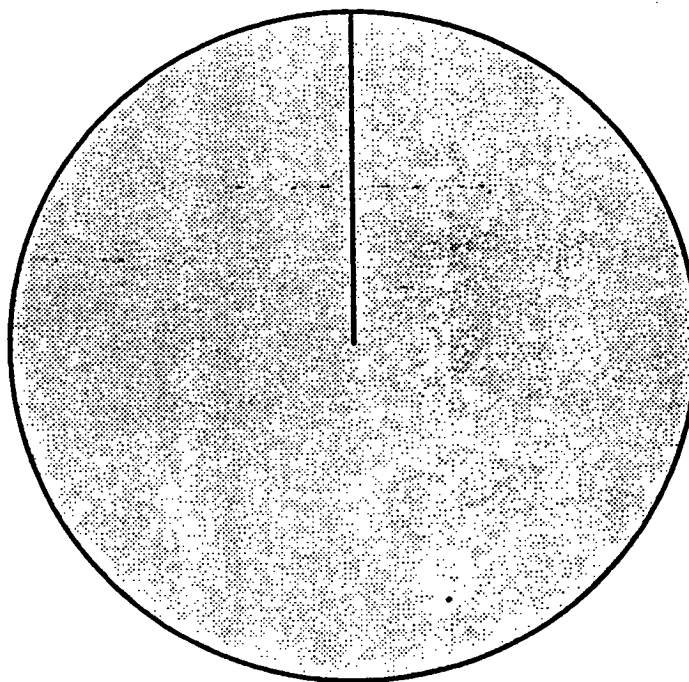


Figure 5. Aggregate Lithologic Composition for Samples RG and RH.

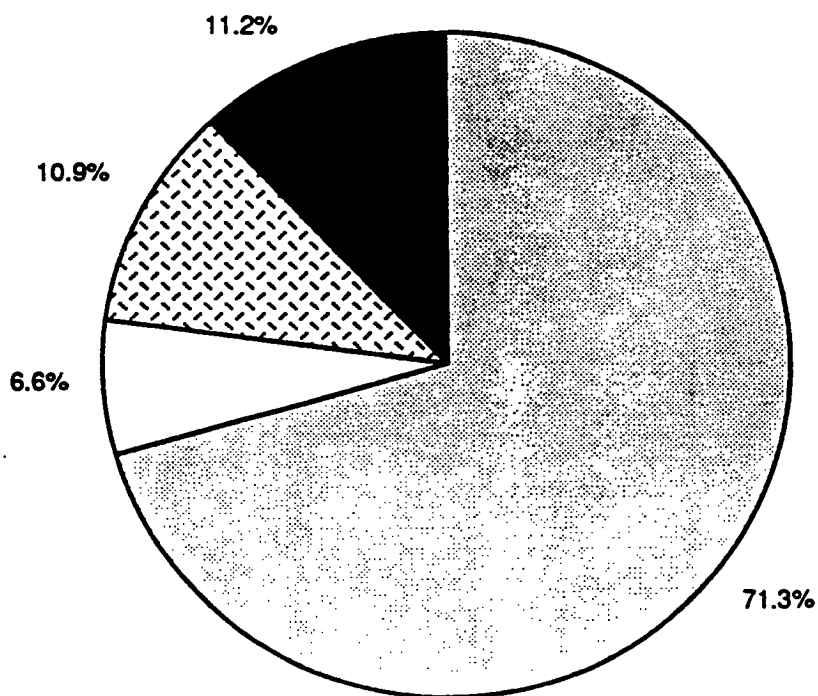
Sandstone RG



□ Calcareous Sandstone

100%

Graywacke RH



□ Micaceous Sandstone
□ Chert
▨ Granite
■ Minerals

Figure 6. Aggregate Lithologic Composition for Samples RJ and RK.

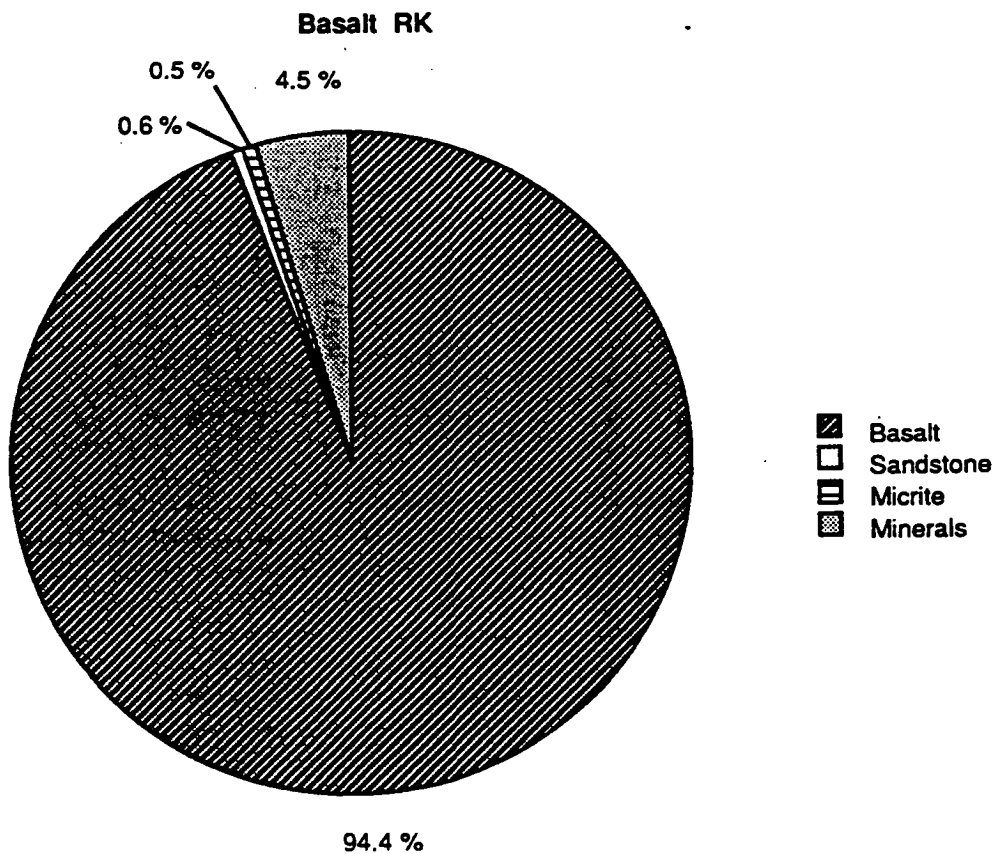
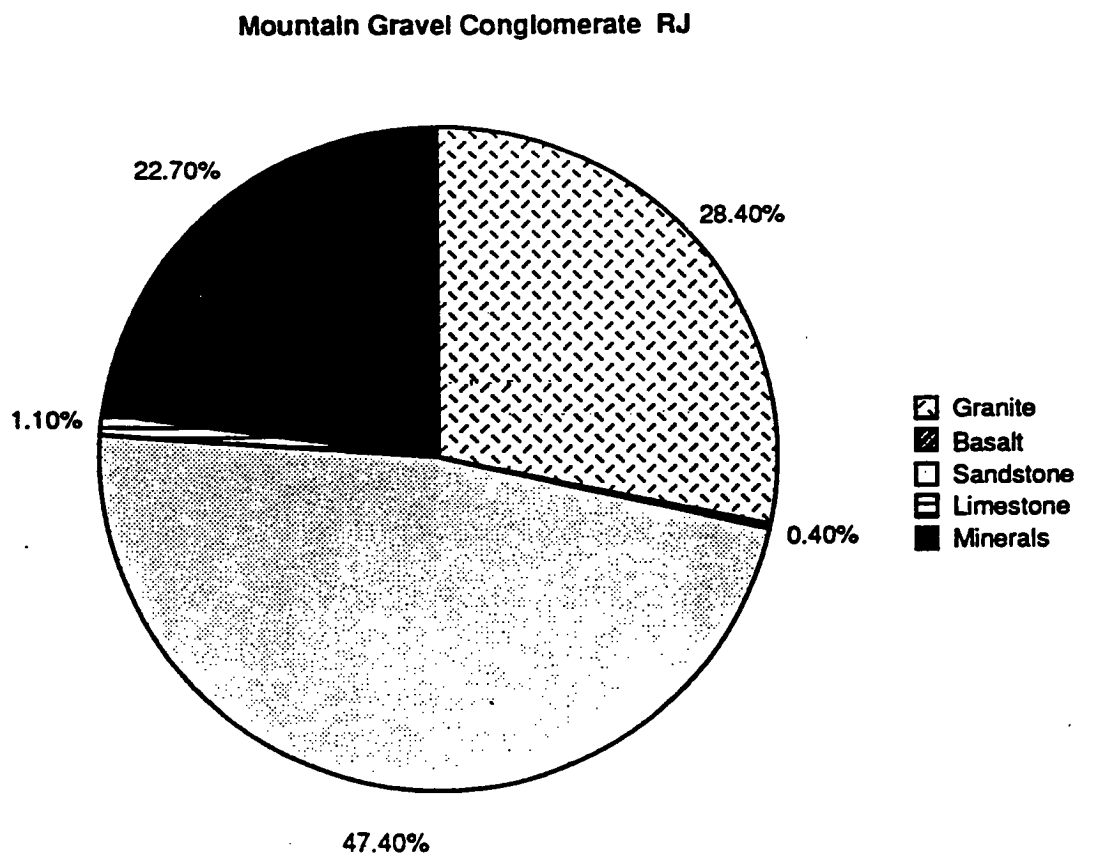
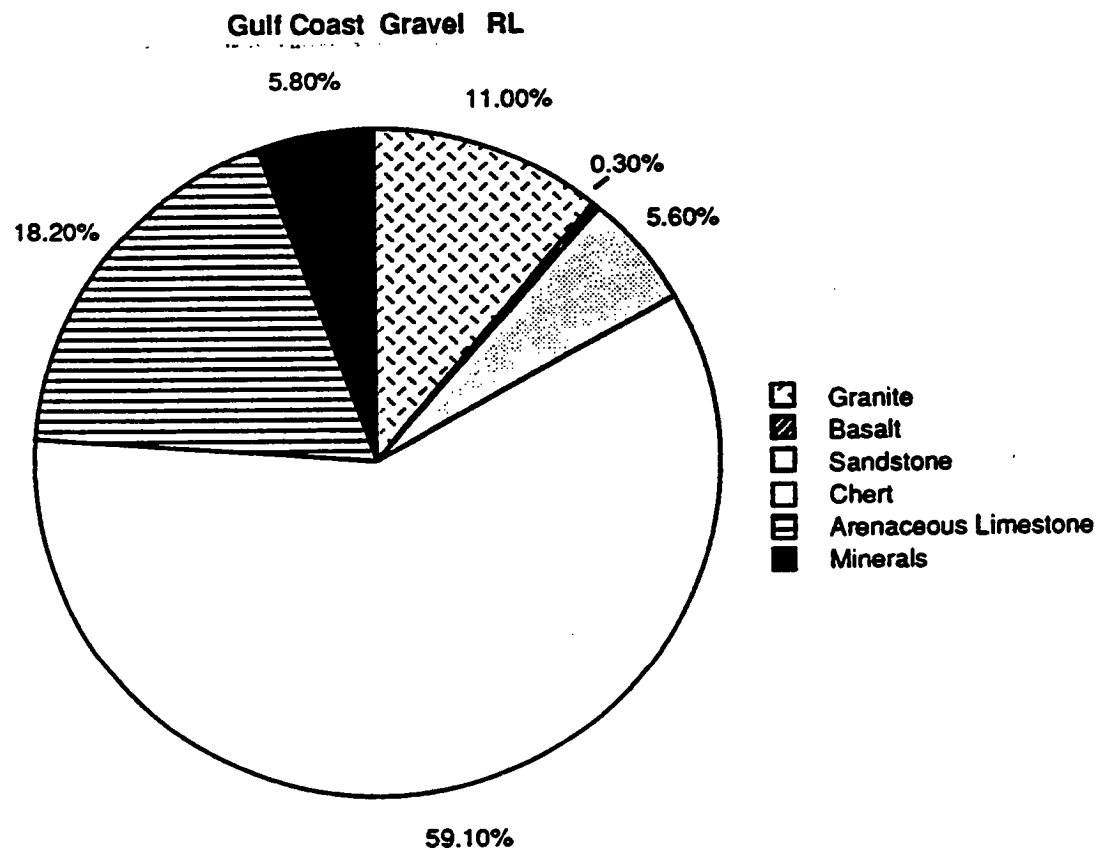


Figure 7. Aggregate Lithologic Composition for Samples RL.



Notes for Tables 3 and 4 and Figures 2 to 7 and list of Abbreviations Used.

ABBREVIATIONS USED

Shape

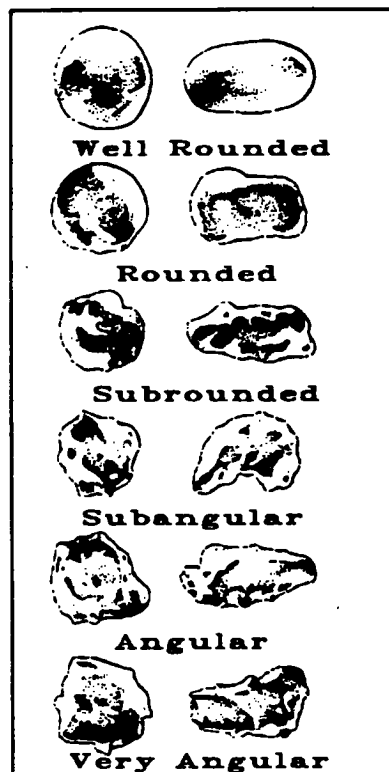
VA= very angular
A= angular
SA= subangular
SR= subrounded
R= rounded
WR= well rounded
Euh= euhedral
Anh= anhedral
Sub= subhedral
Tab= tabular
Hex= hexagonal
Rhomb= rhombohedral

Textures

xtalline= crystalline
c. xtalline= coarsely crystalline
cryptoxtalline= cryptocrystalline
rextal= recrystallization
m.rextal= minor recrystallization
amorp.masses= amorphous masses

Size Equivalents

very fine grained (clay sized) = <0.002 mm
fine grained (silt sized) = 0.0625 mm - 0.002 mm
medium grained (sand sized) = 0.06 mm - 2 mm



Adapted from Ehlers
and Blatt, 1982.

