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Laboratory Report for

Fluor Hanford, Inc.

BC Crib Geotechnical Characterization of C-33 Sand

(Contract No: 27892)

DBS0002

December 8, 2005

Daniel B. Stephens & Associates, Inc.

6020 Academy NE, Suite 100 • Albuquerque, New Mexico 87109

December 8, 2005

Steve Trent
Fluor Hanford, Inc.
PO Box 1000
MSIN A0-21
Richland, WA 99352

Re: DBS&A Laboratory Report for Fluor Hanford, Inc.
BC Crib Geotechnical Characterization of C-33 Sand (Contract No: 27892)

Dear Mr. Trent:

Enclosed is the final report for the Fluor Hanford, Inc.; BC Crib Geotechnical Characterization of C-33 Sand (Contract No: 27892). Please review this report and provide any comments as samples will be held for a maximum of 30 days. After 30 days samples will be returned or disposed of in an appropriate manner.

Sample B1F3D4 Composite required small oversize fraction (> #4 sieve material) corrections for the proctor compaction and saturated and unsaturated hydraulic conductivity testing. Sample B1F3D4 Custom Blend was specifically created based on criteria provided by Fluor Hanford, Inc. Both Composite and Custom Blend samples were remolded to 80%, 90%, and 95% of their respective maximum dry bulk densities. All of the samples settled significantly during saturated hydraulic conductivity testing, and continued settling throughout unsaturated hydraulic conductivity testing. The dimensions of the settled samples were estimated based on the average of the measurements obtained after saturated hydraulic conductivity testing and throughout unsaturated hydraulic conductivity testing. Additional sample test results are provided (designated by the notation 'MSD') based on these estimated measured settled densities (MSDs).

All testing results were evaluated subjectively for consistency and reasonableness, and the results appear to be reasonably representative of the material tested. However, DBS&A does not assume any responsibility for interpretations or analyses based on the data enclosed, nor can we guarantee that these data are fully representative of the undisturbed materials at the field site. We recommend that careful evaluation of these laboratory results be made for your particular application.

The testing utilized to generate the enclosed final report employs methods that are standard for the industry. The results do not constitute a professional opinion by DBS&A, nor can the results affect any professional or expert opinions rendered with respect thereto by DBS&A. You have acknowledged that all the testing undertaken by us, and the final report provided, constitutes mere test results using standardized methods, and cannot be used to disqualify DBS&A from

Daniel B. Stephens & Associates, Inc.
6020 Academy NE, Suite 100 505-822-9400
Albuquerque, NM 87109 FAX 505-822-8877

rendering any professional or expert opinion, having waived any claim of conflict of interest by DBS&A.

We are pleased to provide this service to Fluor Hanford, Inc. and look forward to future laboratory testing on other projects. If you have any questions about the enclosed data, please do not hesitate to call.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.
LABORATORY / TESTING FACILITY

Joleen Hines
Laboratory Supervising Manager

Enclosure

Summaries

Summary of Tests Performed

Laboratory Sample Number	Initial Soil Properties[1] (θ, ρ_d, ϕ)	Saturated Hydraulic Conductivity[2]		Moisture Characteristics[3]					Unsaturated Hydraulic Conductivity	Particle Size[4]			Effective Porosity	Custom Blend Creation	Air Permeability	1/3, 15 Bar Points and Water Holding Capacity	Atterberg Limits	Proctor Compaction
		CH	FH	HC	PP	TH	WP	RH		DS	WS	H						
B1F3D4 Small Sub-Sample	X																	
B1F3D4 Composite										X								X
B1F3D4 Composite (80%)	X	X		X	X		X	X	X									
B1F3D4 Comp (80%) MSD[5]	X	X		X	X		X	X	X									
B1F3D4 Composite (90%)	X	X		X	X		X	X	X									
B1F3D4 Comp (90%) MSD[5]	X	X		X	X		X	X	X									
B1F3D4 Composite (95%)	X	X		X	X		X	X	X									
B1F3D4 Comp (95%) MSD[5]	X	X		X	X		X	X	X									
B1F3D4 Custom Blend										X				X				X
B1F3D4 Custom Blend (80%)	X	X		X	X		X	X	X									
B1F3D4 Blend (80%) MSD[5]	X	X		X	X		X	X	X									
B1F3D4 Custom Blend (90%)	X	X		X	X		X	X	X									
B1F3D4 Blend (90%) MSD[5]	X	X		X	X		X	X	X									
B1F3D4 Custom Blend (95%)	X	X		X	X		X	X	X									
B1F3D4 Blend (95%) MSD[5]	X	X		X		X	X	X	X									

[1] θ = Initial moisture content, ρ_d = Dry bulk density, ϕ = Calculated porosity

[2] CH = Constant head, FH = falling head

[3] HC = Hanging column, PP = Pressure plate, TH = Thermocouple psychrometer, WP = Water activity meter, RH = Relative humidity box

[4] DS = Dry sieve, WS = Wet sieve, H = Hydrometer

[5] MSD= Measure Settled Density. Remolded samples settled significantly during saturated hydraulic conductivity testing, and continued settling throughout unsaturated hydraulic conductivity testing. Settled dimensions were estimated based on the average of the measurements obtained after saturated hydraulic conductivity testing and throughout unsaturated hydraulic conductivity testing. Additional sample test results are provided (designated by the notation 'MSD' following the sample name) based on these averages of the estimated measured settled densities.

Sample Prep Summary

	Proctor Data		Target Remold Densities at 80%, 90% & 95% of Maximum Dry Bulk Density, Dry of Optimum Moisture Content	Actual Remold Values		*Estimated Average* Measured Settled Densities (MSD)*	
Sample Number	Optimum Moisture Content (% g/g)	Maximum Dry Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	Moisture Content (%, g/g)	Dry Bulk Density (g/cm^3)	Average Dry Bulk Density (g/cm^3)	Average Percent Settled (%)
B1F3D4 Composite (80%)	12.7	1.82	1.46	9.6	1.49	1.83	18.6%
B1F3D4 Composite (90%)	12.7	1.82	1.64	5.3	1.64	1.83	11.6%
B1F3D4 Composite (95%)	12.7	1.82	1.73	11.1	1.75	1.85	5.6%
B1F3D4 Custom Blend (80%)	15.4	1.73	1.38	13.2	1.40	1.72	18.7%
B1F3D4 Custom Blend (90%)	15.4	1.73	1.56	13.6	1.58	1.78	11.7%
B1F3D4 Custom Blend (95%)	15.4	1.73	1.64	13.5	1.66	1.75	5.0%

*MSD= Measure Settled Density. Remolded samples settled significantly during saturated hydraulic conductivity testing, and continued settling throughout unsaturated hydraulic conductivity testing. Settled dimensions were estimated based on the average of the measurements obtained throughout saturated and unsaturated hydraulic conductivity testing. Additional sample test results are provided (designated by the notation 'MSD' following the sample name) based on these averages of the estimated measured settled densities.

Summary of Initial Moisture Content, Dry Bulk Density Wet Bulk Density and Calculated Porosity

Sample Number	Initial Moisture Content Gravimetric (%, g/g)	Initial Moisture Content Volumetric (%, cm^3/cm^3)	Dry Bulk Density (g/cm^3)	Wet Bulk Density (g/cm^3)	Calculated Porosity (%)
B1F3D4 Small Sub-Sample	7.9	NA	NA	NA	NA
B1F3D4 Composite (80%)	9.6	14.3	1.49	1.63	43.7
B1F3D4 Comp (80%) MSD	9.6	17.6	1.83	2.01	30.9
B1F3D4 Composite (90%)	5.3	8.7	1.64	1.73	38.0
B1F3D4 Comp (90%) MSD	5.3	9.7	1.83	1.93	30.9
B1F3D4 Composite (95%)	11.1	19.3	1.75	1.94	34.1
B1F3D4 Comp (95%) MSD	11.1	20.5	1.85	2.05	30.2
B1F3D4 Custom Blend (80%)	13.2	18.5	1.40	1.58	47.2
B1F3D4 Blend (80%) MSD	13.2	22.8	1.72	1.95	35.1
B1F3D4 Custom Blend (90%)	13.6	21.5	1.58	1.79	40.5
B1F3D4 Blend (90%) MSD	13.6	24.3	1.78	2.03	32.7
B1F3D4 Custom Blend (95%)	13.5	22.5	1.66	1.89	37.3
B1F3D4 Blend (95%) MSD	13.5	23.7	1.75	1.99	34.0