GENERAL GLOSSARY OF TERMS

Acicular	needle shaped or fibrous.
Anhedral	no crystal faces are developed.
Aphanitic	so fine grained that individual crystals are not distinguishable by the unaided eye.
Augite	a calcium magnesium iron rich pyroxene.
Biotite	a iron-magnesium rich mica, black in color.
BET method	surface area calculated from nitrogen adsorption named for originators, S. Brunauer, P. Emmett and E. Teller.
Calcite	calcium carbonate
Conchoidal	a fracture that gives a smoothly curved surface.
Chlorite	a magnesium mica
Dolomite	calcium magnesium carbonate.
Euhedral	well developed crystal faces.
Foliation	a planar arrangement of minerals in a rock.
Hornblend	a calcium iron magnesium rich amphibole
K-feldspar	microcline or orthoclase feldspar
Micrite	very fine grained limestone.
Muscovite	a potassium mica, transparent.
Plagioclase	a calcium-sodium feldspar
Rootare-	
Prenzlów area	surface area calculated from mercury intrusion as a function of pressure.
Subhedral	only partial development of crystal faces.
Tabular	platy or prismatic.
Zeta Potential	ζ , or electrokinetic potential, is the potential difference across the interface between a moving liquid and a fixed liquid layer attached to a particle.

Table 5. BET Surface Area and Mercury Porosimetry Data Summary.

Aggregate	BET Surface Area m ² /g	Rootare-Prenzlów Surface Area m ² /g	Total Pore Volume cm ³ /g
RA	0.19	0.04	0.01
RB	1.62	0.31	0.05
RC	2.90	0.84	0.12
RD	0.72	0.14	0.03
RE	0.95	0.08	0.01
RF	1.66	0.25	0.02
RG	1.99	0.33	0.07
RH	2.74	0.53	0.11
RJ	1.32	0.05	0.01
RK	15.73	2.37	0.04
RL	2.41	0.15	0.01

Aggregate	% Pore Vol. <u>>3000 Å</u>	% Pore Vol. <u>500-3000 Å</u>	% Pore Vol. <u><500 Å</u>
RA	31	69	0
RB	23	74	4
RC	8	88	4
RD	4	95	1
RE	23	73	3
RF	9	83	9
RG	25	72	3
RH	12	86	2
RJ	26	72	2
RK	20	72	8
RL	8	83	9

Table 6. Acid Insolubles, Water Soluble and pH for SHRP Aggregates

Aggregate	Acid Insoluble	Water Soluble	pH
	Wt %	WT %	
RA	94.6	11.7	9.5
RB	87.9	8.1	9.6
RC	7.9	4.0	9.7
RD	23.5	5.1	9.8
RE	96.1	6.6	9.3
RF	28.2	5.0	10.0
RG	55.7	5.0	9.9
RH	92.1	9.7	8.6
RJ	96.2	6.3	9.6
RK	90.1	9.1	7.4
RL	85.3	9.3	9.8

Table 7. Zeta Potential Measurements of the SHRP Aggregates.

Aggregate	pH	Zeta Potential	s.d.¹
RA	7.71	-28.1	1.8
RB	9.12	-17.1	2.0
RC	9.82	- 6.12	1.3
RD	9.87	-13.6	2.2
RE	8.08	-24.2	1.7
RF	9.51	- 5.79	1.0
RG	9.76	- 9.40	1.4
RH	7.62	-20.5	0.7
RJ	9.45	-27.5	2.5
RK	7.62	-23.4	2.2
RL	9.66	-22.3	1.3

¹Standard Deviation of 10 counts.

Appendix A.

Blend Fractions and Grain Size Distribution of SHRP Aggregates

**RA LITHONIA GRANITE (STRIPPER):
VULCAN MATERIALS**

PERCENT BLEND					TOTAL
38	28	26	8		100

SIEVE	SIEVE	A	B	C	D	E	PERCENT	TARGET
INCH	MM	78	89D	810C	PD. SCR.		BLEND	BLEND
3/4	19.05	100.00	100.00	100.00	100.00		100.00	100
1/2	12.70	76.00	100.00	100.00	100.00		90.88	83.3
3/8	9.65	31.20	98.30	100.00	100.00		73.38	73.6
# 4	4.75	1.40	18.50	89.40	100.00		36.96	53.5
# 8	2.38	0.60	0.80	74.40	99.80		27.78	39.2
# 16	1.19	0.60	0.50	62.60	99.10		24.57	28.7
# 30	0.60	0.60	0.40	47.50	97.90		20.52	21.0
# 50	0.30	0.50	0.30	30.60	94.20		15.77	15.4
# 100	0.15	0.40	0.20	16.30	63.10		9.49	11.3
# 200	0.08	0.30	0.10	8.60	20.80		4.04	8.3

SIEVE	SIEVE	A	B	C	D	E	PERCENT	TARGET
INCH	MM							
3/4	19.05	38.00	28.00	26.00	8.00		100.00	100
1/2	12.70	28.88	28.00	26.00	8.00		90.88	83.3
3/8	9.65	11.86	27.52	26.00	8.00		73.38	73.6
# 4	4.75	0.53	5.18	23.24	8.00		36.96	53.5
# 8	2.38	0.23	0.22	19.34	7.98		27.78	39.2
# 16	1.19	0.23	0.14	16.28	7.93		24.57	28.7
# 30	0.60	0.23	0.11	12.35	7.83		20.52	21.0
# 50	0.30	0.19	0.08	7.96	7.54		15.77	15.4
# 100	0.15	0.15	0.06	4.24	5.05		9.49	11.3
# 200	0.08	0.11	0.03	2.24	1.66		4.04	8.3

RB WATSONVILLE GRANITE (NON-STRIPPER);
GRANITE ROCK CO.

PERCENT BLEND							TOTAL	
37 23 40							100	
SIEVE	SIEVE	A	B	C	D	E	PERCENT BLEND	TARGET BLEND
INCH	MM	1/2-#4	#8-1/4"	CR. FINE				
3/4	19.05	100.00	100.00	100.00			100.00	100
1/2	12.70	95.40	100.00	100.00			98.30	83.3
3/8	9.65	56.90	100.00	100.00			84.05	73.6
# 4	4.75	2.00	54.90	100.00			53.37	53.5
# 8	2.38	1.60	3.70	89.90			37.40	39.2
# 16	1.19	1.50	1.70	68.30			28.27	28.7
# 30	0.60	1.40	1.50	51.30			21.38	21.0
# 50	0.30	1.30	1.40	38.00			16.00	15.4
# 100	0.15	1.10	1.30	26.00			11.11	11.3
# 200	0.08	0.90	1.10	17.00			7.39	8.3
SIEVE	SIEVE	A	B	C	D	E	PERCENT	TARGET
INCH	MM							
3/4	19.05	37.00	23.00	40.00			100.00	100
1/2	12.70	35.30	23.00	40.00			98.30	83.3
3/8	9.65	21.05	23.00	40.00			84.05	73.6
# 4	4.75	0.74	12.63	40.00			53.37	53.5
# 8	2.38	0.59	0.85	35.96			37.40	39.2
# 16	1.19	0.56	0.39	27.32			28.27	28.7
# 30	0.60	0.52	0.35	20.52			21.38	21.0
# 50	0.30	0.48	0.32	15.20			16.00	15.4
# 100	0.15	0.41	0.30	10.40			11.11	11.3
# 200	0.08	0.33	0.25	6.80			7.39	8.3

**RC LESTONE (HIGH ABSORPTION);
McADAMS LESTONE PRODUCTS**

PERCENT BLEND					TOTAL
33	49	18			100

SIEVE	SIEVE	A	B	C	D	E	PERCENT BLEND	TARGET BLEND
INCH	MM	3/4-#8	1/2-#8	-#8				
3/4	19.05	100.00	100.00	100.00			100.00	100
1/2	12.70	61.90	100.00	100.00			87.43	83.3
3/8	9.65	22.60	94.80	100.00			71.91	73.6
# 4	4.75	6.10	43.00	100.00			41.08	53.5
# 8	2.38	4.20	15.30	94.80			25.95	39.2
# 16	1.19	3.80	10.50	75.50			19.99	28.7
# 30	0.60	3.60	9.10	58.60			16.20	21.0
# 50	0.30	3.40	8.40	46.10			13.54	15.4
# 100	0.15	3.20	7.90	37.20			11.62	11.3
# 200	0.08	3.00	7.40	31.90			10.36	8.3
SIEVE	SIEVE	A	B	C	D	E	PERCENT	TARGET
INCH	MM							
3/4	19.05	33.00	49.00	18.00			100.00	100
1/2	12.70	20.43	49.00	18.00			87.43	83.3
3/8	9.65	7.46	46.45	18.00			71.91	73.6
# 4	4.75	2.01	21.07	18.00			41.08	53.5
# 8	2.38	1.39	7.50	17.06			25.95	39.2
# 16	1.19	1.25	5.15	13.59			19.99	28.7
# 30	0.60	1.19	4.46	10.55			16.20	21.0
# 50	0.30	1.12	4.12	8.30			13.54	15.4
# 100	0.15	1.06	3.87	6.70			11.62	11.3
# 200	0.08	0.99	3.63	5.74			10.36	8.3

**RD LIMESTONE (LOW ABSORPTION);
GENSTAR STONE PRODUCTS.**

		PERCENT BLEND					TOTAL	
		20	10	20	25	25	100	
SIEVE	SIEVE	A	B	C	D	E	PERCENT BLEND	TARGET BLEND
INCH	MM	#1	1/2-#8	BIRDSEYE	#10 SCRA	#12 DUST		
3/4	19.05	100.00	100.00	100.00	100.00	100.00	100.00	100
1/2	12.70	88.80	100.00	100.00	100.00	100.00	97.76	83.3
3/8	9.65	48.90	92.90	99.90	100.00	100.00	89.05	73.6
# 4	4.75	6.30	17.10	64.00	94.40	100.00	64.37	53.5
# 8	2.38	1.90	4.30	19.90	64.10	98.00	45.32	39.2
# 16	1.19	1.30	2.00	5.70	40.90	71.30	29.65	28.7
# 30	0.60	1.20	1.40	3.30	26.50	48.50	19.79	21.0
# 50	0.30	1.10	1.20	2.60	18.20	35.20	14.21	15.4
# 100	0.15	1.00	1.10	2.30	13.40	27.00	10.87	11.3
# 200	0.08	0.90	1.00	2.10	10.90	22.30	9.00	8.3
SIEVE	SIEVE	A	B	C	D	E	PERCENT	TARGET
INCH	MM							
3/4	19.05	20.00	10.00	20.00	25.00	25.00	100.00	100
1/2	12.70	17.76	10.00	20.00	25.00	25.00	97.76	83.3
3/8	9.65	9.78	9.29	19.98	25.00	25.00	89.05	73.6
# 4	4.75	1.26	1.71	12.80	23.60	25.00	64.37	53.5
# 8	2.38	0.38	0.43	3.98	16.03	24.50	45.32	39.2
# 16	1.19	0.26	0.20	1.14	10.23	17.83	29.65	28.7
# 30	0.60	0.24	0.14	0.66	6.63	12.13	19.79	21.0
# 50	0.30	0.22	0.12	0.52	4.55	8.80	14.21	15.4
# 100	0.15	0.20	0.11	0.46	3.35	6.75	10.87	11.3
# 200	0.08	0.18	0.10	0.42	2.73	5.58	9.00	8.3

**RE PIEDMONT GRAVEL;
GENSTAR STONE PRODUCTS**

PERCENT BLEND					TOTAL
5	27	45	23		100

SIEVE	SIEVE	A	B	C	D	E	PERCENT BLEND	TARGET BLEND
INCH	MM	5/8 GR.	#7 CR.	1/4 GR.	FLUME SD			
3/4	19.05	100.00	100.00	100.00	100.00		100.00	100
1/2	12.70	88.40	99.50	100.00	100.00		99.29	83.3
3/8	9.65	51.70	87.70	99.40	99.90		93.97	73.6
# 4	4.75	6.40	23.00	49.50	99.60		51.71	53.5
# 8	2.38	1.10	13.40	6.80	97.50		29.16	39.2
# 16	1.19	0.60	9.90	2.20	90.80		24.58	28.7
# 30	0.60	0.40	7.80	1.50	80.80		21.39	21.0
# 50	0.30	0.30	6.20	1.10	63.60		16.81	15.4
# 100	0.15	0.20	4.60	0.80	40.00		10.81	11.3
# 200	0.08	0.20	3.10	0.60	14.70		4.50	8.3

SIEVE	SIEVE	A	B	C	D	E	PERCENT	TARGET
INCH	MM							
3/4	19.05	5.00	27.00	45.00	23.00		100.00	100
1/2	12.70	4.42	26.87	45.00	23.00		99.29	83.3
3/8	9.65	2.59	23.68	44.73	22.98		93.97	73.6
# 4	4.75	0.32	6.21	22.28	22.91		51.71	53.5
# 8	2.38	0.06	3.62	3.06	22.43		29.16	39.2
# 16	1.19	0.03	2.67	0.99	20.88		24.58	28.7
# 30	0.60	0.02	2.11	0.68	18.58		21.39	21.0
# 50	0.30	0.02	1.67	0.50	14.63		16.81	15.4
# 100	0.15	0.01	1.24	0.36	9.20		10.81	11.3
# 200	0.08	0.01	0.84	0.27	3.38		4.50	8.3

**RF GLACIAL GRAVEL;
VULCAN MATERIALS**

PERCENT BLEND							TOTAL
		56	44				100

SIEVE	SIEVE	A	B	C	D	E	PERCENT BLEND	TARGET BLEND
INCH	MM	CA 16	FA 2					
3/4	19.05	100.00	100.00				100.00	100
1/2	12.70	100.00	100.00				100.00	83.3
3/8	9.65	96.40	100.00				97.98	73.6
# 4	4.75	14.90	99.70				52.21	53.5
# 8	2.38	3.90	83.70				39.01	39.2
# 16	1.19	3.20	61.30				28.76	28.7
# 30	0.60	2.90	36.90				17.86	21.0
# 50	0.30	2.70	10.40				6.09	15.4
# 100	0.15	2.50	1.70				2.15	11.3
# 200	0.08	2.10	1.00				1.62	8.3

SIEVE	SIEVE	A	B	C	D	E	PERCENT	TARGET
INCH	MM							
3/4	19.05	56.00	44.00				100.00	100
1/2	12.70	56.00	44.00				100.00	83.3
3/8	9.65	53.98	44.00				97.98	73.6
# 4	4.75	8.34	43.87				52.21	53.5
# 8	2.38	2.18	36.83				39.01	39.2
# 16	1.19	1.79	26.97				28.76	28.7
# 30	0.60	1.62	16.24				17.86	21.0
# 50	0.30	1.51	4.58				6.09	15.4
# 100	0.15	1.40	0.75				2.15	11.3
# 200	0.08	1.18	0.44				1.62	8.3