NA = Not analyzed

Summary of Saturated Hydraulic Conductivity Tests

Sample Number	K_{sat} (cm/sec)	Method of Analysis	
		Constant Head	Falling Head
B1F3D4 Composite (80%)	8.3E-02	X	
B1F3D4 Comp (80%) MSD	6.7E-02	X	
B1F3D4 Composite (90%)	5.2E-02	X	
B1F3D4 Comp (90%) MSD	3.5E-02	X	
B1F3D4 Composite (95%)	4.0E-02	X	
B1F3D4 Comp (95%) MSD	3.8E-02	X	
B1F3D4 Custom Blend (80%)	5.3E-02	X	
B1F3D4 Blend (80%) MSD	4.3E-02	X	
B1F3D4 Custom Blend (90%)	5.0E-02	X	
B1F3D4 Blend (90%) MSD	4.5E-02	X	
B1F3D4 Custom Blend (95%)	2.8E-02	X	
B1F3D4 Blend (95%) MSD	2.7E-02	X	

Summary of Moisture Characteristics of the Initial Drainage Curve

Sample Number	Pressure Head (-cm water)	Moisture Content (%, cm^3/cm^3)
B1F3D4 Composite (80%)	0	27.2
	9	25.4
	41	7.2
	82	4.7
	510	3.6
	9790	1.6
	851293	1.2
B1F3D4 Comp (80%) MSD	0	33.4
	9	31.2
	41	8.9
	82	5.7
	510	4.4
	9790	1.9
	851293	1.4
B1F3D4 Composite (90%)	0	33.3
	4	31.4
	15	23.8
	81	5.0
	510	3.9
	14583	3.4
	851293	1.4
B1F3D4 Comp (90%) MSD	0	37.2
	4	35.1
	15	26.6
	81	5.5
	510	4.4
	14583	3.8
	851293	1.5

Summary of Moisture Characteristics of the Initial Drainage Curve (Continued)

Sample Number	Pressure Head (-cm water)	Moisture Content (%, cm^3/cm^3)
B1F3D4 Composite (95%)	0	33.0
	11	30.6
	37	9.0
	84	5.4
	510	4.3
	7750	2.6
	851293	1.4
B1F3D4 Comp (95%) MSD	0	35.0
	11	32.4
	37	9.5
	84	5.8
	510	4.6
	7750	2.8
	851293	1.4
B1F3D4 Custom Blend (80%)	0	31.8
	10	29.7
	36	14.0
	90	5.2
	612	4.0
	14787	2.7
	851293	1.3
B1F3D4 Blend (80%) MSD	0	39.1
	10	36.5
	36	17.2
	90	6.4
	612	4.9
	14787	3.3
	851293	1.6

Summary of Moisture Characteristics of the Initial Drainage Curve (Continued)

Sample Number	Pressure Head (-cm water)	Moisture Content (%, cm^3/cm^3)
B1F3D4 Custom Blend (90%)	0	33.8
	11	32.2
	39	14.5
	82	6.2
	612	4.7
	23047	2.3
	851293	1.5
B1F3D4 Blend (90%) MSD	0	38.3
	11	36.5
	39	16.4
	82	7.0
	612	5.3
	23047	2.6
	851293	1.7
B1F3D4 Custom Blend (95%)	0	35.8
	10	32.4
	35	15.9
	79	6.2
	510	4.6
	22334	2.9
	851293	1.7
B1F3D4 Blend (95%) MSD	0	37.7
	10	34.1
	35	16.7
	79	6.5
	510	4.8
	22334	3.1
	851293	1.8

Summary of Calculated Unsaturated Hydraulic Properties

Sample Number	α (cm^{-1})	N (dimensionless)	θ_r	θ_s
B1F3D4 Composite (80%)	0.0571	2.7210	0.0220	0.2743
B1F3D4 Comp (80%) MSD	0.0572	2.7210	0.0270	0.3369
B1F3D4 Composite (90%)	0.0609	2.5588	0.0278	0.3264
B1F3D4 Comp (90%) MSD	0.0609	2.5606	0.0310	0.3643
B1F3D4 Composite (95%)	0.0519	3.2694	0.0307	0.3323
B1F3D4 Comp (95%) MSD	0.0519	3.2702	0.0325	0.3519
B1F3D4 Custom Blend (80%)	0.0449	2.6338	0.0253	0.3172
B1F3D4 Blend (80%) MSD	0.0449	2.6351	0.0311	0.3901
B1F3D4 Custom Blend (90%)	0.0400	2.8294	0.0277	0.3394
B1F3D4 Blend (90%) MSD	0.0401	2.8296	0.0314	0.3842
B1F3D4 Custom Blend (95%)	0.0483	2.5344	0.0284	0.3553
B1F3D4 Blend (95%) MSD	0.0548	2.0759	0.0000	0.3811

Summary of Calculated Unsaturated Hydraulic Properties with Gravel Corrections

Sample Number	Ksat	α (cm^{-1})	N (dimensionless)	θ_i	θ_r	θ_s
B1F3D4 Composite (80%)	8.0E-02	0.0571	2.7210	0.1385	0.0213	0.2657
B1F3D4 Comp (80%) MSD	6.4E-02	0.0572	2.7210	0.1693	0.0260	0.3240
B1F3D4 Composite (90%)	5.0E-02	0.0609	2.5588	0.0840	0.0268	0.3152
B1F3D4 Comp (90%) MSD	3.4E-02	0.0609	2.5606	0.0933	0.0298	0.3504
B1F3D4 Composite (95%)	3.9E-02	0.0519	3.2694	0.1859	0.0296	0.3201
B1F3D4 Comp (95%) MSD	3.7E-02	0.0519	3.2702	0.1971	0.0312	0.3383

Summary of Particle Size Characteristics

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification
B1F3D4 Composite	0.30	1.1	1.7	5.7	0.68	DS	Poorly-graded sand	Sand †
B1F3D4 Custom Blend	0.18	0.56	0.70	3.9	0.97	DS	Poorly-graded sand	Sand

Sample B1F3D4 Composite was sieved on a standard ASTM D422 sieve stack. Sample B1F3D4 Custom Blend was was specifically created and sieved based on the criteria below (provided by the client).

Custom Blend Criteria

Sieve	Percent Passing, by weight
9.5 mm (3/8-in)	100
4.75 mm (No. 4)	100
2.36 mm (No.8)	100
1.18 mm (No. 16)	85
0.60 mm (No. 30)	60
0.30 mm (No. 50)	30
0.15 mm (No. 100)	10
0.075 mm (No. 200)*	3*

*Maximum 3% + 200

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Summary of Proctor Compaction Tests

Sample Number	Optimum Moisture Content (% g/g)	Maximum Dry Bulk Density (g/cm^3)
B1F3D4 Composite	12.7	1.82
B1F3D4 Composite(Gravel Corrected)	12.3	1.85
B1F3D4 Custom Blend	15.4	1.73

Laboratory Data and Graphical Plots

Initial Properties

Summary of Initial Moisture Content, Dry Bulk Density Wet Bulk Density and Calculated Porosity

Sample Number	Initial Moisture Content Gravimetric (%, g/g)	Initial Moisture Content Volumetric (%, cm^3/cm^3)	Dry Bulk Density (g/cm^3)	Wet Bulk Density (g/cm^3)	Calculated Porosity (%)
B1F3D4 Small Sub-Sample	7.9	NA	NA	NA	NA
B1F3D4 Composite (80%)	9.6	14.3	1.49	1.63	43.7
B1F3D4 Comp (80%) MSD	9.6	17.6	1.83	2.01	30.9
B1F3D4 Composite (90%)	5.3	8.7	1.64	1.73	38.0
B1F3D4 Comp (90%) MSD	5.3	9.7	1.83	1.93	30.9
B1F3D4 Composite (95%)	11.1	19.3	1.75	1.94	34.1
B1F3D4 Comp (95%) MSD	11.1	20.5	1.85	2.05	30.2
B1F3D4 Custom Blend (80%)	13.2	18.5	1.40	1.58	47.2
B1F3D4 Blend (80%) MSD	13.2	22.8	1.72	1.95	35.1
B1F3D4 Custom Blend (90%)	13.6	21.5	1.58	1.79	40.5
B1F3D4 Blend (90%) MSD	13.6	24.3	1.78	2.03	32.7
B1F3D4 Custom Blend (95%)	13.5	22.5	1.66	1.89	37.3
B1F3D4 Blend (95%) MSD	13.5	23.7	1.75	1.99	34.0