RG SANDSTONE;
COMMERCIAL STONE

PERCENT BLEND					TOTAL
6	44	50			100

SIEVE INCH	SIEVE MM	A #8	B SAND	C -200	D	E	PERCENT BLEND	TARGET BLEND
3/4	19.05	100.00	100.00	100.00			100.00	100
1/2	12.70	76.00	100.00	100.00			98.56	83.3
3/8	9.65	31.20	98.30	100.00			95.12	73.6
# 4	4.75	1.40	18.50	89.40			52.92	53.5
# 8	2.38	0.60	0.80	74.40			37.59	39.2
# 16	1.19	0.60	0.50	62.60			31.56	28.7
# 30	0.60	0.60	0.40	47.50			23.96	21.0
# 50	0.30	0.50	0.30	30.60			15.46	15.4
# 100	0.15	0.40	0.20	16.30			8.26	11.3
# 200	0.08	0.30	0.10	8.60			4.36	8.3
SIEVE INCH	SIEVE MM	A	B	C	D	E	PERCENT	TARGET
3/4	19.05	6.00	44.00	50.00			100.00	100
1/2	12.70	4.56	44.00	50.00			98.56	83.3
3/8	9.65	1.87	43.25	50.00			95.12	73.6
# 4	4.75	0.08	8.14	44.70			52.92	53.5
# 8	2.38	0.04	0.35	37.20			37.59	39.2
# 16	1.19	0.04	0.22	31.30			31.56	28.7
# 30	0.60	0.04	0.18	23.75			23.96	21.0
# 50	0.30	0.03	0.13	15.30			15.46	15.4
# 100	0.15	0.02	0.09	8.15			8.26	11.3
# 200	0.08	0.02	0.04	4.30			4.36	8.3

**RH GREYLOCKE;
KAISER SAND AND GRAVEL**

PERCENT BLEND							TOTAL	
		59	33	8			100	
SIEVE	SIEVE	A	B	C	D	E	PERCENT BLEND	TARGET BLEND
INCH	MM	3/8	SAND	BG. FIN.				
3/4	19.05	100.00	100.00	100.00			100.00	100
1/2	12.70	100.00	100.00	100.00			100.00	83.3
3/8	9.65	96.40	100.00	100.00			97.88	73.6
# 4	4.75	5.50	100.00	100.00			44.25	53.5
# 8	2.38	0.70	94.50	100.00			39.60	39.2
# 16	1.19	0.50	69.40	100.00			31.20	28.7
# 30	0.60	0.50	40.10	100.00			21.53	21.0
# 50	0.30	0.50	21.40	99.90			15.35	15.4
# 100	0.15	0.50	7.60	98.70			10.70	11.3
# 200	0.08	0.50	1.70	94.30			8.40	8.3
SIEVE	SIEVE	A	B	C	D	E	PERCENT	TARGET
INCH	MM							
3/4	19.05	59.00	33.00	8.00			100.00	100
1/2	12.70	59.00	33.00	8.00			100.00	83.3
3/8	9.65	56.88	33.00	8.00			97.88	73.6
# 4	4.75	3.25	33.00	8.00			44.25	53.5
# 8	2.38	0.41	31.19	8.00			39.60	39.2
# 16	1.19	0.30	22.90	8.00			31.20	28.7
# 30	0.60	0.30	13.23	8.00			21.53	21.0
# 50	0.30	0.30	7.06	7.99			15.35	15.4
# 100	0.15	0.30	2.51	7.90			10.70	11.3
# 200	0.08	0.30	0.56	7.54			8.40	8.3

**RJ MOUNTAIN GRAVEL CONGLOMERATE;
TETON STONE COMPANY**

PERCENT BLEND					TOTAL
40	8	52			100

SIEVE	SIEVE	A	B	C	D	E	PERCENT BLEND	TARGET BLEND
INCH	MM	1/2 PM	TYPE G	- 4				
3/4	19.05	100.00	100.00	100.00			100.00	100
1/2	12.70	76.00	100.00	100.00			90.40	83.3
3/8	9.65	31.20	98.30	100.00			72.34	73.6
# 4	4.75	1.40	18.50	89.40			48.53	53.5
# 8	2.38	0.60	0.80	74.40			38.99	39.2
# 16	1.19	0.60	0.50	62.60			32.83	28.7
# 30	0.60	0.60	0.40	47.50			24.97	21.0
# 50	0.30	0.50	0.30	30.60			16.14	15.4
# 100	0.15	0.40	0.20	16.30			8.65	11.3
# 200	0.08	0.30	0.10	8.60			4.60	8.3

SIEVE	SIEVE	A	B	C	D	E	PERCENT	TARGET
INCH	MM							
3/4	19.05	40.00	8.00	52.00			100.00	100
1/2	12.70	30.40	8.00	52.00			90.40	83.3
3/8	9.65	12.48	7.86	52.00			72.34	73.6
# 4	4.75	0.56	1.48	46.49			48.53	53.5
# 8	2.38	0.24	0.06	38.69			38.99	39.2
# 16	1.19	0.24	0.04	32.55			32.83	28.7
# 30	0.60	0.24	0.03	24.70			24.97	21.0
# 50	0.30	0.20	0.02	15.91			16.14	15.4
# 100	0.15	0.16	0.02	8.48			8.65	11.3
# 200	0.08	0.12	0.01	4.47			4.60	8.3

**RK BASALT;
BLUE MOUNTAIN ASPHALT COMPANY**

PERCENT BLEND					TOTAL
29	20	51			100

SIEVE	SIEVE	A	B	C	D	E	PERCENT BLEND	TARGET BLEND
INCH	MM	3/4-1/4	1/2-1/4	1/4				
3/4	19.05	100.00	100.00	100.00			100.00	100
1/2	12.70	46.40	100.00	100.00			84.46	83.3
3/8	9.65	9.70	98.30	100.00			73.47	73.6
# 4	4.75	0.90	18.50	89.40			49.56	53.5
# 8	2.38	0.60	0.80	74.40			38.28	39.2
# 16	1.19	0.60	0.50	62.60			32.20	28.7
# 30	0.60	0.60	0.40	47.50			24.48	21.0
# 50	0.30	0.50	0.30	30.60			15.81	15.4
# 100	0.15	0.40	0.20	16.30			8.47	11.3
# 200	0.08	0.30	0.10	8.60			4.49	8.3
SIEVE	SIEVE	A	B	C	D	E	PERCENT	TARGET
INCH	MM							
3/4	19.05	29.00	20.00	51.00			100.00	100
1/2	12.70	13.46	20.00	51.00			84.46	83.3
3/8	9.65	2.81	19.66	51.00			73.47	73.6
# 4	4.75	0.26	3.70	45.59			49.56	53.5
# 8	2.38	0.17	0.16	37.94			38.28	39.2
# 16	1.19	0.17	0.10	31.93			32.20	28.7
# 30	0.60	0.17	0.08	24.23			24.48	21.0
# 50	0.30	0.15	0.06	15.61			15.81	15.4
# 100	0.15	0.12	0.04	8.31			8.47	11.3
# 200	0.08	0.09	0.02	4.39			4.49	8.3

RL GULF STATES CHERT;
FORDYCE INCORP.

PERCENT BLEND					TOTAL
24	41	35			100

SIEVE	SIEVE	A	B	C	D	E	PERCENT BLEND	TARGET BLEND
INCH	MM	#4	#6	#8-200				
3/4	19.05	100.00	100.00	100.00			100.00	100
1/2	12.70	100.00	100.00	100.00			100.00	83.3
3/8	9.65	87.00	100.00	100.00			96.88	73.6
# 4	4.75	63.20	76.10	100.00			81.37	53.5
# 8	2.38	27.60	8.20	93.00			42.54	39.2
# 16	1.19	18.00	0.30	68.60			28.45	28.7
# 30	0.60	14.20	0.00	52.80			21.89	21.0
# 50	0.30	11.60	0.00	28.10			12.62	15.4
# 100	0.15	7.10	0.00	3.80			3.03	11.3
# 200	0.08	4.60	0.00	0.00			1.10	8.3
SIEVE	SIEVE	A	B	C	D	E	PERCENT	TARGET
INCH	MM							
3/4	19.05	24.00	41.00	35.00			100.00	100
1/2	12.70	24.00	41.00	35.00			100.00	83.3
3/8	9.65	20.88	41.00	35.00			96.88	73.6
# 4	4.75	15.17	31.20	35.00			81.37	53.5
# 8	2.38	6.62	3.36	32.55			42.54	39.2
# 16	1.19	4.32	0.12	24.01			28.45	28.7
# 30	0.60	3.41	0.00	18.48			21.89	21.0
# 50	0.30	2.78	0.00	9.84			12.62	15.4
# 100	0.15	1.70	0.00	1.33			3.03	11.3
# 200	0.08	1.10	0.00	0.00			1.10	8.3

Appendix B

List of Mercury Porosity Data for Aggregates

Units and Terms used in Appendix B

Ds(r)	first derivative of surface area as a function of radius.
Dv(r)	first derivative of volume as a function of radius.
dV/dP	change in volume with pressure
Radius (r)	units of angstroms
Surface Area	units of m^3/g
Volume	units of cm^3/g
Pressure	units of PSIA

Aggregate A

PORE INTRUSION DATA									
PRESSURE	PORE Radius	INTRUSION VOLUME	DELTA Hg VOLUME	% VOLUME	dV/dP	Dv(r)	Ds(r)	CUMULATIVE SURF. AREA	PORE NUM. FRACTION
25	42664.4	0.001	0.0000	6.88	2.29E-04	1.34E-07	6.29E-08	0.000	0.00E+00
64	16665.8	0.0083	0.0073	57.34	7.62E-05	2.79E-07	3.27E-07	0.005	9.67E-04
114	9356.2	0.0104	0.0021	72.02	2.94E-05	3.45E-07	7.25E-07	0.009	1.60E-03
169	6311.3	0.0115	0.0011	79.36	1.59E-05	4.06E-07	1.26E-06	0.011	3.75E-03
244	4371.4	0.0124	0.0009	85.78	9.61E-06	5.17E-07	2.32E-06	0.015	5.37E-03
339	3146.3	0.0130	0.0006	89.91	5.99E-06	6.24E-07	3.90E-06	0.018	7.93E-03
443	2407.7	0.0135	0.0005	93.35	3.07E-06	5.52E-07	4.54E-06	0.022	6.38E-03
555	1921.8	0.0138	0.0003	95.41	1.71E-06	4.83E-07	4.98E-06	0.025	6.14E-03
672	1587.2	0.0140	0.0002	96.79	1.61E-06	6.72E-07	8.40E-06	0.027	8.54E-03
796	1340.0	0.0140	0.0001	97.25	6.62E-07	3.87E-07	5.73E-06	0.028	5.81E-03
919	1160.6	0.0142	0.0001	98.17	5.09E-07	3.98E-07	6.80E-06	0.030	5.97E-03
1046	1019.7	0.0142	0.0001	98.62	1.06E-06	1.08E-06	2.10E-05	0.031	1.62E-02
1174	908.5	0.0143	0.0000	98.85	5.52E-07	7.05E-07	1.54E-05	0.032	1.06E-02
1303	818.6	0.0143	0.0001	99.31	4.73E-07	7.45E-07	1.81E-05	0.033	1.12E-02
1433	744.3	0.0144	0.0000	99.54	0.00E+00	0.00E+00	0.00E+00	0.034	0.00E+00
1563	682.4	0.0144	0.0000	99.77	4.41E-07	1.00E-06	2.93E-05	0.035	1.39E-02
1699	627.8	0.0144	0.0000	99.77	0.00E+00	0.00E+00	0.00E+00	0.035	0.00E+00
1834	581.6	0.0144	0.0000	99.77	4.42E-07	1.38E-06	4.73E-05	0.035	2.24E-02
1973	540.6	0.0144	0.0000	100.00	0.00E+00	0.00E+00	0.00E+00	0.036	0.00E+00
>2136 NO ADDITIONAL INTRUSION									

Aggregate A, Continued

INTERPOLATED INTRUSION DATA							
Mean Pressure	Pore Radius	Percent Volume	Cumul. Volume	Volume in Kg Interval	dv/dP	dv/log r	Cumul. Surf Area
42.7	20000.0 - 30000.0	19.87	0.0074	2.87E-03	1.61E-04	6.52E-04	0.004
71.1	10000.0 - 20000.0	19.84	0.0102	2.86E-03	5.37E-05	6.86E-04	0.008
112.3	9000.0 - 10000.0	1.88	0.0105	2.72E-04	2.29E-05	6.84E-05	0.009
125.5	8000.0 - 9000.0	2.49	0.0108	3.59E-04	2.42E-05	9.14E-05	0.010
142.2	7000.0 - 8000.0	2.49	0.0112	3.60E-04	1.89E-05	9.29E-05	0.011
164.1	6000.0 - 7000.0	2.70	0.0116	3.89E-04	1.53E-05	1.02E-04	0.012
193.9	5000.0 - 6000.0	3.24	0.0121	4.68E-04	1.32E-05	1.25E-04	0.014
237.0	4000.0 - 5000.0	3.27	0.0125	4.72E-04	8.85E-06	1.29E-04	0.016
304.7	3000.0 - 4000.0	3.87	0.0131	5.59E-04	6.29E-06	1.58E-04	0.019
426.6	2000.0 - 3000.0	4.51	0.0137	6.51E-04	3.66E-06	1.92E-04	0.024
711.1	1000.0 - 2000.0	3.64	0.0143	5.26E-04	9.87E-07	1.66E-04	0.032
1122.7	900.0 - 1000.0	0.00	0.0143	0.00E+00	0.00E+00	0.00E+00	0.032
1254.8	800.0 - 900.0	0.46	0.0143	6.62E-05	4.47E-07	2.26E-05	0.033
1422.1	700.0 - 800.0	0.24	0.0144	3.47E-05	1.82E-07	1.21E-05	0.034
1640.9	600.0 - 700.0	0.22	0.0144	3.15E-05	1.24E-07	1.12E-05	0.035
1939.3	500.0 - 600.0	0.23	0.014	3.31E-05	9.31E-08	1.21E-05	0.036

DATA SUMMARY			
PSIA	A	Cumulative cc/g	Surface m ² /g
10666	100.0	0.0144	0.036
1067	1000.0	0.0143	0.032
107	10000.0	0.0102	0.008
Pore volume in pores greater than 30000.0 Angstroms = 0.0045 cc/g			
Pore volume between 500.0 and 30000.0 Angstroms = 0.0100 cc/g			
Pore volume in pores less than 500.0 Angstroms = 0.0000 cc/g			
Total pore volume intruded = 0.0144 cc/g			