NA = Not analyzed

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Small Sub-Sample
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 4-Oct-05

Field weight of sample* (g): 624.02
Tare weight, ring (g): 0.00
Tare weight, cap/plate/epoxy (g): 286.96

Dry weight of sample (g): 312.42
Sample volume (cm^3): NA
Assumed particle density: 2.65

Initial Volumetric Moisture Content (% vol): NA
Initial Gravimetric Moisture Content (% g/g): 7.9
Dry bulk density (g/cm^3): NA
Wet bulk density (g/cm^3): NA
Calculated Porosity (% vol): NA
Percent Saturation: NA

Comments:

* Weight including tares
NA = Not analyzed

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Composite (80%)
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 4-Oct-05

Field weight of sample* (g): 510.12
Tare weight, ring (g): 142.95
Tare weight, cap/plate/epoxy (g): 0.00

Dry weight of sample (g): 335.05
Sample volume (cm^3): 224.67
Assumed particle density: 2.65

Initial Volumetric Moisture Content (% vol): 14.3
Initial Gravimetric Moisture Content (% g/g): 9.6
Dry bulk density (g/cm^3): 1.49
Wet bulk density (g/cm^3): 1.63
Calculated Porosity (% vol): 43.7
Percent Saturation: 32.7

Comments:

* Weight including tares
NA = Not analyzed

Laboratory analysis by: D. O'Dowd
Data entered by: J. Hines
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Comp (80%) MSD
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 4-Oct-05

Field weight of sample* (g): 510.12
Tare weight, ring (g): 142.95
Tare weight, cap/plate/epoxy (g): 0.00

Dry weight of sample (g): 335.05
Sample volume (cm^3): 182.97
Assumed particle density: 2.65

Initial Volumetric Moisture Content (% vol): 17.6
Initial Gravimetric Moisture Content (% g/g): 9.6
Dry bulk density (g/cm^3): 1.83
Wet bulk density (g/cm^3): 2.01
Calculated Porosity (% vol): 30.9
Percent Saturation: 56.8

Comments:

* Weight including tares
NA = Not analyzed

Laboratory analysis by: D. O'Dowd
Data entered by: J. Hines
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Composite (90%)
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 4-Nov-05

Field weight of sample* (g): 527.63
Tare weight, ring (g): 142.95
Tare weight, cap/plate/epoxy (g): 0.00

Dry weight of sample (g): 365.39
Sample volume (cm^3): 222.47
Assumed particle density: 2.65

Initial Volumetric Moisture Content (% vol): 8.7
Initial Gravimetric Moisture Content (% g/g): 5.3
Dry bulk density (g/cm^3): 1.64
Wet bulk density (g/cm^3): 1.73
Calculated Porosity (% vol): 38.0
Percent Saturation: 22.8

Comments:

* Weight including tares
NA = Not analyzed

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Comp (90%) MSD
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 4-Nov-05

Field weight of sample* (g): 527.63
Tare weight, ring (g): 142.95
Tare weight, cap/plate/epoxy (g): 0.00

Dry weight of sample (g): 365.39
Sample volume (cm^3): 199.41
Assumed particle density: 2.65

Initial Volumetric Moisture Content (% vol): 9.7

Initial Gravimetric Moisture Content (% g/g): 5.3

Dry bulk density (g/cm^3): 1.83

Wet bulk density (g/cm^3): 1.93

Calculated Porosity (% vol): 30.9

Percent Saturation: 31.4

Comments:

* Weight including tares
NA = Not analyzed

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Composite (95%)
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 4-Oct-05

Field weight of sample* (g): 549.11
Tare weight, ring (g): 101.62
Tare weight, cap/plate/epoxy (g): 0.00

Dry weight of sample (g): 402.94
Sample volume (cm^3): 230.67
Assumed particle density: 2.65

Initial Volumetric Moisture Content (% vol): 19.3
Initial Gravimetric Moisture Content (% g/g): 11.1
Dry bulk density (g/cm^3): 1.75
Wet bulk density (g/cm^3): 1.94
Calculated Porosity (% vol): 34.1
Percent Saturation: 56.7

Comments:

* Weight including tares
NA = Not analyzed

Laboratory analysis by: D. O'Dowd
Data entered by: C. Fillwock
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Comp (95%) MSD
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 4-Oct-05

Field weight of sample* (g): 549.11
Tare weight, ring (g): 101.62
Tare weight, cap/plate/epoxy (g): 0.00

Dry weight of sample (g): 402.94
Sample volume (cm^3): 217.77
Assumed particle density: 2.65

Initial Volumetric Moisture Content (% vol): 20.5
Initial Gravimetric Moisture Content (% g/g): 11.1
Dry bulk density (g/cm^3): 1.85
Wet bulk density (g/cm^3): 2.05
Calculated Porosity (% vol): 30.2
Percent Saturation: 67.8

Comments:

* Weight including tares
NA = Not analyzed

Laboratory analysis by: D. O'Dowd
Data entered by: C. Fillwock
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Custom Blend (80%)
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 24-Oct-05

Field weight of sample* (g): 499.48
Tare weight, ring (g): 144.12
Tare weight, cap/plate/epoxy (g): 0.00

Dry weight of sample (g): 313.81
Sample volume (cm^3): 224.32
Assumed particle density: 2.65

Initial Volumetric Moisture Content (% vol): 18.5

Initial Gravimetric Moisture Content (% g/g): 13.2

Dry bulk density (g/cm^3): 1.40

Wet bulk density (g/cm^3): 1.58

Calculated Porosity (% vol): 47.2

Percent Saturation: 39.2

Comments:

* Weight including tares
NA = Not analyzed

Laboratory analysis by: D. O'Dowd
Data entered by: J. Hines
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Blend (80%) MSD
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 24-Oct-05

Field weight of sample* (g): 499.48
Tare weight, ring (g): 144.12
Tare weight, cap/plate/epoxy (g): 0.00

Dry weight of sample (g): 313.81
Sample volume (cm^3): 182.41
Assumed particle density: 2.65

Initial Volumetric Moisture Content (% vol): 22.8
Initial Gravimetric Moisture Content (% g/g): 13.2
Dry bulk density (g/cm^3): 1.72
Wet bulk density (g/cm^3): 1.95
Calculated Porosity (% vol): 35.1
Percent Saturation: 64.9

Comments:

* Weight including tares
NA = Not analyzed

Laboratory analysis by: D. O'Dowd
Data entered by: J. Hines
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Custom Blend (90%)
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 24-Oct-05

Field weight of sample* (g): 538.80
Tare weight, ring (g): 134.64
Tare weight, cap/plate/epoxy (g): 0.00

Dry weight of sample (g): 355.68
Sample volume (cm^3): 225.71
Assumed particle density: 2.65

Initial Volumetric Moisture Content (% vol): 21.5
Initial Gravimetric Moisture Content (% g/g): 13.6
Dry bulk density (g/cm^3): 1.58
Wet bulk density (g/cm^3): 1.79
Calculated Porosity (% vol): 40.5
Percent Saturation: 53.0

Comments:

* Weight including tares
NA = Not analyzed

Laboratory analysis by: D. O'Dowd
Data entered by: J. Hines
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Blend (90%) MSD
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 24-Oct-05

Field weight of sample* (g): 538.80
Tare weight, ring (g): 134.64
Tare weight, cap/plate/epoxy (g): 0.00

Dry weight of sample (g): 355.68
Sample volume (cm^3): 199.36
Assumed particle density: 2.65

Initial Volumetric Moisture Content (% vol): 24.3
Initial Gravimetric Moisture Content (% g/g): 13.6
Dry bulk density (g/cm^3): 1.78
Wet bulk density (g/cm^3): 2.03
Calculated Porosity (% vol): 32.7
Percent Saturation: 74.4

Comments:

* Weight including tares
NA = Not analyzed

Laboratory analysis by: D. O'Dowd
Data entered by: J. Hines
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Custom Blend (95%)
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 24-Oct-05

Field weight of sample* (g): 535.88
Tare weight, ring (g): 101.49
Tare weight, cap/plate/epoxy (g): 0.00