Aggregate B

PORE INTRUSION DATA									
PRESSURE	Radius	PORE VOLUME	INTRUSION Hg VOLUME	DELTA % VOLUME	dV/dP	Dv(r)	Ds(r)	CUMULATIVE SURF. AREA	PORE NUM. FRACTION
26	41023.5	0.0015	0.0000	3.27	6.90E-04	4.37E-07	2.13E-07	0.000	0.00E+00
68	15685.5	0.0225	0.0210	48.32	2.49E-04	1.00E-06	1.23E-06	0.016	1.53E-04
114	9356.2	0.0286	0.0061	61.40	9.50E-05	1.12E-06	2.35E-06	0.026	1.37E-04
166	6425.4	0.0321	0.0035	68.88	5.37E-05	1.34E-06	4.09E-06	0.035	2.46E-04
238	4481.6	0.0349	0.0027	74.77	3.14E-05	1.61E-06	7.08E-06	0.046	3.95E-04
327	3261.8	0.0369	0.0021	79.25	2.09E-05	2.03E-06	1.23E-05	0.057	6.22E-04
429	2486.3	0.0386	0.0016	82.71	1.39E-05	2.34E-06	1.86E-05	0.068	7.89E-04
538	1982.5	0.0397	0.0012	85.23	8.48E-06	2.26E-06	2.26E-05	0.079	6.91E-04
650	1640.9	0.0406	0.0008	87.01	8.27E-06	3.22E-06	3.89E-05	0.088	1.08E-03
769	1387.0	0.0414	0.0008	88.69	5.04E-06	2.75E-06	3.93E-05	0.098	1.09E-03
888	1201.1	0.0419	0.0006	89.91	4.37E-06	3.19E-06	5.27E-05	0.107	1.17E-03
1010	1056.1	0.0425	0.0006	91.12	4.13E-06	3.91E-06	7.35E-05	0.117	1.44E-03
1136	938.9	0.0429	0.0004	92.06	2.79E-06	3.34E-06	7.08E-05	0.126	1.33E-03
1263	844.5	0.0433	0.0004	92.90	2.79E-06	4.14E-06	9.75E-05	0.135	1.52E-03
1392	766.2	0.0436	0.0003	93.55	2.68E-06	4.83E-06	1.25E-04	0.142	1.92E-03
1522	700.8	0.0439	0.0003	94.21	1.96E-06	4.22E-06	1.20E-04	0.150	1.81E-03
1652	645.6	0.0442	0.0003	94.86	1.92E-06	4.86E-06	1.50E-04	0.159	1.93E-03
1783	598.2	0.0444	0.0002	95.23	1.35E-06	3.99E-06	1.33E-04	0.165	1.59E-03
1917	556.4	0.0446	0.0002	95.70	1.29E-06	4.42E-06	1.58E-04	0.173	1.89E-03
2081	512.5	0.0448	0.0002	96.17	1.01E-06	4.06E-06	1.58E-04	0.181	1.74E-03
2299	463.9	0.0451	0.0002	96.64	1.29E-06	6.32E-06	2.71E-04	0.190	5.42E-03
2559	416.8	0.0453	0.0003	97.20	6.22E-07	3.78E-06	1.80E-04	0.201	3.24E-03
2838	375.8	0.0454	0.0001	97.48	9.35E-07	6.99E-06	3.70E-04	0.208	5.99E-03
3122	341.6	0.0456	0.0002	97.85	3.11E-07	2.82E-06	1.64E-04	0.218	2.59E-03
3404	313.3	0.0458	0.0002	98.22	6.02E-07	6.48E-06	4.12E-04	0.228	5.56E-03
3691	289.0	0.0460	0.0002	98.60	6.22E-07	7.89E-06	5.44E-04	0.240	6.76E-03
3982	267.9	0.0460	0.0000	98.69	0.00E+00	0.00E+00	0.00E+00	0.243	0.00E+00
4274	249.6	0.0461	0.0001	98.88	2.90E-07	4.94E-06	3.95E-04	0.250	4.24E-03
4564	233.7	0.0462	0.0001	99.07	0.00E+00	0.00E+00	0.00E+00	0.257	0.00E+00
4852	219.8	0.0463	0.0001	99.25	0.00E+00	0.00E+00	0.00E+00	0.264	0.00E+00
5155	206.9	0.0463	0.0000	99.35	2.07E-07	5.14E-06	4.95E-04	0.268	4.56E-03
5583	191.0	0.0464	0.0001	99.53	1.94E-07	5.61E-06	5.85E-04	0.277	7.73E-03
6023	177.1	0.0464	0.0000	99.63	0.00E+00	0.00E+00	0.00E+00	0.282	0.00E+00
6488	164.4	0.0465	0.0000	99.72	1.78E-07	6.97E-06	8.45E-04	0.287	1.00E-02
6959	153.3	0.0465	0.0000	99.81	1.82E-07	8.19E-06	1.06E-03	0.292	1.20E-02
7440	143.4	0.0466	0.0001	100.00	1.82E-07	9.36E-06	1.30E-03	0.304	1.32E-02
>7925 NO ADDITIONAL INTRUSION									

Aggregate B, Continued

INTERPOLATED INTRUSION DATA							
Mean Pressure	Pore Radius	Percent Volume	Cumul. Volume	Volume in Hg Interval	dV/dP	dV/log r	Cumul. Surf Area
42.7	20000.0 - 30000.0	16.70	0.0184	7.79E-03	4.38E-04	1.77E-03	0.011
71.1	10000.0 - 20000.0	20.59	0.0280	9.60E-03	1.80E-04	2.30E-03	0.025
112.3	9000.0 - 10000.0	2.36	0.0291	1.10E-03	9.28E-05	2.76E-04	0.027
125.5	8000.0 - 9000.0	2.43	0.0302	1.14E-03	7.66E-05	2.89E-04	0.030
142.2	7000.0 - 8000.0	2.44	0.0313	1.14E-03	5.96E-05	2.93E-04	0.033
164.1	6000.0 - 7000.0	2.87	0.0327	1.34E-03	5.27E-05	3.51E-04	0.037
193.9	5000.0 - 6000.0	2.91	0.0340	1.36E-03	3.82E-05	3.63E-04	0.042
237.0	4000.0 - 5000.0	3.42	0.0356	1.59E-03	2.99E-05	4.36E-04	0.049
304.7	3000.0 - 4000.0	3.98	0.0375	1.85E-03	2.09E-05	5.23E-04	0.060
426.6	2000.0 - 3000.0	4.79	0.0397	2.23E-03	1.26E-05	6.57E-04	0.078
711.1	1000.0 - 2000.0	6.39	0.0427	2.98E-03	5.59E-06	9.38E-04	0.121
1122.7	900.0 - 1000.0	0.88	0.0431	4.09E-04	3.45E-06	1.37E-04	0.129
1254.8	800.0 - 900.0	0.90	0.0435	4.20E-04	2.83E-06	1.43E-04	0.139
1422.1	700.0 - 800.0	0.90	0.0439	4.21E-04	2.21E-06	1.46E-04	0.151
1640.9	600.0 - 700.0	1.02	0.0444	4.74E-04	1.86E-06	1.68E-04	0.165
1939.3	500.0 - 600.0	1.11	0.0449	5.17E-04	1.46E-06	1.89E-04	0.184

INTRUSION DATA			
PSIA	Å	Cumulative cc/g	Surface m ² /g
10666	100.0	0.0466	0.304
1067	1000.0	0.0427	0.121
107	10000.0	0.0280	0.025
Pore volume in pores greater than 30000.0 Angstroms = 0.0106 cc/g			
Pore volume between 500.0 and 30000.0 Angstroms = 0.0344 cc/g			
Pore volume in pores less than 500.0 Angstroms = 0.0017 cc/g			
Total pore volume intruded = 0.0466 cc/g			

Aggregate C

PORE INTRUSION DATA									
PRESSURE	PORE Radius	INTRUSION VOLUME	DELTA Hg VOLUME	% VOLUME	dV/dP	Dv(r)	Ds(r)	CUMULATIVE SURF. AREA	PORE NUM. FRACTION
26	41023.5	0.0014	0.0000	1.12	5.32E-04	3.37E-07	1.64E-07	0.000	0.00E+00
66	16160.8	0.0388	0.0374	31.57	7.92E-04	2.99E-06	3.56E-06	0.032	1.81E-04
110	9696.5	0.0631	0.0243	51.37	4.64E-04	5.03E-06	1.01E-05	0.071	3.05E-04
161	6624.9	0.0781	0.0149	63.53	2.04E-04	4.75E-06	1.40E-05	0.108	4.03E-04
208	5127.9	0.0855	0.0075	69.59	1.26E-04	4.99E-06	1.92E-05	0.134	3.03E-04
270	3950.4	0.0917	0.0062	74.60	8.16E-05	5.45E-06	2.73E-05	0.161	3.97E-04
350	3047.5	0.0967	0.0050	78.64	5.57E-05	6.21E-06	4.02E-05	0.190	7.54E-04
436	2446.4	0.1005	0.0038	81.75	3.77E-05	6.60E-06	5.35E-05	0.218	6.41E-04
533	2001.1	0.1036	0.0031	84.27	2.69E-05	7.04E-06	6.97E-05	0.246	8.54E-04
637	1674.4	0.1060	0.0024	86.26	2.36E-05	8.79E-06	1.04E-04	0.272	1.28E-03
744	1433.6	0.1081	0.0020	87.91	1.75E-05	8.93E-06	1.24E-04	0.299	1.19E-03
855	1247.5	0.1098	0.0017	89.32	1.48E-05	1.00E-05	1.59E-04	0.325	1.33E-03
972	1097.3	0.1113	0.0015	90.51	1.20E-05	1.05E-05	1.91E-04	0.350	1.53E-03
1093	975.9	0.1126	0.0013	91.59	9.76E-06	1.08E-05	2.20E-04	0.375	1.57E-03
1212	880.0	0.1136	0.0010	92.42	7.35E-06	1.00E-05	2.27E-04	0.397	1.46E-03
1335	799.0	0.1145	0.0009	93.18	5.88E-06	9.72E-06	2.42E-04	0.420	1.53E-03
1460	730.6	0.1154	0.0008	93.87	6.42E-06	1.27E-05	3.47E-04	0.442	2.01E-03
1586	672.5	0.1161	0.0007	94.44	5.63E-06	1.32E-05	3.90E-04	0.462	2.08E-03
1714	622.3	0.1168	0.0007	94.99	5.57E-06	1.52E-05	4.88E-04	0.483	2.40E-03
1845	578.1	0.1173	0.0006	95.45	4.75E-06	1.50E-05	5.19E-04	0.502	2.56E-03
1977	539.5	0.1179	0.0006	95.92	3.59E-06	1.31E-05	4.83E-04	0.522	2.22E-03
2177	489.9	0.1186	0.0007	96.46	3.30E-06	1.45E-05	5.87E-04	0.548	4.74E-03
2445	436.2	0.1193	0.0008	97.08	2.64E-06	1.46E-05	6.68E-04	0.581	4.62E-03
2722	391.8	0.1200	0.0006	97.58	1.60E-06	1.10E-05	5.57E-04	0.611	4.00E-03
3000	355.5	0.1204	0.0005	97.98	1.58E-06	1.33E-05	7.42E-04	0.637	4.34E-03
3283	324.9	0.1208	0.0004	98.30	1.57E-06	1.58E-05	9.66E-04	0.661	5.35E-03
3568	298.9	0.1212	0.0004	98.59	1.23E-06	1.46E-05	9.74E-04	0.684	4.97E-03
3858	276.5	0.1215	0.0003	98.85	1.22E-06	1.70E-05	1.22E-03	0.705	5.97E-03
4147	257.2	0.1218	0.0003	99.06	6.01E-07	9.63E-06	7.46E-04	0.725	3.39E-03
4437	240.4	0.1219	0.0001	99.17	6.12E-07	1.12E-05	9.30E-04	0.735	3.95E-03
4731	225.5	0.1222	0.0003	99.39	9.08E-07	1.89E-05	1.68E-03	0.758	6.44E-03
5028	212.1	0.1223	0.0001	99.49	6.01E-07	1.42E-05	1.33E-03	0.770	5.16E-03
5336	199.9	0.1224	0.0001	99.60	3.06E-07	8.10E-06	8.07E-04	0.783	4.42E-03
5762	185.1	0.1226	0.0001	99.71	1.97E-07	6.09E-06	6.55E-04	0.797	3.32E-03
6222	171.4	0.1227	0.0001	99.78	1.93E-07	6.95E-06	8.07E-04	0.807	3.88E-03
6691	159.4	0.1227	0.0001	99.86	0.00E+00	0.00E+00	0.00E+00	0.818	0.00E+00
7169	148.8	0.1228	0.0001	99.93	1.89E-07	9.03E-06	1.21E-03	0.829	5.15E-03
7651	139.4	0.1229	0.0000	99.96	1.81E-07	9.87E-06	1.41E-03	0.836	5.87E-03
8148	130.9	0.1229	0.0000	99.96	0.00E+00	0.00E+00	0.00E+00	0.836	0.00E+00
8646	123.4	0.1229	0.0000	100.00	0.00E+00	0.00E+00	0.00E+00	0.843	0.00E+00
>9158 NO ADDITIONAL INTRUSION									

Aggregate C, Continued

INTERPOLATED INTRUSION DATA							
Mean Pressure	Pore Radius	Percent Volume	Cumul. Volume	Volume in Hg Interval	dV/dP	dV/log r	Cumul. Surf Area
42.7	20000.0 - 30000.0	14.99	0.0283	1.84E-02	1.04E-03	4.19E-03	0.020
71.1	10000.0 - 20000.0	27.37	0.0619	3.36E-02	6.31E-04	8.06E-03	0.069
112.3	9000.0 - 10000.0	3.80	0.0666	4.67E-03	3.94E-04	1.17E-03	0.079
125.5	8000.0 - 9000.0	3.72	0.0712	4.57E-03	3.09E-04	1.16E-03	0.089
142.2	7000.0 - 8000.0	4.04	0.0761	4.97E-03	2.61E-04	1.28E-03	0.103
164.1	6000.0 - 7000.0	4.11	0.0812	5.05E-03	1.99E-04	1.32E-03	0.118
193.9	5000.0 - 6000.0	4.10	0.0862	5.04E-03	1.42E-04	1.35E-03	0.137
237.0	4000.0 - 5000.0	4.19	0.0914	5.15E-03	9.65E-05	1.41E-03	0.160
304.7	3000.0 - 4000.0	4.59	0.0970	5.64E-03	6.34E-05	1.59E-03	0.192
426.6	2000.0 - 3000.0	5.35	0.1036	6.58E-03	3.70E-05	1.94E-03	0.246
711.1	1000.0 - 2000.0	7.12	0.1124	8.75E-03	1.64E-05	2.75E-03	0.370
1122.7	900.0 - 1000.0	0.89	0.1134	1.09E-03	9.18E-06	3.65E-04	0.393
1254.8	800.0 - 900.0	0.89	0.1145	1.10E-03	7.39E-06	3.74E-04	0.419
1422.1	700.0 - 800.0	0.99	0.1158	1.22E-03	6.41E-06	4.25E-04	0.452
1640.9	600.0 - 700.0	1.04	0.1170	1.27E-03	5.01E-06	4.53E-04	0.491
1939.3	500.0 - 600.0	1.11	0.1184	1.36E-03	3.83E-06	4.97E-04	0.541

DATA SUMMARY			
PSIA	A	Cumulative cc/g	Surface m ² /g
10666	100.0	0.1229	0.843
1067	1000.0	0.1124	0.370
107	10000.0	0.0619	0.069
Pore volume in pores greater than 30000.0 Angstroms =		0.0099 cc/g	
Pore volume between 500.0 and 30000.0 Angstroms =		0.1085 cc/g	
Pore volume in pores less than 500.0 Angstroms =		0.0045 cc/g	
Total pore volume intruded =		0.1229 cc/g	

Aggregate D

PORE INTRUSION DATA									
PORE PRESSURE	INTRUSION Radius	DELTA VOLUME Hg	DELTA VOLUME	% VOLUME	dV/dP	Dv(r)	Ds(r)	CUMULATIVE SURF. AREA	PORE NUM. FRACTION
26	41023.5	0.0000	0.0000	0.12	8.21E-05	5.20E-08	2.54E-08	0.000	0.00E+00
68	15685.5	0.0080	0.0079	25.22	2.16E-04	8.71E-07	1.07E-06	0.007	7.67E-04
117	9116.3	0.0153	0.0073	48.45	1.16E-04	1.44E-06	3.10E-06	0.020	1.01E-03
164	6503.7	0.0195	0.0042	61.68	7.56E-05	1.84E-06	5.54E-06	0.031	1.94E-03
228	4678.1	0.0231	0.0036	73.05	4.21E-05	1.99E-06	8.37E-06	0.044	2.45E-03
311	3429.6	0.0257	0.0026	81.33	2.40E-05	2.12E-06	1.22E-05	0.057	2.99E-03
410	2601.5	0.0275	0.0018	86.90	1.34E-05	2.06E-06	1.56E-05	0.068	3.99E-03
522	2043.3	0.0286	0.0011	90.36	9.54E-06	2.38E-06	2.30E-05	0.078	5.04E-03
636	1677.1	0.0293	0.0007	92.58	4.58E-06	1.71E-06	2.02E-05	0.086	3.31E-03
755	1412.7	0.0297	0.0004	93.94	3.88E-06	2.04E-06	2.86E-05	0.091	4.67E-03
877	1216.2	0.0301	0.0004	95.18	3.26E-06	2.31E-06	3.78E-05	0.097	5.30E-03
1000	1066.6	0.0304	0.0003	96.17	3.16E-06	2.92E-06	5.44E-05	0.103	6.70E-03
1127	946.4	0.0306	0.0002	96.91	1.92E-06	2.26E-06	4.74E-05	0.107	5.57E-03
1256	849.2	0.0308	0.0001	97.28	1.25E-06	1.83E-06	4.30E-05	0.110	4.20E-03
1387	769.0	0.0309	0.0002	97.78	5.58E-07	9.97E-07	2.58E-05	0.114	2.29E-03
1518	702.6	0.0310	0.0001	98.02	6.01E-07	1.29E-06	3.65E-05	0.116	2.95E-03
1650	646.4	0.0311	0.0001	98.39	6.01E-07	1.52E-06	4.69E-05	0.119	3.49E-03
1785	597.5	0.0312	0.0001	98.64	6.01E-07	1.78E-06	5.94E-05	0.122	4.40E-03
1920	555.5	0.0313	0.0001	98.89	5.58E-07	1.92E-06	6.87E-05	0.125	4.73E-03
2083	512.1	0.0313	0.0000	99.01	5.58E-07	2.26E-06	8.78E-05	0.126	5.57E-03
2264	471.1	0.0314	0.0001	99.26	2.70E-07	1.28E-06	5.39E-05	0.129	6.54E-03
2527	422.1	0.0314	0.0000	99.38	0.00E+00	0.00E+00	0.00E+00	0.131	0.00E+00
2808	379.8	0.0315	0.0001	99.75	2.70E-07	1.97E-06	1.03E-04	0.137	1.01E-02
3094	344.7	0.0315	0.0000	99.75	2.61E-07	2.32E-06	1.34E-04	0.137	1.18E-02
3384	315.2	0.0316	0.0000	99.88	2.79E-07	2.97E-06	1.88E-04	0.139	1.57E-02
3675	290.2	0.0316	0.0000	100.00	0.00E+00	0.00E+00	0.00E+00	0.142	0.00E+00
>3967	NO ADDITIONAL INTRUSION								

Aggregate D, Continued

INTERPOLATED INTRUSION DATA							
Mean Pressure	Pore Radius	Percent Volume	Cumul. Volume	Volume in Hg Interval	dV/dP	dV/log r	Cumul. Surf Area
42.7	20000.0 - 30000.0	10.7	0.0047	3.41E-03	1.92E-04	7.75E-04	0.004
71.1	10000.0 - 20000.0	29.81	0.0141	9.42E-03	1.77E-04	2.26E-03	0.017
112.3	9000.0 - 10000.0	4.34	0.0155	1.37E-03	1.16E-04	3.45E-04	0.020
125.5	8000.0 - 9000.0	4.62	0.0169	1.46E-03	9.85E-05	3.72E-04	0.023
142.2	7000.0 - 8000.0	5.33	0.0186	1.68E-03	8.84E-05	4.35E-04	0.028
164.1	6000.0 - 7000.0	5.73	0.0204	1.81E-03	7.13E-05	4.75E-04	0.034
193.9	5000.0 - 6000.0	6.33	0.0224	2.00E-03	5.62E-05	5.35E-04	0.041
237.0	4000.0 - 5000.0	6.31	0.0244	1.99E-03	3.74E-05	5.46E-04	0.050
304.7	3000.0 - 4000.0	6.83	0.0266	2.16E-03	2.43E-05	6.10E-04	0.062
426.6	2000.0 - 3000.0	6.66	0.0287	2.10E-03	1.18E-05	6.19E-04	0.079
711.1	1000.0 - 2000.0	5.77	0.0305	1.82E-03	3.42E-06	5.75E-04	0.105
1122.7	900.0 - 1000.0	0.49	0.0307	1.56E-04	1.32E-06	5.25E-05	0.108
1254.8	800.0 - 900.0	0.61	0.0309	1.93E-04	1.30E-06	6.59E-05	0.113
1422.1	700.0 - 800.0	0.38	0.0310	1.19E-04	6.27E-07	4.15E-05	0.116
1640.9	600.0 - 700.0	0.62	0.0312	1.95E-04	7.69E-07	6.95E-05	0.122
1939.3	500.0 - 600.0	0.45	0.0313	1.41E-04	3.97E-07	5.15E-05	0.127

DATA SUMMARY			
PSIA	Å	Cumulative cc/g	Surface m ² /g
10666	100.0	0.0316	0.142
1067	1000.0	0.0305	0.105
107	10000.0	0.0141	0.017
Pore volume in pores greater than 30000.0 Angstroms = 0.0013 cc/g			
Pore volume between 500.0 and 30000.0 Angstroms = 0.0301 cc/g			
Pore volume in pores less than 500.0 Angstroms = 0.0003 cc/g			
Total pore volume intruded = 0.0316 cc/g			

Aggregate E

PORE INTRUSION DATA									
PRESSURE	PORE Radius	INTRUSION VOLUME	DELTA Hg VOLUME	% VOLUME	dV/dP	Dv(r)	Ds(r)	CUMULATIVE SURF AREA	PORE NUM. FRACTION
26	41023.5	0.0005	0.0000	3.94	1.84E-04	1.17E-07	5.70E-08	0.000	0.00E+00
67	15919.6	0.0068	0.0063	51.18	6.75E-05	2.63E-07	3.19E-07	0.005	2.15E-04
114	9356.2	0.0084	0.0015	62.73	2.18E-05	2.56E-07	5.38E-07	0.007	1.67E-04
167	6386.9	0.0092	0.0008	68.77	1.22E-05	3.05E-07	9.35E-07	0.009	3.49E-04
239	4462.8	0.0099	0.0007	74.02	8.80E-06	4.58E-07	2.02E-06	0.012	5.24E-04
327	3261.8	0.0105	0.0006	78.22	5.82E-06	5.68E-07	3.43E-06	0.015	8.36E-04
428	2492.1	0.0109	0.0005	81.63	4.04E-06	6.75E-07	5.35E-06	0.018	1.22E-03
535	1993.7	0.0113	0.0004	84.51	2.96E-06	7.80E-07	7.75E-06	0.022	1.28E-03
648	1646.0	0.0116	0.0002	86.35	5.85E-07	2.27E-07	2.73E-06	0.024	3.71E-04
768	1388.8	0.0117	0.0002	87.66	1.22E-06	6.66E-07	9.52E-06	0.027	1.31E-03
887	1202.5	0.0120	0.0002	89.50	1.83E-06	1.33E-06	2.20E-05	0.031	2.61E-03
1010	1056.1	0.0122	0.0002	91.08	1.67E-06	1.57E-06	2.96E-05	0.034	3.34E-03
1135	939.7	0.0123	0.0001	91.86	6.38E-07	7.62E-07	1.61E-05	0.036	1.74E-03
1261	845.8	0.0125	0.0002	93.18	1.08E-06	1.59E-06	3.75E-05	0.040	3.39E-03
1391	766.8	0.0126	0.0001	93.96	5.40E-07	9.70E-07	2.52E-05	0.043	2.22E-03
1522	700.8	0.0126	0.0001	94.49	0.00E+00	0.00E+00	0.00E+00	0.045	0.00E+00
1653	645.3	0.0127	0.0001	95.01	5.40E-07	1.37E-06	4.24E-05	0.047	2.70E-03
1786	597.2	0.0128	0.0001	95.54	5.02E-07	1.49E-06	4.97E-05	0.049	3.17E-03
1921	555.2	0.0129	0.0001	96.59	5.02E-07	1.72E-06	6.18E-05	0.054	3.95E-03
2058	518.3	0.0130	0.0000	96.85	0.00E+00	0.00E+00	0.00E+00	0.055	0.00E+00
2235	477.2	0.0130	0.0001	97.38	2.60E-07	1.20E-06	5.01E-05	0.058	5.32E-03
2499	426.8	0.0131	0.0001	97.90	2.51E-07	1.45E-06	6.77E-05	0.061	6.65E-03
2779	383.8	0.0131	0.0000	98.16	2.51E-07	1.80E-06	9.32E-05	0.063	8.23E-03
3062	348.3	0.0132	0.0001	98.69	0.00E+00	0.00E+00	0.00E+00	0.067	0.00E+00
3350	318.4	0.0133	0.0001	99.21	2.42E-07	2.53E-06	1.58E-04	0.071	1.20E-02
3640	293.0	0.0133	0.0000	99.48	2.51E-07	3.09E-06	2.10E-04	0.073	1.47E-02
3933	271.2	0.0133	0.0000	99.48	2.51E-07	3.61E-06	2.65E-04	0.073	1.83E-02
4227	252.3	0.0134	0.0001	100.00	2.34E-07	3.89E-06	3.08E-04	0.079	1.91E-02
>4522 NO ADDITIONAL INTRUSION									

Aggregate E, Continued

INTERPOLATED INTRUSION DATA							
Mean Pressure	Pore Radius	Percent Volume	Cumul. Volume	Volume in Hg Interval	dV/dP	dV/log r	Cumul. Surf Area
42.7	20000.0 - 30000.0	19.69	0.0058	2.63E-03	1.48E-04	5.99E-04	0.004
71.1	10000.0 - 20000.0	18.29	0.0082	2.45E-03	4.59E-05	5.86E-04	0.007
112.3	9000.0 - 10000.0	1.83	0.0085	2.45E-04	2.07E-05	6.16E-05	0.008
125.5	8000.0 - 9000.0	2.04	0.0087	2.72E-04	1.84E-05	6.93E-05	0.008
142.2	7000.0 - 8000.0	2.02	0.0090	2.70E-04	1.42E-05	6.96E-05	0.009
164.1	6000.0 - 7000.0	2.23	0.0093	2.99E-04	1.18E-05	7.83E-05	0.010
193.9	5000.0 - 6000.0	2.64	0.0097	3.54E-04	9.95E-06	9.46E-05	0.011
237.0	4000.0 - 5000.0	3.38	0.0101	4.52E-04	8.48E-06	1.24E-04	0.013
304.7	3000.0 - 4000.0	3.85	0.0106	5.15E-04	5.80E-06	1.45E-04	0.016
426.6	2000.0 - 3000.0	4.97	0.0113	6.65E-04	3.74E-06	1.96E-04	0.022
711.1	1000.0 - 2000.0	7.13	0.0123	9.54E-04	1.79E-06	3.00E-04	0.036
1122.7	900.0 - 1000.0	0.77	0.0124	1.03E-04	8.69E-07	3.46E-05	0.038
1254.8	800.0 - 900.0	1.07	0.0125	1.43E-04	9.64E-07	4.88E-05	0.041
1422.1	700.0 - 800.0	1.05	0.0126	1.40E-04	7.37E-07	4.89E-05	0.045
1640.9	600.0 - 700.0	1.05	0.0128	1.40E-04	5.53E-07	4.99E-05	0.049
1939.3	500.0 - 600.0	1.57	0.0130	2.11E-04	5.93E-07	7.69E-05	0.057

DATA SUMMARY			
PSIA	A	Cumulative cc/g	Surface m ² /g
10666	100.0	0.0134	0.079
1067	1000.0	0.0123	0.036
107	10000.0	0.0082	0.007
Pore volume in pores greater than 30000.0 Angstroms = 0.0031 cc/g			
Pore volume between 500.0 and 30000.0 Angstroms = 0.0098 cc/g			
Pore volume in pores less than 500.0 Angstroms = 0.0004 cc/g			
Total pore volume intruded = 0.0134 cc/g			