Dry weight of sample (g): 382.56
Sample volume (cm^3): 230.30
Assumed particle density: 2.65

Initial Volumetric Moisture Content (% vol): 22.5
Initial Gravimetric Moisture Content (% g/g): 13.5
Dry bulk density (g/cm^3): 1.66
Wet bulk density (g/cm^3): 1.89
Calculated Porosity (% vol): 37.3
Percent Saturation: 60.3

Comments:

* Weight including tares
NA = Not analyzed

Laboratory analysis by: D. O'Dowd
Data entered by: J. Hines
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Blend (95%) MSD
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 24-Oct-05

Field weight of sample* (g): 535.88
Tare weight, ring (g): 101.49
Tare weight, cap/plate/epoxy (g): 0.00

Dry weight of sample (g): 382.56
Sample volume (cm^3): 218.77
Assumed particle density: 2.65

Initial Volumetric Moisture Content (% vol): 23.7
Initial Gravimetric Moisture Content (% g/g): 13.5
Dry bulk density (g/cm^3): 1.75
Wet bulk density (g/cm^3): 1.99
Calculated Porosity (% vol): 34.0
Percent Saturation: 69.7

Comments:

* Weight including tares
NA = Not analyzed

Laboratory analysis by: D. O'Dowd
Data entered by: J. Hines
Checked by: J. Hines

Saturated Hydraulic Conductivity

Summary of Saturated Hydraulic Conductivity Tests

Sample Number	K_{sat} (cm/sec)	Method of Analysis	
		Constant Head	Falling Head
B1F3D4 Composite (80%)	8.3E-02	X	
B1F3D4 Comp (80%) MSD	6.7E-02	X	
B1F3D4 Composite (90%)	5.2E-02	X	
B1F3D4 Comp (90%) MSD	3.5E-02	X	
B1F3D4 Composite (95%)	4.0E-02	X	
B1F3D4 Comp (95%) MSD	3.8E-02	X	
B1F3D4 Custom Blend (80%)	5.3E-02	X	
B1F3D4 Blend (80%) MSD	4.3E-02	X	
B1F3D4 Custom Blend (90%)	5.0E-02	X	
B1F3D4 Blend (90%) MSD	4.5E-02	X	
B1F3D4 Custom Blend (95%)	2.8E-02	X	
B1F3D4 Blend (95%) MSD	2.7E-02	X	

Daniel B. Stephens & Associates, Inc.

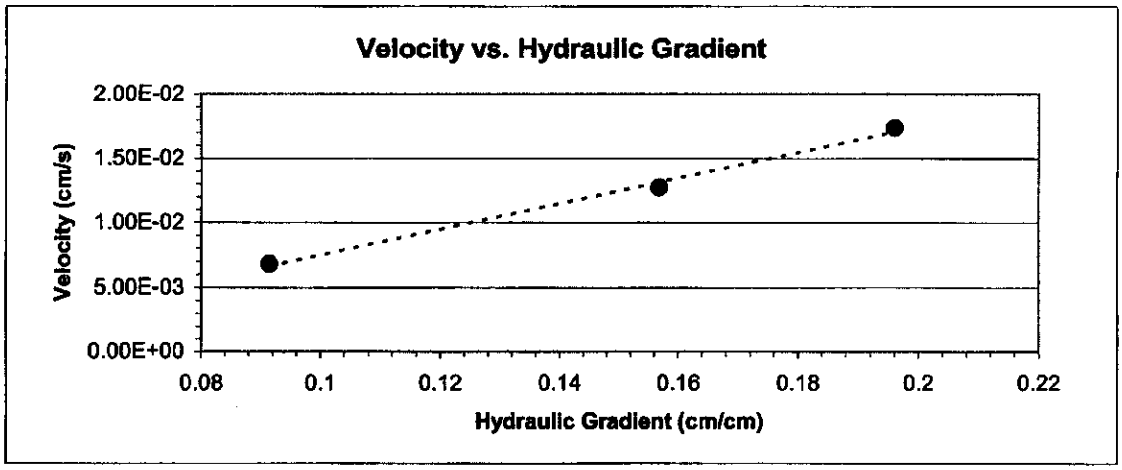
Saturated Hydraulic Conductivity
Constant Head Method

Job name: Fluor Hanford, Inc.
Job number: LB05.0212.00
Sample number: B1F3D4 Composite (80%)
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Type of water used: TAP
Collection vessel tare (g): 6.64
Sample length (cm): 7.65
Sample diameter (cm): 6.12
Sample x-sectional area (cm^2): 29.37

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
06-Dec-05	10:01:32	19.0	1.2	17.1	10.5	28	8.1E-02	8.3E-02
06-Dec-05	10:02:00							
Test # 2:								
06-Dec-05	11:03:05	19.0	1.5	22.0	15.3	30	8.9E-02	9.0E-02
06-Dec-05	11:03:35							
Test # 3:								
06-Dec-05	12:07:03	19.5	0.7	15.0	8.4	42	7.4E-02	7.5E-02
06-Dec-05	12:07:45							

***Average Ksat* (cm/sec):** **8.3E-02**



Comments:

Laboratory analysis by: M. Carillo
Data entered by: J. Hines
Checked by: J. Hines

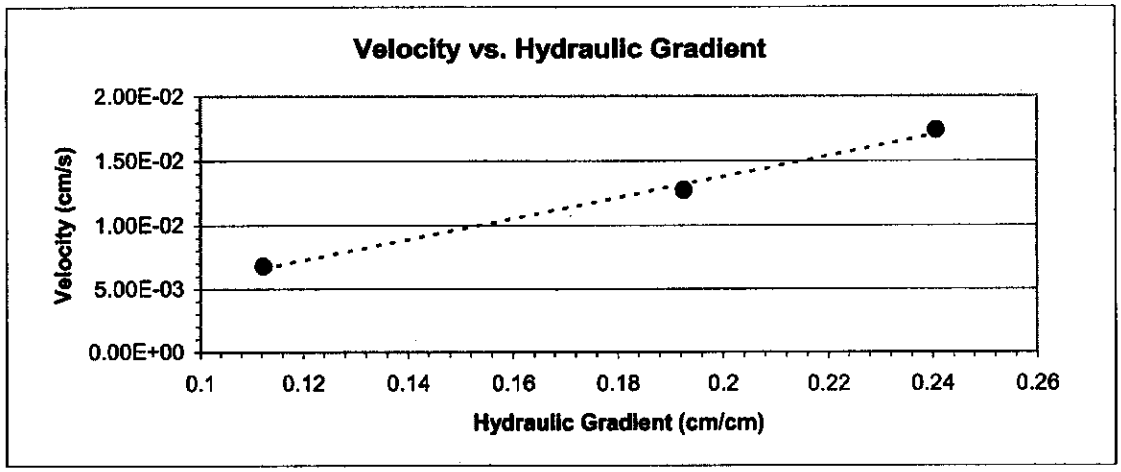
Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Fluor Hanford, Inc.	*Type of water used:*	TAP
Job number:	LB05.0212.00	*Collection vessel tare* (g):	6.64
Sample number:	B1F3D4 Comp (80%) MSD	*Sample length* (cm):	6.23
Location:	Sand Pile - ARP	*Sample diameter* (cm):	6.12
Date/Time Collected:	9/23/05 11:42	*Sample x-sectional area* (cm^2):	29.37

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
06-Dec-05	10:01:32	19.0	1.2	17.1	10.5	28	6.6E-02	6.7E-02
06-Dec-05	10:02:00							
Test # 2:								
06-Dec-05	11:03:05	19.0	1.5	22.0	15.3	30	7.2E-02	7.4E-02
06-Dec-05	11:03:35							
Test # 3:								
06-Dec-05	12:07:03	19.5	0.7	15.0	8.4	42	6.0E-02	6.1E-02
06-Dec-05	12:07:45							

***Average Ksat* (cm/sec):** **6.7E-02**



Comments:

Laboratory analysis by: M. Carillo
Data entered by: J. Hines
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

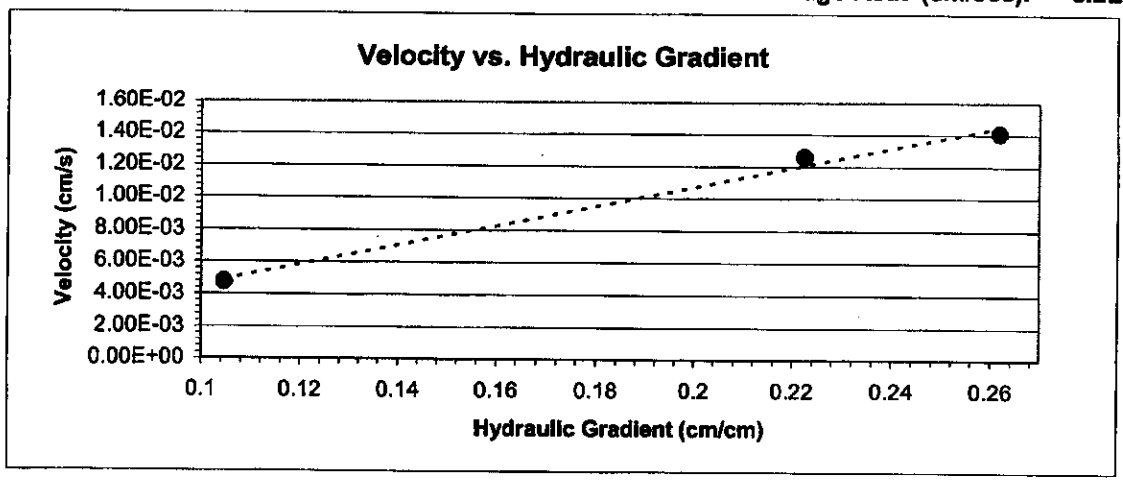
Saturated Hydraulic Conductivity
Constant Head Method

Job name: Fluor Hanford, Inc.
Job number: LB05.0212.00
Sample number: B1F3D4 Composite (90%)
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Type of water used: TAP
Collection vessel tare (g): 4.62
Sample length (cm): 7.64
Sample diameter (cm): 6.09
Sample x-sectional area (cm^2): 29.12

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
02-Dec-05	14:18:40	19.5	2.0	21.0	16.4	40	5.4E-02	5.4E-02
02-Dec-05	14:19:20							
Test # 2:								
02-Dec-05	16:16:25	19.5	1.7	17.5	12.8	35	5.7E-02	5.7E-02
02-Dec-05	16:17:00							
Test # 3:								
04-Dec-05	10:52:10	19.0	0.8	13.2	8.6	62	4.5E-02	4.6E-02
04-Dec-05	10:53:12							

***Average Ksat* (cm/sec): 5.2E-02**



Comments:

Laboratory analysis by: M. Carillo
Data entered by: M. Carillo
Checked by: J. Hines

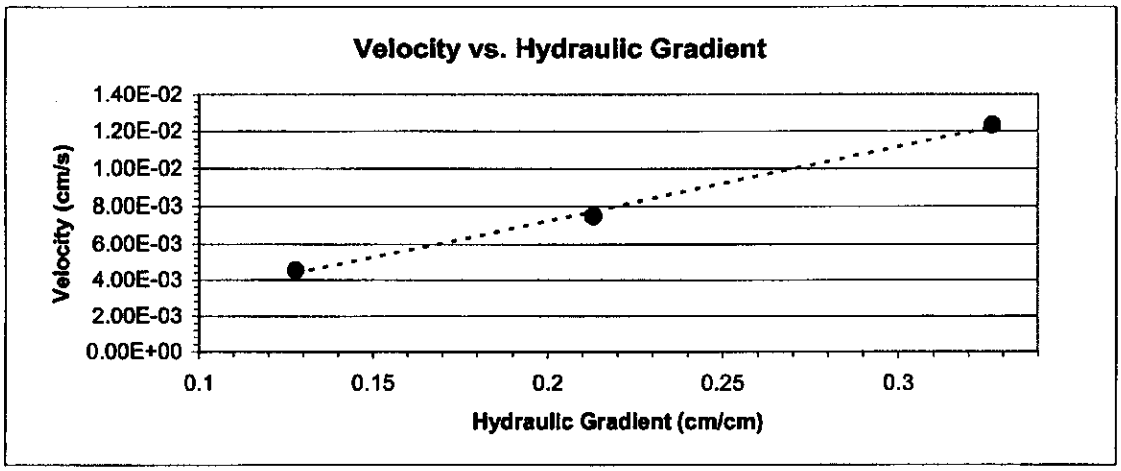
Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Fluor Hanford, Inc.	*Type of water used:*	TAP
Job number:	LB05.0212.00	*Collection vessel tare* (g):	6.38
Sample number:	B1F3D4 Comp (90%) MSD	*Sample length* (cm):	7.04
Location:	Sand Pile - ARP	*Sample diameter* (cm):	6.13
Date/Time Collected:	9/23/05 11:42	*Sample x-sectional area* (cm^2):	29.54

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
27-Nov-05	10:36:32	19.0	0.9	11.7	5.4	40	3.5E-02	3.6E-02
27-Nov-05	10:37:12							
Test # 2:								
28-Nov-05	08:08:30	19.0	1.5	14.6	8.2	37	3.5E-02	3.6E-02
28-Nov-05	08:09:07							
Test # 3:								
28-Nov-05	12:10:24	20.0	2.3	18.4	12.0	33	3.8E-02	3.8E-02
28-Nov-05	12:10:57							

***Average Ksat* (cm/sec):** **3.7E-02**



Comments:

Laboratory analysis by: M. Carillo
Data entered by: M. Carillo
Checked by: J. Hines

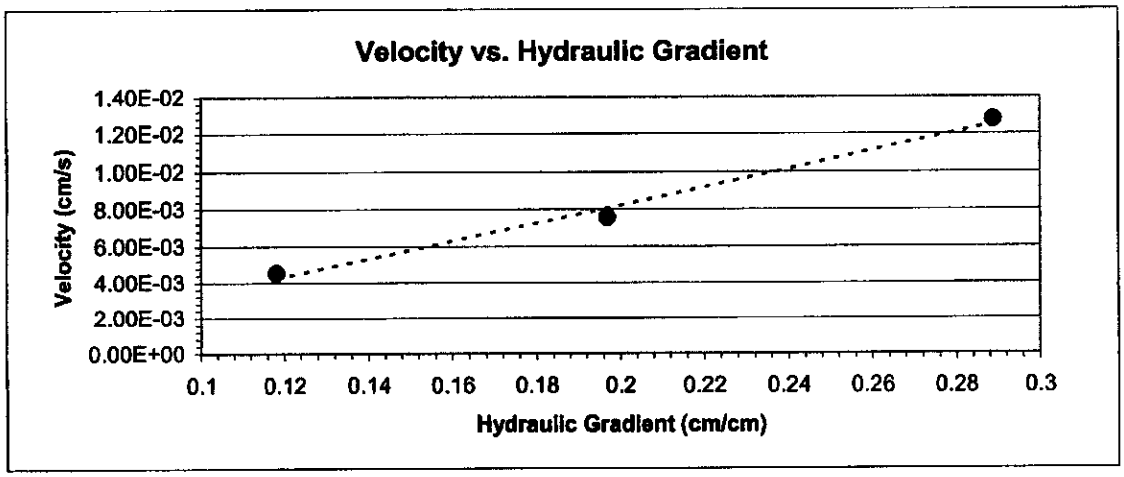
Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Fluor Hanford, Inc.	*Type of water used:*	TAP
Job number:	LB05.0212.00	*Collection vessel tare* (g):	11.36
Sample number:	B1F3D4 Composite (95%)	*Sample length* (cm):	7.62
Location:	Sand Pile - ARP	*Sample diameter* (cm):	6.21
Date/Time Collected:	9/23/05 11:42	*Sample x-sectional area* (cm^2):	30.29

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
01-Dec-05	13:10:50	20.0	0.9	18.2	6.9	50	3.8E-02	3.8E-02
01-Dec-05	13:11:40							
Test # 2:								
02-Dec-05	14:20:36	19.5	1.5	21.4	10.1	44	3.8E-02	3.9E-02
02-Dec-05	14:21:20							
Test # 3:								
02-Dec-05	16:22:37	19.5	2.2	21.0	9.7	25	4.4E-02	4.5E-02
02-Dec-05	16:23:02							

***Average Ksat* (cm/sec):** **4.0E-02**



Comments:

Laboratory analysis by: M. Carillo
Data entered by: M. Carillo
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