Aggregate F

PORE INTRUSION DATA									
PRESSURE	PORE Radius	INTRUSION VOLUME	DELTA Hg VOLUME	% VOLUME	dV/dP	Dv(r)	Ds(r)	CUMULATIVE SURF. AREA	PORE NUM. FRACTION
25	42664.4	0.0001	0.0000	0.57	1.05E-04	6.15E-08	2.88E-08	0.000	0.00E+00
70	15237.3	0.0059	0.0058	28.54	7.60E-05	3.25E-07	4.11E-07	0.005	4.30E-05
120	8888.4	0.0086	0.0027	41.38	4.19E-05	5.42E-07	1.20E-06	0.010	7.19E-05
187	5703.8	0.0109	0.0023	52.30	2.89E-05	9.16E-07	3.16E-06	0.016	1.46E-04
272	3921.4	0.0126	0.0017	60.54	1.84E-05	1.24E-06	6.23E-06	0.023	2.63E-04
369	2890.5	0.0139	0.0014	67.05	1.20E-05	1.49E-06	1.02E-05	0.031	3.95E-04
478	2231.4	0.0149	0.0010	71.84	7.21E-06	1.51E-06	1.33E-05	0.039	4.79E-04
591	1804.8	0.0157	0.0008	75.48	5.82E-06	1.87E-06	2.05E-05	0.047	5.46E-04
707	1508.6	0.0163	0.0006	78.35	4.11E-06	1.89E-06	2.49E-05	0.054	6.02E-04
827	1289.7	0.0167	0.0004	80.27	3.24E-06	2.04E-06	3.14E-05	0.060	7.57E-04
949	1123.9	0.0171	0.0004	82.18	3.23E-06	2.69E-06	4.75E-05	0.066	9.27E-04
1071	995.9	0.0175	0.0004	83.91	1.95E-06	2.08E-06	4.15E-05	0.073	6.06E-04
1196	891.8	0.0178	0.0003	85.44	1.89E-06	2.51E-06	5.60E-05	0.080	7.99E-04
1325	805.0	0.0181	0.0003	86.78	1.23E-06	2.00E-06	4.94E-05	0.087	6.89E-04
1452	734.6	0.0183	0.0002	87.74	1.23E-06	2.40E-06	6.51E-05	0.092	8.28E-04
1582	674.2	0.0184	0.0002	88.51	1.23E-06	2.85E-06	8.43E-05	0.096	9.84E-04
1711	623.4	0.0186	0.0002	89.46	1.23E-06	3.34E-06	1.07E-04	0.102	1.15E-03
1843	578.7	0.0187	0.0001	90.04	1.18E-06	3.74E-06	1.29E-04	0.106	1.29E-03
1976	539.8	0.0189	0.0002	90.80	9.60E-07	3.49E-06	1.29E-04	0.112	1.20E-03
2150	496.1	0.0191	0.0002	91.57	5.90E-07	2.54E-06	1.02E-04	0.118	9.44E-04
2407	443.1	0.0193	0.0002	92.72	8.87E-07	4.76E-06	2.14E-04	0.129	3.28E-03
2684	397.4	0.0195	0.0002	93.68	8.77E-07	5.86E-06	2.93E-04	0.138	4.50E-03
2960	360.3	0.0196	0.0002	94.44	2.85E-07	2.32E-06	1.28E-04	0.147	1.72E-03
3241	329.1	0.0198	0.0002	95.21	5.60E-07	5.46E-06	3.31E-04	0.156	4.06E-03
3524	302.7	0.0199	0.0001	95.59	2.66E-07	3.07E-06	2.02E-04	0.161	2.28E-03
3811	279.9	0.0200	0.0001	96.17	2.85E-07	3.85E-06	2.74E-04	0.169	2.96E-03
4098	260.3	0.0201	0.0001	96.74	2.75E-07	4.30E-06	3.29E-04	0.178	3.30E-03
4387	243.1	0.0202	0.0000	96.93	2.75E-07	4.92E-06	4.04E-04	0.181	4.05E-03
4675	228.2	0.0203	0.0001	97.51	2.75E-07	5.60E-06	4.89E-04	0.191	4.30E-03
4960	215.0	0.0204	0.0001	97.89	2.75E-07	6.30E-06	5.85E-04	0.199	4.68E-03
5352	199.3	0.0204	0.0001	98.28	3.80E-07	1.01E-05	1.01E-03	0.206	1.10E-02
5790	184.2	0.0205	0.0001	98.66	0.00E+00	0.00E+00	0.00E+00	0.215	0.00E+00
6246	170.8	0.0206	0.0000	98.85	1.66E-07	6.03E-06	7.04E-04	0.219	7.35E-03
6709	159.0	0.0206	0.0001	99.23	0.00E+00	0.00E+00	0.00E+00	0.229	0.00E+00
7177	148.6	0.0207	0.0000	99.43	0.00E+00	0.00E+00	0.00E+00	0.234	0.00E+00
7656	139.3	0.0207	0.0000	99.62	1.66E-07	9.07E-06	1.30E-03	0.240	1.15E-02
8140	131.0	0.0208	0.0000	99.81	0.00E+00	0.00E+00	0.00E+00	0.245	0.00E+00
8637	123.5	0.0208	0.0000	99.81	0.00E+00	0.00E+00	0.00E+00	0.245	0.00E+00
9137	116.7	0.0208	0.0000	99.81	0.00E+00	0.00E+00	0.00E+00	0.245	0.00E+00
9665	110.4	0.0208	0.0000	99.81	0.00E+00	0.00E+00	0.00E+00	0.245	0.00E+00
10339	103.2	0.0208	0.0000	100.00	1.17E-07	1.17E-05	2.25E-03	0.253	2.17E-02
>11047 NO ADDITIONAL INTRUSION									

Aggregate F, Continued

INTERPOLATED INTRUSION DATA							
Mean Pressure	Pore Radius	Percent Volume	Cumul. Volume	Volume in Hg Interval	dV/dP	dV/log r	Cumul. Surf Area
42.7	20000.0 - 30000.0	12.11	0.0044	2.52E-03	1.42E-04	5.73E-04	0.003
71.1	10000.0 - 20000.0	17.33	0.0080	3.61E-03	6.76E-05	8.63E-04	0.008
112.3	9000.0 - 10000.0	2.53	0.0085	5.27E-04	4.45E-05	1.32E-04	0.009
125.5	8000.0 - 9000.0	2.72	0.0091	5.65E-04	3.81E-05	1.44E-04	0.011
142.2	7000.0 - 8000.0	3.52	0.0098	7.33E-04	3.85E-05	1.89E-04	0.013
164.1	6000.0 - 7000.0	3.60	0.0106	7.49E-04	2.95E-05	1.96E-04	0.015
193.9	5000.0 - 6000.0	4.39	0.0115	9.13E-04	2.57E-05	2.44E-04	0.018
237.0	4000.0 - 5000.0	4.76	0.0125	9.90E-04	1.86E-05	2.71E-04	0.023
304.7	3000.0 - 4000.0	6.23	0.0138	1.30E-03	1.46E-05	3.66E-04	0.030
426.6	2000.0 - 3000.0	7.51	0.0153	1.56E-03	8.79E-06	4.60E-04	0.043
711.1	1000.0 - 2000.0	10.07	0.0174	2.09E-03	3.93E-06	6.59E-04	0.073
1122.7	900.0 - 1000.0	1.44	0.0177	2.99E-04	2.52E-06	1.00E-04	0.079
1254.8	800.0 - 900.0	1.51	0.0181	3.15E-04	2.13E-06	1.08E-04	0.087
1422.1	700.0 - 800.0	1.43	0.0184	2.98E-04	1.56E-06	1.04E-04	0.095
1640.9	600.0 - 700.0	1.45	0.0187	3.02E-04	1.19E-06	1.07E-04	0.104
1939.3	500.0 - 600.0	1.89	0.0190	3.92E-04	1.10E-06	1.43E-04	0.118

DATA SUMMARY			
PSIA	Å	Cumulative cc/g	Surface m ² /g
10666	100.0	0.0208	0.253
1067	1000.0	0.0174	0.073
107	10000.0	0.0080	0.008
Pore volume in pores greater than 30000.0 Angstroms = 0.0019 cc/g			
Pore volume between 500.0 and 30000.0 Angstroms = 0.0172 cc/g			
Pore volume in pores less than 500.0 Angstroms = 0.0018 cc/g			
Total pore volume intruded = 0.0208 cc/g			

PORE INTRUSION DATA									
PRESSURE	PORE Radius	INTRUSION VOLUME	DELTA Hg VOLUME	% VOLUME	dV/dP	Dv(r)	Ds(r)	CUMULATIVE PORE NUM. SURF. AREA	PORE NUM. FRACTION
26	41023.5	0.0047	0.0000	6.94	8.88E-04	5.63E-07	2.75E-07	0.000	0.00E+00
66	16160.8	0.0347	0.0301	51.82	3.90E-04	1.47E-06	1.75E-06	0.023	2.63E-04
111	9609.1	0.0449	0.0102	67.03	1.51E-04	1.66E-06	3.38E-06	0.040	2.97E-04
163	6543.6	0.0504	0.0055	75.30	7.62E-05	1.85E-06	5.59E-06	0.054	2.65E-04
218	4892.7	0.0536	0.0032	80.07	4.59E-05	1.98E-06	7.97E-06	0.065	4.95E-04
288	3703.5	0.0561	0.0025	83.75	2.90E-05	2.20E-06	1.17E-05	0.076	5.50E-04
373	2859.5	0.0579	0.0018	86.40	1.71E-05	2.19E-06	1.51E-05	0.087	6.24E-04
470	2269.4	0.0592	0.0013	88.33	1.06E-05	2.14E-06	1.86E-05	0.097	8.41E-04
576	1851.8	0.0601	0.0009	89.75	8.23E-06	2.51E-06	2.68E-05	0.107	9.86E-04
687	1552.6	0.0608	0.0007	90.74	5.10E-06	2.22E-06	2.84E-05	0.115	7.94E-04
803	1328.3	0.0614	0.0007	91.73	4.94E-06	2.94E-06	4.39E-05	0.124	1.26E-03
922	1156.8	0.0620	0.0005	92.54	4.76E-06	3.74E-06	6.43E-05	0.132	1.60E-03
1042	1023.6	0.0625	0.0005	93.34	4.23E-06	4.26E-06	8.27E-05	0.142	1.83E-03
1163	917.1	0.0629	0.0004	93.95	3.62E-06	4.54E-06	9.86E-05	0.151	2.11E-03
1287	828.8	0.0633	0.0004	94.52	2.56E-06	3.93E-06	9.44E-05	0.160	1.68E-03
1412	755.4	0.0637	0.0003	95.04	2.47E-06	4.58E-06	1.21E-04	0.168	2.13E-03
1541	692.2	0.0640	0.0003	95.56	2.56E-06	5.64E-06	1.62E-04	0.178	2.82E-03
1671	638.3	0.0643	0.0003	96.03	2.44E-06	6.33E-06	1.98E-04	0.187	3.17E-03
1802	591.9	0.0646	0.0003	96.41	1.95E-06	5.88E-06	1.98E-04	0.196	2.73E-03
1933	551.8	0.0648	0.0003	96.79	1.89E-06	6.59E-06	2.38E-04	0.204	3.29E-03
2133	500.1	0.0652	0.0003	97.31	9.74E-07	4.10E-06	1.63E-04	0.218	3.96E-03
2389	446.5	0.0655	0.0004	97.87	1.17E-06	6.20E-06	2.76E-04	0.234	6.20E-03
2666	400.1	0.0659	0.0003	98.35	9.04E-07	5.96E-06	2.97E-04	0.249	5.96E-03
2943	362.4	0.0661	0.0002	98.68	6.78E-07	5.45E-06	2.99E-04	0.261	5.45E-03
3224	330.8	0.0662	0.0002	98.91	9.13E-07	8.82E-06	5.31E-04	0.270	9.13E-03
3511	303.8	0.0664	0.0002	99.20	6.78E-07	7.77E-06	5.09E-04	0.282	8.05E-03
3802	280.5	0.0665	0.0001	99.34	4.44E-07	5.97E-06	4.24E-04	0.288	6.40E-03
4093	260.6	0.0667	0.0001	99.53	2.11E-07	3.29E-06	2.51E-04	0.297	3.52E-03
4388	243.1	0.0667	0.0001	99.62	2.11E-07	3.78E-06	3.10E-04	0.303	4.32E-03
4686	227.6	0.0668	0.0001	99.76	2.18E-07	4.46E-06	3.91E-04	0.311	4.78E-03
4983	214.0	0.0668	0.0000	99.81	2.11E-07	4.88E-06	4.55E-04	0.314	5.23E-03
5281	202.0	0.0669	0.0000	99.86	0.00E+00	0.00E+00	0.00E+00	0.317	0.00E+00
5646	188.9	0.0669	0.0000	99.91	0.00E+00	0.00E+00	0.00E+00	0.320	0.00E+00
6097	174.9	0.0669	0.0000	99.95	0.00E+00	0.00E+00	0.00E+00	0.323	0.00E+00
6545	163.0	0.0670	0.0000	100.00	1.41E-07	5.61E-06	6.86E-04	0.327	9.01E-03
>7012 NO ADDITIONAL INTRUSION									

Aggregate G, Continued

INTERPOLATED INTRUSION DATA							
Mean Pressure	Pore Radius	Percent Volume	Cumul. Volume	Volume in Hg Interval	dV/dP	dV/log r	Cumul. Surf Area
42.7	20000.0 - 30000.0	17.84	0.0289	1.20E-02	6.72E-04	2.72E-03	0.017
71.1	10000.0 - 20000.0	22.87	0.0443	1.53E-02	2.87E-04	3.67E-03	0.038
112.3	9000.0 - 10000.0	2.41	0.0459	1.61E-03	1.36E-04	4.06E-04	0.042
125.5	8000.0 - 9000.0	2.64	0.0476	1.77E-03	1.20E-04	4.51E-04	0.046
142.2	7000.0 - 8000.0	2.87	0.0496	1.92E-03	1.01E-04	4.95E-04	0.051
164.1	6000.0 - 7000.0	2.87	0.0515	1.92E-03	7.56E-05	5.04E-04	0.057
193.9	5000.0 - 6000.0	2.91	0.0534	1.95E-03	5.48E-05	5.21E-04	0.064
237.0	4000.0 - 5000.0	2.96	0.0554	1.98E-03	3.72E-05	5.43E-04	0.073
304.7	3000.0 - 4000.0	3.24	0.0576	2.17E-03	2.44E-05	6.12E-04	0.085
426.6	2000.0 - 3000.0	3.24	0.0598	2.17E-03	1.22E-05	6.38E-04	0.103
711.1	1000.0 - 2000.0	4.26	0.0626	2.86E-03	5.36E-06	8.99E-04	0.144
1122.7	900.0 - 1000.0	0.60	0.0630	4.04E-04	3.41E-06	1.36E-04	0.153
1254.8	800.0 - 900.0	0.64	0.0634	4.30E-04	2.90E-06	1.47E-04	0.163
1422.1	700.0 - 800.0	0.80	0.0640	5.39E-04	2.83E-06	1.87E-04	0.177
1640.9	600.0 - 700.0	0.83	0.0645	5.59E-04	2.20E-06	1.99E-04	0.195
1939.3	500.0 - 600.0	0.94	0.0652	6.29E-04	1.77E-06	2.29E-04	0.218

DATA SUMMARY			
PSIA	Å	Cumulative cc/g	Surface m ² /g
10666	100.0	0.0670	0.327
1067	1000.0	0.0626	0.144
107	10000.0	0.0443	0.038
Pore volume in pores greater than 30000.0 Angstroms = 0.0170 cc/g			
Pore volume between 500.0 and 30000.0 Angstroms = 0.0482 cc/g			
Pore volume in pores less than 500.0 Angstroms = 0.0018 cc/g			
Total pore volume intruded = 0.0670 cc/g			