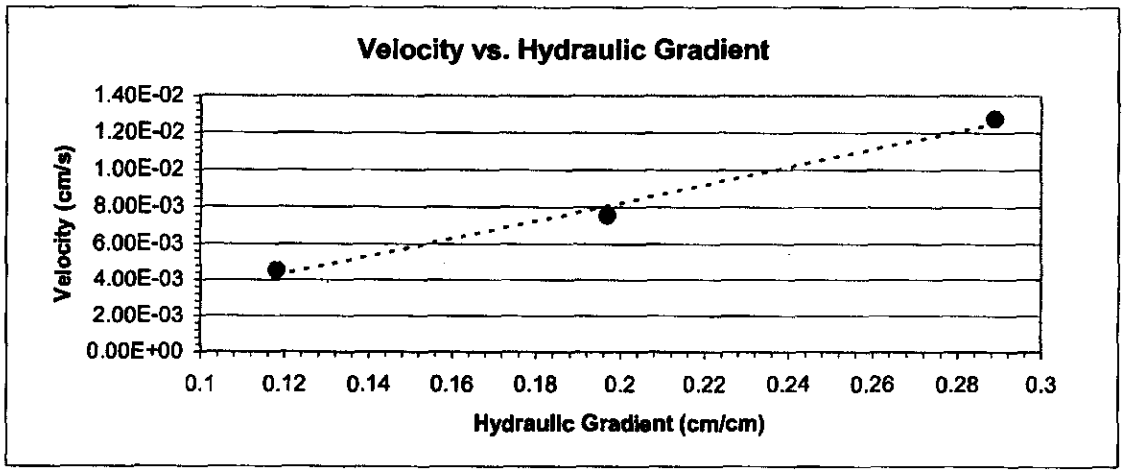
Saturated Hydraulic Conductivity
Constant Head Method

Job name: Fluor Hanford, Inc.
Job number: LB05.0212.00
Sample number: B1F3D4 Composite (95%)
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Type of water used: TAP
Collection vessel tare (g): 11.36
Sample length (cm): 7.62
Sample diameter (cm): 6.21
Sample x-sectional area (cm^2): 30.29

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
01-Dec-05	13:10:50	20.0	0.9	18.2	6.9	50	3.8E-02	3.8E-02
01-Dec-05	13:11:40							
Test # 2:								
02-Dec-05	14:20:36	19.5	1.5	21.4	10.1	44	3.8E-02	3.9E-02
02-Dec-05	14:21:20							
Test # 3:								
02-Dec-05	16:22:37	19.5	2.2	21.0	9.7	25	4.4E-02	4.5E-02
02-Dec-05	16:23:02							

***Average Ksat* (cm/sec): 4.0E-02**



Comments:

Laboratory analysis by: M. Carillo
Data entered by: M. Carillo
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

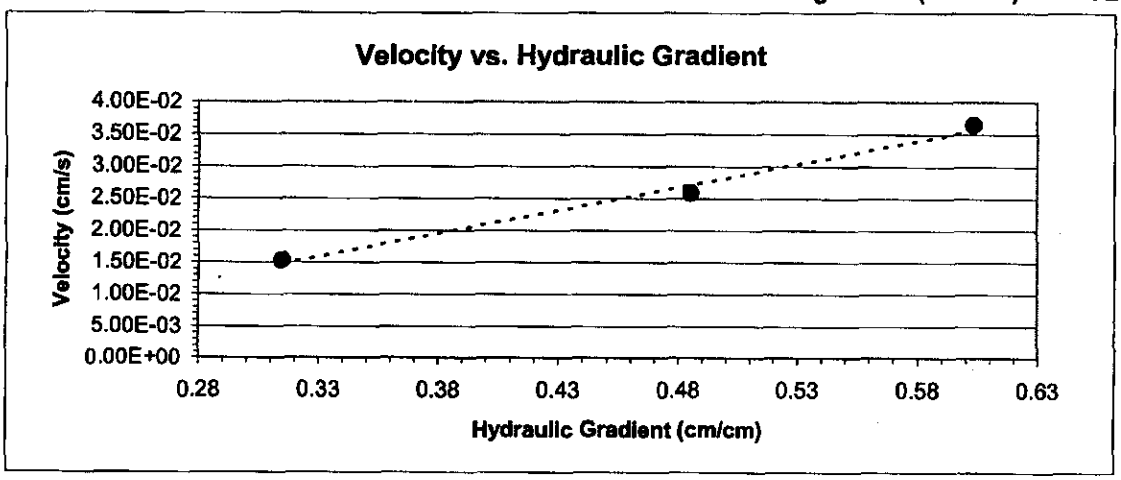
Saturated Hydraulic Conductivity
Constant Head Method

Job name: Fluor Hanford, Inc.
Job number: LB05.0212.00
Sample number: B1F3D4 Custom Blend (80%)
Location: Sand Pile - American Rock Produc
Date/Time Collected: 9/23/05 11:42

Type of water used: TAP
Collection vessel tare (g): 4.73
Sample length (cm): 7.62
Sample diameter (cm): 6.12
Sample x-sectional area (cm^2): 29.43

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
01-Nov-05	11:23:10	20.0	2.4	15.1	10.3	23	4.8E-02	4.8E-02
01-Nov-05	11:23:33							
Test # 2:								
01-Nov-05	15:20:10	21.5	3.7	20.0	15.2	20	5.3E-02	5.1E-02
01-Nov-05	15:20:30							
Test # 3:								
03-Nov-05	12:57:10	21.0	4.6	23.0	18.3	17	6.0E-02	5.9E-02
03-Nov-05	12:57:27							

***Average Ksat* (cm/sec): 5.3E-02**



Comments:

Laboratory analysis by: M. Carillo
Data entered by: M. Carillo
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

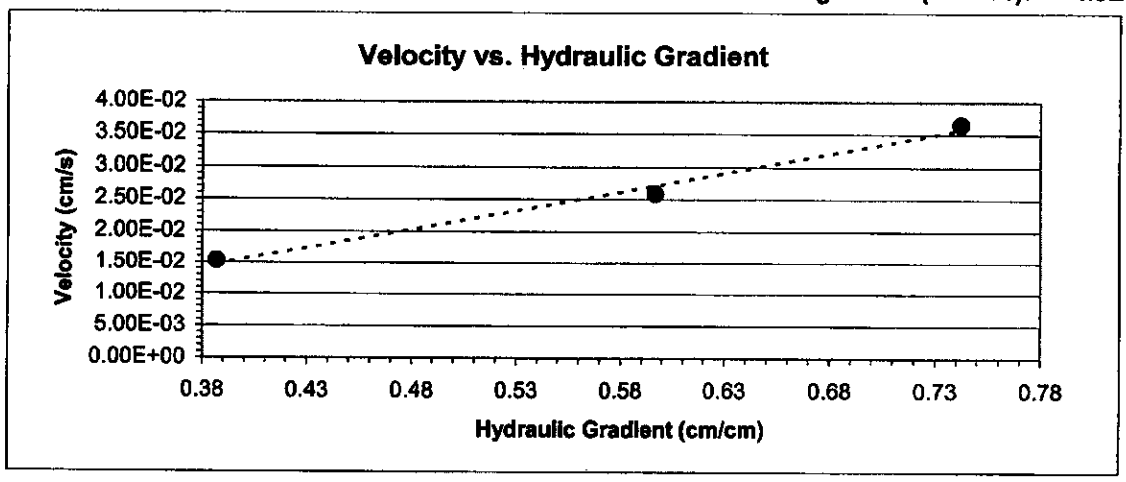
Saturated Hydraulic Conductivity
Constant Head Method

Job name: Fluor Hanford, Inc.
Job number: LB05.0212.00
Sample number: B1F3D4 Blend (80%) MSD
Ring Number: Sand Pile - American Rock Produc
Depth: 9/23/05 11:42

Type of water used: TAP
Collection vessel tare (g): 4.73
Sample length (cm): 6.20
Sample diameter (cm): 6.12
Sample x-sectional area (cm^2): 29.43

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
01-Nov-05	11:23:10	20.0	2.4	15.1	10.3	23	3.9E-02	3.9E-02
01-Nov-05	11:23:33							
Test # 2:								
01-Nov-05	15:20:10	21.5	3.7	20.0	15.2	20	4.3E-02	4.2E-02
01-Nov-05	15:20:30							
Test # 3:								
03-Nov-05	12:57:10	21.0	4.6	23.0	18.3	17	4.9E-02	4.8E-02
03-Nov-05	12:57:27							