PORE INTRUSION DATA									
PORE PRESSURE	INTRUSION Radius	DELTA VOLUME	% VOLUME Hg VOLUME		dV/dP	Dv(r)	Ds(r)	CUMULATIVE SURF. AREA	PORE NUM. FRACTION
26	41023.5	0.0039	0.0000	3.72	5.87E-04	3.72E-07	1.81E-07	0.000	0.00E+00
66	16160.8	0.0367	0.0328	34.80	6.53E-04	2.51E-06	3.01E-06	0.027	2.17E-04
109	9785.4	0.0576	0.0208	54.55	4.11E-04	4.37E-06	8.72E-06	0.061	4.73E-04
161	6624.9	0.0724	0.0148	68.60	2.02E-04	4.70E-06	1.39E-05	0.098	7.13E-04
216	4938.0	0.0810	0.0086	76.78	1.21E-04	5.16E-06	2.07E-05	0.128	5.59E-04
280	3809.3	0.0866	0.0056	82.09	6.85E-05	4.91E-06	2.55E-05	0.153	7.45E-04
357	2987.7	0.0907	0.0041	85.99	4.20E-05	4.93E-06	3.26E-05	0.178	7.47E-04
450	2370.2	0.0937	0.0030	88.79	2.57E-05	4.78E-06	3.99E-05	0.200	9.32E-04
556	1918.4	0.0957	0.0020	90.67	1.62E-05	4.59E-06	4.74E-05	0.219	1.10E-03
662	1611.2	0.0971	0.0014	92.04	9.77E-06	3.95E-06	4.87E-05	0.235	8.57E-04
775	1376.3	0.0984	0.0012	93.22	9.61E-06	5.33E-06	7.69E-05	0.252	1.27E-03
892	1195.8	0.0992	0.0009	94.03	7.04E-06	5.18E-06	8.61E-05	0.265	1.35E-03
1014	1051.9	0.1000	0.0007	94.73	6.38E-06	6.08E-06	1.15E-04	0.278	1.58E-03
1137	938.1	0.1006	0.0006	95.32	4.41E-06	5.28E-06	1.12E-04	0.291	1.60E-03
1259	847.2	0.1011	0.0005	95.76	5.10E-06	7.51E-06	1.76E-04	0.301	2.12E-03
1386	769.6	0.1015	0.0005	96.20	3.79E-06	6.76E-06	1.75E-04	0.313	1.91E-03
1513	705.0	0.1019	0.0004	96.54	3.09E-06	6.58E-06	1.86E-04	0.322	1.85E-03
1642	649.6	0.1022	0.0004	96.87	2.36E-06	5.91E-06	1.81E-04	0.332	1.67E-03
1771	602.3	0.1025	0.0003	97.16	2.36E-06	6.90E-06	2.28E-04	0.342	1.80E-03
1904	560.2	0.1028	0.0003	97.46	1.71E-06	5.77E-06	2.05E-04	0.353	1.63E-03
2065	516.5	0.1031	0.0003	97.71	2.05E-06	8.14E-06	3.14E-04	0.363	2.30E-03
2295	464.8	0.1035	0.0004	98.05	1.15E-06	5.63E-06	2.41E-04	0.378	3.29E-03
2565	415.8	0.1038	0.0003	98.34	8.64E-07	5.28E-06	2.52E-04	0.392	3.09E-03
2843	375.2	0.1040	0.0003	98.60	8.44E-07	6.33E-06	3.36E-04	0.405	3.84E-03
3124	341.4	0.1043	0.0002	98.82	5.56E-07	5.04E-06	2.94E-04	0.419	3.06E-03
3408	313.0	0.1045	0.0002	99.00	5.46E-07	5.89E-06	3.75E-04	0.431	3.71E-03
3695	288.7	0.1046	0.0002	99.15	5.46E-07	6.94E-06	4.79E-04	0.441	4.36E-03
3986	267.6	0.1048	0.0002	99.30	2.78E-07	4.11E-06	3.06E-04	0.452	2.58E-03
4278	249.3	0.1049	0.0002	99.45	2.68E-07	4.57E-06	3.66E-04	0.464	2.87E-03
4572	233.3	0.1050	0.0000	99.48	2.59E-07	5.05E-06	4.32E-04	0.467	3.18E-03
4867	219.2	0.1051	0.0001	99.59	2.59E-07	5.72E-06	5.21E-04	0.478	3.72E-03
5164	206.5	0.1052	0.0001	99.67	0.00E+00	0.00E+00	0.00E+00	0.485	0.00E+00
5534	192.7	0.1053	0.0001	99.78	1.77E-07	5.04E-06	5.21E-04	0.497	4.80E-03
5970	178.7	0.1053	0.0000	99.82	0.00E+00	0.00E+00	0.00E+00	0.501	0.00E+00
6409	166.4	0.1054	0.0000	99.85	0.00E+00	0.00E+00	0.00E+00	0.505	0.00E+00
6876	155.1	0.1054	0.0000	99.89	0.00E+00	0.00E+00	0.00E+00	0.510	0.00E+00
7352	145.1	0.1054	0.0000	99.93	0.00E+00	0.00E+00	0.00E+00	0.516	0.00E+00
7834	136.2	0.1054	0.0000	99.93	1.53E-07	8.72E-06	1.28E-03	0.516	9.08E-03
8331	128.0	0.1055	0.0000	99.96	0.00E+00	0.00E+00	0.00E+00	0.521	0.00E+00
8831	120.8	0.1055	0.0000	99.96	0.00E+00	0.00E+00	0.00E+00	0.521	0.00E+00
9345	114.1	0.1055	0.0000	100.00	1.50E-07	1.22E-05	2.13E-03	0.528	1.37E-02
>9896 NO ADDITIONAL INTRUSION									

Aggregate H, Continued

INTERPOLATED INTRUSION DATA							
Mean Pressure	Pore Radius	Percent Volume	Cumul. Volume Hg	Volume in Interval	dV/dP	dV/log r	Cumul. Surf.Area
42.7	20000.0 - 30000.0	14.69	0.0283	1.55E-02	8.72E-04	3.52E-03	0.018
71.1	10000.0 - 20000.0	27.01	0.0568	2.85E-02	5.34E-04	6.82E-03	0.059
112.3	9000.0 - 10000.0	4.11	0.0611	4.34E-03	3.66E-04	1.09E-03	0.068
125.5	8000.0 - 9000.0	4.13	0.0655	4.36E-03	2.94E-04	1.11E-03	0.079
142.2	7000.0 - 8000.0	4.71	0.0705	4.97E-03	2.61E-04	1.28E-03	0.092
164.1	6000.0 - 7000.0	4.85	0.0756	5.12E-03	2.02E-04	1.34E-03	0.108
193.9	5000.0 - 6000.0	4.80	0.0806	5.06E-03	1.42E-04	1.35E-03	0.126
237.0	4000.0 - 5000.0	4.75	0.0857	5.01E-03	9.40E-05	1.37E-03	0.149
304.7	3000.0 - 4000.0	4.76	0.0907	5.02E-03	5.65E-05	1.42E-03	0.177
426.6	2000.0 - 3000.0	4.45	0.0954	4.70E-03	2.64E-05	1.38E-03	0.216
711.1	1000.0 - 2000.0	4.63	0.1003	4.88E-03	9.16E-06	1.54E-03	0.284
1122.7	900.0 - 1000.0	0.45	0.1007	4.78E-04	4.04E-06	1.61E-04	0.294
1254.8	800.0 - 900.0	0.54	0.1013	5.75E-04	3.88E-06	1.96E-04	0.308
1422.1	700.0 - 800.0	0.59	0.1019	6.22E-04	3.27E-06	2.16E-04	0.324
1640.9	600.0 - 700.0	0.58	0.1025	6.09E-04	2.40E-06	2.16E-04	0.343
1939.3	500.0 - 600.0	0.65	0.1032	6.86E-04	1.93E-06	2.50E-04	0.368

DATA SUMMARY			
PSIA	A	Cumulative cc/g	Surface m ² /g
10666	100.0	0.1055	0.528
1067	1000.0	0.1003	0.284
107	10000.0	0.0568	0.059
Pore volume in pores greater than 30000.0 Angstroms = 0.0128 cc/g			
Pore volume between 500.0 and 30000.0 Angstroms = 0.0905 cc/g			
Pore volume in pores less than 500.0 Angstroms = 0.0023 cc/g			
Total pore volume intruded = 0.1055 cc/g			

Aggregate J

PORE INTRUSION DATA									
PRESSURE	PORE Radius	INTRUSION VOLUME	DELTA Hg VOLUME	% VOLUME	dV/dP	Dv(r)	Ds(r)	CUMULATIVE SURF. AREA	PORE NUM. FRACTION
26	41023.5	0.0000	0.0000	0.00	1.15E-04	7.26E-08	3.54E-08	0.000	0.00E+00
66	16160.8	0.0049	0.0049	39.31	7.04E-05	2.66E-07	3.17E-07	0.004	7.78E-04
118	9039.1	0.0073	0.0024	58.62	3.09E-05	3.87E-07	8.38E-07	0.008	1.13E-03
177	6026.1	0.0086	0.0013	68.97	1.76E-05	4.96E-07	1.62E-06	0.011	2.03E-03
262	4071.0	0.0097	0.0011	77.93	1.12E-05	6.91E-07	3.32E-06	0.016	4.45E-03
366	2914.2	0.0106	0.0009	84.83	4.58E-06	5.57E-07	3.76E-06	0.021	3.91E-03
485	2199.2	0.0110	0.0004	88.28	2.75E-06	5.92E-07	5.32E-06	0.024	4.16E-03
612	1742.8	0.0114	0.0004	91.72	2.55E-06	8.78E-07	9.97E-06	0.028	6.16E-03
746	1429.8	0.0118	0.0003	94.48	1.32E-06	6.76E-07	9.36E-06	0.033	5.93E-03
885	1205.2	0.0119	0.0002	95.86	0.00E+00	0.00E+00	0.00E+00	0.035	0.00E+00
1024	1041.6	0.0119	0.0000	95.86	0.00E+00	0.00E+00	0.00E+00	0.035	0.00E+00
1167	914.0	0.0120	0.0001	96.55	0.00E+00	0.00E+00	0.00E+00	0.037	0.00E+00
1310	814.2	0.0121	0.0001	97.24	0.00E+00	0.00E+00	0.00E+00	0.039	0.00E+00
1456	732.6	0.0122	0.0001	97.93	0.00E+00	0.00E+00	0.00E+00	0.041	0.00E+00
1603	665.4	0.0123	0.0001	98.62	0.00E+00	0.00E+00	0.00E+00	0.044	0.00E+00
1756	607.4	0.0124	0.0001	99.31	1.23E-06	3.52E-06	1.15E-04	0.046	3.29E-02
1906	559.6	0.0125	0.0001	100.00	1.07E-06	3.63E-06	1.29E-04	0.049	3.40E-02
>2059	NO ADDITIONAL INTRUSION								

Aggregate J, Continued

INTERPOLATED INTRUSION DATA							
Mean Pressure	Pore Radius	Percent Volume	Cumul. Volume	Volume in Hg Interval	dV/dP	dV/log r	Cumul. Surf.Area
42.7	20000.0 - 30000.0	18.55	0.0041	2.31E-03	1.30E-04	5.25E-04	0.003
71.1	10000.0 - 20000.0	24.25	0.0071	3.02E-03	5.67E-05	7.23E-04	0.007
112.3	9000.0 - 10000.0	2.02	0.0073	2.51E-04	2.12E-05	6.32E-05	0.008
125.5	8000.0 - 9000.0	3.38	0.0077	4.22E-04	2.85E-05	1.07E-04	0.009
142.2	7000.0 - 8000.0	3.61	0.0082	4.50E-04	2.36E-05	1.16E-04	0.010
164.1	6000.0 - 7000.0	3.33	0.0086	4.14E-04	1.63E-05	1.09E-04	0.011
193.9	5000.0 - 6000.0	4.96	0.0092	6.17E-04	1.74E-05	1.65E-04	0.013
237.0	4000.0 - 5000.0	4.66	0.0098	5.81E-04	1.09E-05	1.59E-04	0.016
304.7	3000.0 - 4000.0	5.49	0.0105	6.84E-04	7.70E-06	1.93E-04	0.020
426.6	2000.0 - 3000.0	5.29	0.0112	6.58E-04	3.70E-06	1.94E-04	0.025
711.1	1000.0 - 2000.0	7.04	0.0120	8.77E-04	1.64E-06	2.76E-04	0.037
1122.7	900.0 - 1000.0	0.00	0.0120	0.00E+00	0.00E+00	0.00E+00	0.037
1254.8	800.0 - 900.0	0.69	0.0121	8.59E-05	5.80E-07	2.93E-05	0.039
1422.1	700.0 - 800.0	0.69	0.0122	8.59E-05	4.51E-07	2.99E-05	0.041
1640.9	600.0 - 700.0	1.38	0.0124	1.72E-04	6.77E-07	6.11E-05	0.046
1939.3	500.0 - 600.0	0.69	0.0125	8.59E-05	2.42E-07	3.14E-05	0.049

DATA SUMMARY			
PSIA	Å	Cumulative cc/g	Surface m ² /g
10666	100.0	0.0125	0.049
1067	1000.0	0.0120	0.037
107	10000.0	0.0071	0.007
Pore volume in pores greater than 30000.0 Angstroms = 0.0017 cc/g			
Pore volume between 500.0 and 30000.0 Angstroms = 0.0107 cc/g			
Pore volume in pores less than 500.0 Angstroms = 0.0000 cc/g			
Total pore volume intruded = 0.0125 cc/g			