***Average Ksat* (cm/sec):** **4.3E-02**



Comments:

Laboratory analysis by: M. Carillo
Data entered by: M. Carillo
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

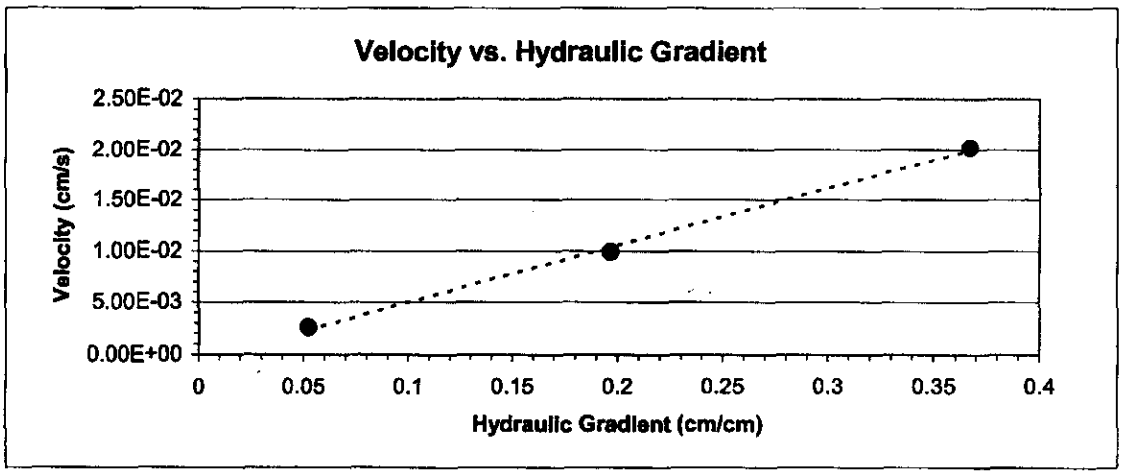
Saturated Hydraulic Conductivity
Constant Head Method

Job name: Fluor Hanford, Inc.
Job number: LB05.0212.00
Sample number: B1F3D4 Custom Blend (90%)
Location: Sand Pile - American Rock Product
Date/Time Collected: 9/23/05 11:42

Type of water used: TAP
Collection vessel tare (g): 6.36
Sample length (cm): 7.62
Sample diameter (cm): 6.14
Sample x-sectional area (cm^2): 29.61

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
27-Oct-05	12:42:00	20.5	1.5	19.5	13.2	45	5.0E-02	5.0E-02
27-Oct-05	12:42:45							
Test # 2:								
27-Oct-05	16:41:42	21.5	2.8	20.1	13.7	23	5.5E-02	5.3E-02
27-Oct-05	16:42:05							
Test # 3:								
28-Oct-05	12:12:16	20.5	0.4	27.0	20.6	270	4.9E-02	4.9E-02
28-Oct-05	12:16:46							

***Average Ksat* (cm/sec): 5.0E-02**



Comments:

Laboratory analysis by: M. Carillo
Data entered by: J. Hines
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

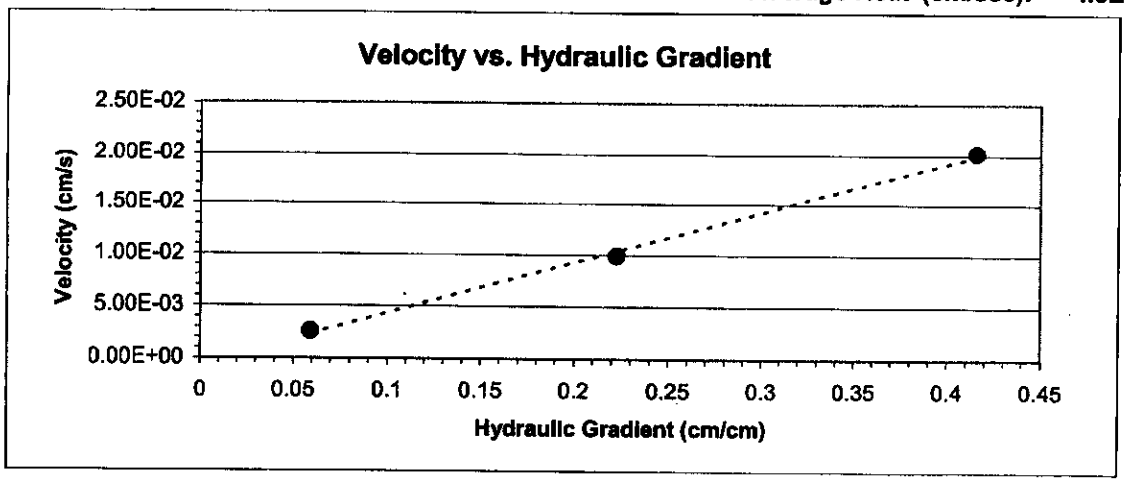
Saturated Hydraulic Conductivity
Constant Head Method

Job name: Fluor Hanford, Inc.
Job number: LB05.0212.00
Sample number: B1F3D4 Blend (90%) MSD
Ring Number: Sand Pile - American Rock Product
Depth: 9/23/05 11:42

Type of water used: TAP
Collection vessel tare (g): 6.36
Sample length (cm): 6.73
Sample diameter (cm): 6.14
Sample x-sectional area (cm^2): 29.61

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
27-Oct-05	12:42:00	20.5	1.5	19.5	13.2	45	4.4E-02	4.4E-02
27-Oct-05	12:42:45							
Test # 2:								
27-Oct-05	16:41:42	21.5	2.8	20.1	13.7	23	4.8E-02	4.7E-02
27-Oct-05	16:42:05							
Test # 3:								
28-Oct-05	12:12:16	20.5	0.4	27.0	20.6	270	4.3E-02	4.3E-02
28-Oct-05	12:16:46							

***Average Ksat* (cm/sec):** **4.5E-02**



Comments:

Laboratory analysis by: M. Carillo
Data entered by: J. Hines
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

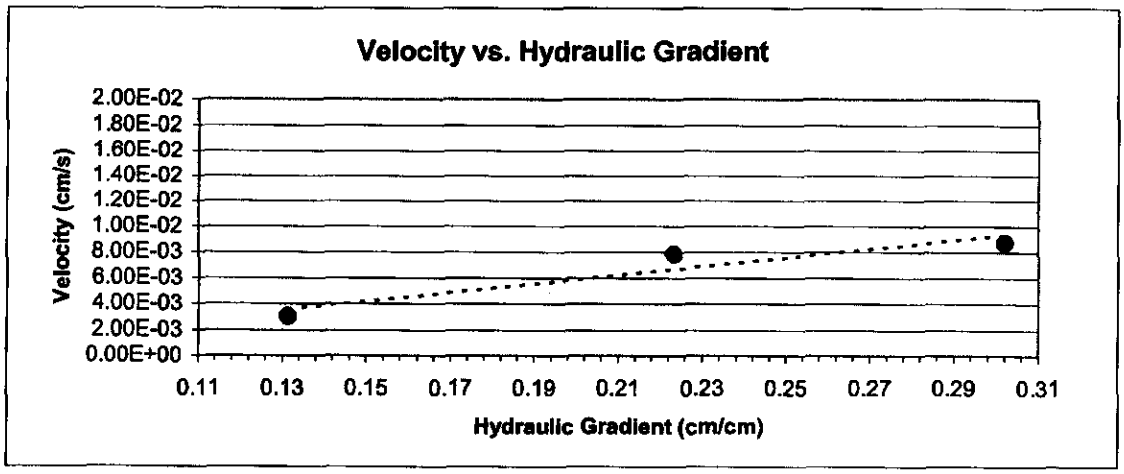
Saturated Hydraulic Conductivity
Constant Head Method

Job name: Fluor Hanford, Inc.
Job number: LB05.0212.00
Sample number: B1F3D4 Custom Blend (95%)
Location: Sand Pile - American Rock Product
Date/Time Collected: 9/23/05 11:42

Type of water used: TAP
Collection vessel tare (g): 6.62
Sample length (cm): 7.61
Sample diameter (cm): 6.21
Sample x-sectional area (cm^2): 30.26