Aggregate K

PORE INTRUSION DATA									
PRESSURE	PORE Radius	INTRUSION VOLUME	DELTA Hg VOLUME	% VOLUME	dv/dP	Dv(r)	Ds(r)	CUMULATIVE SURF. AREA	PORE NUM. FRACTION
27	39504.1	0.0025	0.0000	6.29	4.16E-04	2.84E-07	1.44E-07	0.000	0.00E+00
66	16160.8	0.0195	0.0170	48.80	2.51E-04	9.65E-07	1.16E-06	0.014	6.46E-07
115	9274.9	0.0257	0.0062	64.30	8.82E-05	1.03E-06	2.15E-06	0.024	1.20E-06
163	6543.6	0.0284	0.0028	71.26	4.74E-05	1.14E-06	3.41E-06	0.031	1.14E-06
224	4761.7	0.0306	0.0021	76.57	2.82E-05	1.28E-06	5.31E-06	0.039	1.50E-06
308	3463.0	0.0321	0.0015	80.39	1.49E-05	1.29E-06	7.34E-06	0.046	1.94E-06
408	2614.2	0.0332	0.0012	83.31	9.58E-06	1.45E-06	1.09E-05	0.054	2.92E-06
522	2043.3	0.0341	0.0008	85.33	6.33E-06	1.58E-06	1.53E-05	0.061	2.92E-06
644	1656.2	0.0347	0.0007	87.05	4.25E-06	1.62E-06	1.94E-05	0.068	3.26E-06
771	1383.4	0.0351	0.0004	87.95	3.23E-06	1.77E-06	2.54E-05	0.073	3.85E-06
902	1182.5	0.0355	0.0004	88.92	2.66E-06	2.01E-06	3.37E-05	0.079	4.03E-06
1039	1026.6	0.0358	0.0003	89.67	1.72E-06	1.71E-06	3.32E-05	0.084	3.73E-06
1179	904.7	0.0360	0.0002	90.19	2.56E-06	3.30E-06	7.25E-05	0.089	8.29E-06
1319	808.7	0.0362	0.0002	90.64	8.25E-07	1.33E-06	3.28E-05	0.093	3.12E-06
1461	730.1	0.0364	0.0002	91.09	1.18E-06	2.33E-06	6.36E-05	0.098	5.47E-06
1606	664.1	0.0364	0.0001	91.32	8.25E-07	1.98E-06	5.93E-05	0.100	4.64E-06
1752	608.8	0.0366	0.0001	91.62	4.27E-07	1.22E-06	3.98E-05	0.104	3.06E-06
1901	561.1	0.0367	0.0001	91.92	3.98E-07	1.34E-06	4.76E-05	0.108	3.14E-06
2052	519.8	0.0367	0.0001	92.07	8.25E-07	3.23E-06	1.24E-04	0.110	8.66E-06
2202	484.4	0.0368	0.0001	92.22	3.98E-07	1.80E-06	7.40E-05	0.113	4.52E-06
2354	453.1	0.0369	0.0001	92.51	3.73E-07	1.93E-06	8.49E-05	0.118	4.52E-06
2556	417.3	0.0370	0.0001	92.66	3.73E-07	2.27E-06	1.09E-04	0.120	6.09E-06
2865	372.3	0.0370	0.0001	92.81	1.87E-07	1.42E-06	7.59E-05	0.123	7.38E-06
3181	335.3	0.0371	0.0001	92.96	1.87E-07	1.75E-06	1.04E-04	0.127	9.69E-06
3501	304.7	0.0372	0.0001	93.11	0.00E+00	0.00E+00	0.00E+00	0.130	0.00E+00
3822	279.1	0.0372	0.0000	93.19	1.87E-07	2.54E-06	1.81E-04	0.132	1.32E-05
4147	257.2	0.0372	0.0000	93.26	1.87E-07	2.99E-06	2.31E-04	0.135	1.60E-05
4477	238.2	0.0372	0.0000	93.26	0.00E+00	0.00E+00	0.00E+00	0.135	0.00E+00
4805	222.0	0.0372	0.0000	93.26	0.00E+00	0.00E+00	0.00E+00	0.135	0.00E+00
5137	207.6	0.0372	0.0000	93.26	0.00E+00	0.00E+00	0.00E+00	0.135	0.00E+00
5469	195.0	0.0372	0.0000	93.34	0.00E+00	0.00E+00	0.00E+00	0.138	0.00E+00
5800	183.9	0.0372	0.0000	93.34	0.00E+00	0.00E+00	0.00E+00	0.138	0.00E+00
6214--35799 PSI NO INTRUSION									
35799	29.8	0.0372	0.0000	93.34	0.00E+00	0.00E+00	0.00E+00	0.138	0.00E+00
37728	28.3	0.0372	0.0000	93.34	3.05E-08	4.05E-05	2.85E-02	0.138	1.33E-03
39754	26.8	0.0374	0.0002	93.79	1.10E-07	1.61E-04	1.20E-01	0.268	5.49E-03
42115	25.3	0.0377	0.0003	94.46	1.47E-07	2.43E-04	1.92E-01	0.475	9.82E-03
44587	23.9	0.0380	0.0003	95.28	1.43E-07	2.65E-04	2.21E-01	0.741	1.10E-02
47133	22.6	0.0384	0.0004	96.18	1.40E-07	2.89E-04	2.55E-01	1.049	1.24E-02
49748	21.4	0.0387	0.0003	97.01	1.58E-07	3.65E-04	3.40E-01	1.349	1.61E-02
52449	20.3	0.0391	0.0004	97.98	1.52E-07	3.91E-04	3.84E-01	1.721	1.79E-02
55245	19.3	0.0395	0.0004	98.95	1.69E-07	4.80E-04	4.96E-01	2.114	2.30E-02
58214	18.3	0.0397	0.0002	99.55	9.42E-08	2.98E-04	3.24E-01	2.367	1.48E-02

Aggregate K, Continued

INTERPOLATED INTRUSION DATA							
Mean Pressure	Pore Radius	Percent Volume	Cumul. Volume	Volume in Hg Interval	dV/dP	dV/log r	Cumul. Surf Area
42.7	20000.0 - 30000.0	19.94	0.0158	7.96E-03	4.48E-04	1.81E-03	0.010
71.1	10000.0 - 20000.0	22.98	0.0250	9.17E-03	1.72E-04	2.20E-03	0.022
112.3	9000.0 - 10000.0	2.35	0.0259	9.36E-04	7.90E-05	2.35E-04	0.024
125.5	8000.0 - 9000.0	2.41	0.0269	9.62E-04	6.49E-05	2.45E-04	0.027
142.2	7000.0 - 8000.0	2.62	0.0279	1.05E-03	5.49E-05	2.70E-04	0.029
164.1	6000.0 - 7000.0	2.90	0.0291	1.16E-03	4.55E-05	3.03E-04	0.033
193.9	5000.0 - 6000.0	2.89	0.0302	1.15E-03	3.25E-05	3.09E-04	0.037
237.0	4000.0 - 5000.0	3.03	0.0314	1.21E-03	2.27E-05	3.31E-04	0.043
304.7	3000.0 - 4000.0	3.17	0.0327	1.27E-03	1.42E-05	3.57E-04	0.050
426.6	2000.0 - 3000.0	3.56	0.0341	1.42E-03	8.00E-06	4.19E-04	0.061
711.1	1000.0 - 2000.0	4.20	0.0358	1.68E-03	3.15E-06	5.28E-04	0.085
1122.7	900.0 - 1000.0	0.48	0.0360	1.92E-04	1.62E-06	6.46E-05	0.089
1254.8	800.0 - 900.0	0.42	0.0362	1.67E-04	1.13E-06	5.69E-05	0.093
1422.1	700.0 - 800.0	0.60	0.0364	2.38E-04	1.25E-06	8.29E-05	0.099
1640.9	600.0 - 700.0	0.37	0.0366	1.49E-04	5.88E-07	5.31E-05	0.104
1939.3	500.0 - 600.0	0.60	0.0368	2.39E-04	6.72E-07	8.72E-05	0.113

DATA SUMMARY			
PSIA	A	Cumulative cc/g	Surface m ² /g
10666	100.0	0.0372	0.138
1067	1000.0	0.0358	0.085
107	10000.0	0.0250	0.022
Pore volume in pores greater than 30000.0 Angstroms =		0.0079 cc/g	
Pore volume between 500.0 and 30000.0 Angstroms =		0.0289 cc/g	
Pore volume in pores less than 500.0 Angstroms =		0.0031 cc/g	
Total pore volume intruded =		0.0399 cc/g	

Aggregate L

PORE INTRUSION DATA									
PRESSURE	PORE Radius	INTRUSION VOLUME	DELTA Hg VOLUME	% VOLUME	dV/dP	Dv(r)	Ds(r)	CUMULATIVE SURF. AREA	PORE NUM. FRACTION
26	41023.5	0.0000	0.0000	0.00	7.24E-05	4.59E-08	2.24E-08	0.000	0.00E+00
66	16160.8	0.0034	0.0034	27.21	5.84E-05	2.24E-07	2.69E-07	0.003	4.59E-05
120	8888.4	0.0054	0.0019	42.62	2.47E-05	3.20E-07	7.04E-07	0.006	8.19E-05
188	5673.5	0.0067	0.0013	52.79	1.49E-05	4.76E-07	1.65E-06	0.010	1.71E-04
284	3755.7	0.0078	0.0012	61.97	8.86E-06	6.45E-07	3.37E-06	0.015	3.63E-04
395	2700.3	0.0086	0.0008	68.20	5.60E-06	7.97E-07	5.82E-06	0.020	4.49E-04
518	2059.1	0.0092	0.0006	72.79	4.47E-06	1.09E-06	1.05E-05	0.025	7.84E-04
649	1643.5	0.0096	0.0004	76.07	3.10E-06	1.20E-06	1.45E-05	0.029	7.39E-04
781	1365.7	0.0099	0.0003	78.69	6.37E-07	3.59E-07	5.21E-06	0.033	2.21E-04
915	1165.7	0.0101	0.0002	80.33	2.55E-06	1.97E-06	3.36E-05	0.037	1.31E-03
1055	1011.0	0.0104	0.0003	82.62	1.78E-06	1.83E-06	3.60E-05	0.042	1.41E-03
1193	894.1	0.0106	0.0002	84.26	1.19E-06	1.57E-06	3.49E-05	0.047	1.05E-03
1335	799.0	0.0108	0.0001	85.25	1.14E-06	1.89E-06	4.70E-05	0.050	1.45E-03
1482	719.7	0.0109	0.0002	86.56	5.17E-07	1.05E-06	2.91E-05	0.054	8.64E-04
1627	655.6	0.0111	0.0001	87.54	1.18E-06	2.91E-06	8.84E-05	0.058	2.09E-03
1773	601.6	0.0111	0.0001	88.20	1.07E-06	3.13E-06	1.04E-04	0.060	2.08E-03
1922	554.9	0.0113	0.0002	89.51	5.52E-07	1.90E-06	6.81E-05	0.066	1.46E-03
2071	515.0	0.0114	0.0001	90.16	5.52E-07	2.20E-06	8.53E-05	0.069	1.58E-03
2221	480.2	0.0115	0.0001	91.15	5.52E-07	2.54E-06	1.05E-04	0.074	1.95E-03
2374	449.3	0.0116	0.0001	92.13	5.17E-07	2.72E-06	1.20E-04	0.079	2.23E-03
2591	411.7	0.0118	0.0002	93.44	5.35E-07	3.33E-06	1.61E-04	0.087	5.11E-03
2899	367.9	0.0120	0.0002	94.75	5.35E-07	4.17E-06	2.25E-04	0.096	6.83E-03
3212	332.1	0.0120	0.0001	95.41	0.00E+00	0.00E+00	0.00E+00	0.100	0.00E+00
3533	301.9	0.0121	0.0001	96.07	5.10E-07	5.91E-06	3.90E-04	0.106	9.39E-03
3852	276.9	0.0122	0.0001	96.72	2.59E-07	3.57E-06	2.57E-04	0.111	5.85E-03
4176	255.4	0.0123	0.0001	97.38	2.59E-07	4.20E-06	3.27E-04	0.118	6.88E-03
4505	236.8	0.0124	0.0001	98.03	2.51E-07	4.74E-06	3.99E-04	0.124	7.77E-03
4830	220.8	0.0124	0.0000	98.36	0.00E+00	0.00E+00	0.00E+00	0.128	0.00E+00
5156	206.9	0.0125	0.0000	98.69	0.00E+00	0.00E+00	0.00E+00	0.132	0.00E+00
5487	194.4	0.0125	0.0000	99.02	0.00E+00	0.00E+00	0.00E+00	0.136	0.00E+00
5812	183.5	0.0125	0.0000	99.34	0.00E+00	0.00E+00	0.00E+00	0.140	0.00E+00
6194	172.2	0.0125	0.0000	99.34	0.00E+00	0.00E+00	0.00E+00	0.140	0.00E+00
6662	160.1	0.0126	0.0000	99.67	1.62E-07	6.70E-06	8.34E-04	0.145	1.82E-02
7187	148.4	0.0126	0.0000	99.67	1.53E-07	7.37E-06	9.90E-04	0.145	1.93E-02
7727	138.0	0.0126	0.0000	100.00	0.00E+00	0.00E+00	0.00E+00	0.151	0.00E+00
>8272 NO ADDITIONAL INTRUSION									

Aggregate L, Continued

INTERPOLATED INTRUSION DATA							
Mean Pressure	Pore Radius	Percent Volume	Cumul. Volume	Volume Hg Interval	dV/dP	dV/log r	Cumul. Surf. Area
42.7	20000.0 - 30000.0	12.90	0.0026	1.63E-03	9.16E-05	3.70E-04	0.002
71.1	10000.0 - 20000.0	19.15	0.0051	2.42E-03	4.53E-05	5.79E-04	0.005
112.3	9000.0 - 10000.0	2.15	0.0053	2.72E-04	2.29E-05	6.83E-05	0.006
125.5	8000.0 - 9000.0	2.68	0.0057	3.39E-04	2.29E-05	8.62E-05	0.007
142.2	7000.0 - 8000.0	3.07	0.0061	3.87E-04	2.03E-05	1.00E-04	0.008
164.1	6000.0 - 7000.0	3.42	0.0065	4.32E-04	1.70E-05	1.13E-04	0.009
193.9	5000.0 - 6000.0	4.15	0.0070	5.24E-04	1.47E-05	1.40E-04	0.011
237.0	4000.0 - 5000.0	5.29	0.0077	6.68E-04	1.25E-05	1.83E-04	0.014
304.7	3000.0 - 4000.0	5.42	0.0084	6.84E-04	7.69E-06	1.93E-04	0.018
426.6	2000.0 - 3000.0	7.02	0.0093	8.86E-04	4.98E-06	2.61E-04	0.025
711.1	1000.0 - 2000.0	9.34	0.0104	1.18E-03	2.21E-06	3.71E-04	0.042
1122.7	900.0 - 1000.0	1.44	0.0106	1.82E-04	1.53E-06	6.11E-05	0.046
1254.8	800.0 - 900.0	1.18	0.0108	1.49E-04	1.01E-06	5.09E-05	0.050
1422.1	700.0 - 800.0	1.31	0.0109	1.66E-04	8.69E-07	5.76E-05	0.054
1640.9	600.0 - 700.0	1.74	0.0111	2.20E-04	8.66E-07	7.82E-05	0.061
1939.3	500.0 - 600.0	2.24	0.0114	2.83E-04	7.97E-07	1.03E-04	0.071

DATA SUMMARY			
PSIA	Å	Cumulative cc/g	Surface m ² /g
10666	100.0	0.0126	0.151
1067	1000.0	0.0104	0.042
107	10000.0	0.0051	0.005
Pore volume in pores greater than 30000.0 Angstroms = 0.0010 cc/g			
Pore volume between 500.0 and 30000.0 Angstroms = 0.0104 cc/g			
Pore volume in pores less than 500.0 Angstroms = 0.0012 cc/g			
Total pore volume intruded = 0.0126 cc/g			