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
27-Oct-05	12:43:54	20.5	2.3	22.7	16.1	61	2.9E-02	2.8E-02
27-Oct-05	12:44:55							
Test # 2:								
27-Oct-05	14:44:43	21.5	1.0	18.0	11.4	125	2.3E-02	2.2E-02
27-Oct-05	14:46:48							
Test # 3:								
28-Oct-05	15:07:03	20.5	1.7	41.4	34.8	147	3.5E-02	3.5E-02
28-Oct-05	15:09:30							

***Average Ksat* (cm/sec): 2.8E-02**



Comments:

Laboratory analysis by: M. Carillo
Data entered by: J. Hines
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

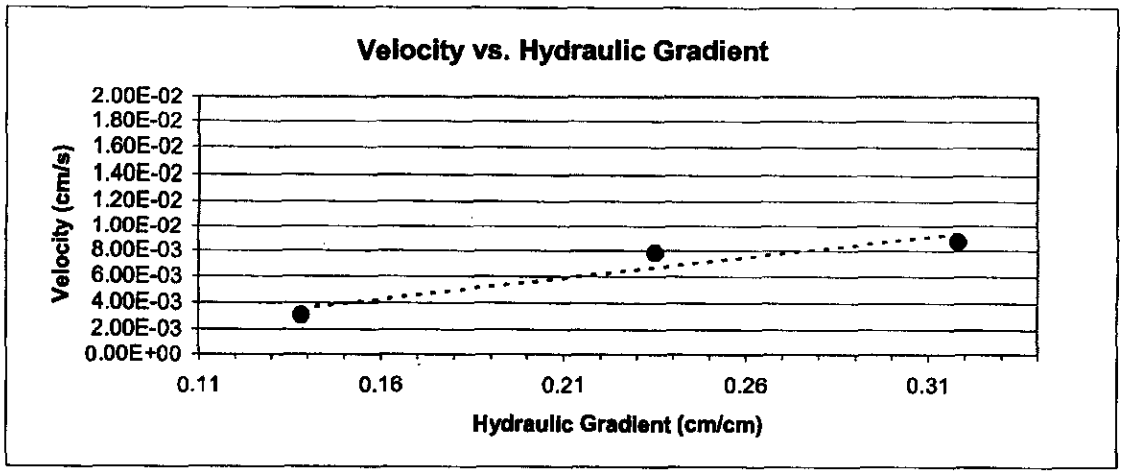
Saturated Hydraulic Conductivity
Constant Head Method

Job name: Fluor Hanford, Inc.
Job number: LB05.0212.00
Sample number: B1F3D4 Blend (95%) MSD
Ring Number: Sand Pile - American Rock Product
Depth: 9/23/05 11:42

Type of water used: TAP
Collection vessel tare (g): 6.62
Sample length (cm): 7.23
Sample diameter (cm): 6.21
Sample x-sectional area (cm^2): 30.26

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
27-Oct-05	12:43:54	20.5	2.3	22.7	16.1	61	2.7E-02	2.7E-02
27-Oct-05	12:44:55							
Test # 2:								
27-Oct-05	14:44:43	21.5	1.0	18.0	11.4	125	2.2E-02	2.1E-02
27-Oct-05	14:46:48							
Test # 3:								
28-Oct-05	15:07:03	20.5	1.7	41.4	34.8	147	3.3E-02	3.3E-02
28-Oct-05	15:09:30							

***Average Ksat* (cm/sec): 2.7E-02**



Comments:

Laboratory analysis by: M. Carillo
Data entered by: J. Hines
Checked by: J. Hines

Unsaturated Hydraulic Conductivity

Summary of Moisture Characteristics of the Initial Drainage Curve

Sample Number	Pressure Head (-cm water)	Moisture Content (%, cm^3/cm^3)
B1F3D4 Composite (80%)	0	27.2
	9	25.4
	41	7.2
	82	4.7
	510	3.6
	9790	1.6
	851293	1.2
B1F3D4 Comp (80%) MSD	0	33.4
	9	31.2
	41	8.9
	82	5.7
	510	4.4
	9790	1.9
	851293	1.4
B1F3D4 Composite (90%)	0	33.3
	4	31.4
	15	23.8
	81	5.0
	510	3.9
	14583	3.4
	851293	1.4
B1F3D4 Comp (90%) MSD	0	37.2
	4	35.1
	15	26.6
	81	5.5
	510	4.4
	14583	3.8
	851293	1.5

Summary of Moisture Characteristics of the Initial Drainage Curve (Continued)

Sample Number	Pressure Head (-cm water)	Moisture Content (%, cm^3/cm^3)
B1F3D4 Composite (95%)	0	33.0
	11	30.6
	37	9.0
	84	5.4
	510	4.3
	7750	2.6
	851293	1.4
B1F3D4 Comp (95%) MSD	0	35.0
	11	32.4
	37	9.5
	84	5.8
	510	4.6
	7750	2.8
	851293	1.4
B1F3D4 Custom Blend (80%)	0	31.8
	10	29.7
	36	14.0
	90	5.2
	612	4.0
	14787	2.7
	851293	1.3
B1F3D4 Blend (80%) MSD	0	39.1
	10	36.5
	36	17.2
	90	6.4
	612	4.9
	14787	3.3
	851293	1.6

Summary of Moisture Characteristics of the Initial Drainage Curve (Continued)

Sample Number	Pressure Head (-cm water)	Moisture Content (%, cm^3/cm^3)
B1F3D4 Custom Blend (90%)	0	33.8
	11	32.2
	39	14.5
	82	6.2
	612	4.7
	23047	2.3
	851293	1.5
B1F3D4 Blend (90%) MSD	0	38.3
	11	36.5
	39	16.4
	82	7.0
	612	5.3
	23047	2.6
	851293	1.7
B1F3D4 Custom Blend (95%)	0	35.8
	10	32.4
	35	15.9
	79	6.2
	510	4.6
	22334	2.9
	851293	1.7
B1F3D4 Blend (95%) MSD	0	37.7
	10	34.1
	35	16.7
	79	6.5
	510	4.8
	22334	3.1
	851293	1.8

Summary of Calculated Unsaturated Hydraulic Properties

Sample Number	α (cm^{-1})	N (dimensionless)	θ_r	θ_s
B1F3D4 Composite (80%)	0.0571	2.7210	0.0220	0.2743
B1F3D4 Comp (80%) MSD	0.0572	2.7210	0.0270	0.3369
B1F3D4 Composite (90%)	0.0609	2.5588	0.0278	0.3264
B1F3D4 Comp (90%) MSD	0.0609	2.5606	0.0310	0.3643
B1F3D4 Composite (95%)	0.0519	3.2694	0.0307	0.3323
B1F3D4 Comp (95%) MSD	0.0519	3.2702	0.0325	0.3519
B1F3D4 Custom Blend (80%)	0.0449	2.6338	0.0253	0.3172
B1F3D4 Blend (80%) MSD	0.0449	2.6351	0.0311	0.3901
B1F3D4 Custom Blend (90%)	0.0400	2.8294	0.0277	0.3394
B1F3D4 Blend (90%) MSD	0.0401	2.8296	0.0314	0.3842
B1F3D4 Custom Blend (95%)	0.0483	2.5344	0.0284	0.3553
B1F3D4 Blend (95%) MSD	0.0548	2.0759	0.0000	0.3811

Summary of Calculated Unsaturated Hydraulic Properties with Gravel Corrections

Sample Number	Ksat	α (cm^{-1})	N (dimensionless)	θ_i	θ_r	θ_s
B1F3D4 Composite (80%)	8.0E-02	0.0571	2.7210	0.1385	0.0213	0.2657
B1F3D4 Comp (80%) MSD	6.4E-02	0.0572	2.7210	0.1693	0.0260	0.3240
B1F3D4 Composite (90%)	5.0E-02	0.0609	2.5588	0.0840	0.0268	0.3152
B1F3D4 Comp (90%) MSD	3.4E-02	0.0609	2.5606	0.0933	0.0298	0.3504
B1F3D4 Composite (95%)	3.9E-02	0.0519	3.2694	0.1859	0.0296	0.3201
B1F3D4 Comp (95%) MSD	3.7E-02	0.0519	3.2702	0.1971	0.0312	0.3383

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column/Pressure Plate/Thermocouple

(Main Drainage Curve)

Job Name:	Fluor Hanford, Inc.	*Dry wt. of sample* (g):	335.05
Job Number:	LB05.0212.00	*Tare wt., screen & clamp* (g):	25.68
Sample Number:	B1F3D4 Composite (80%)	*Tare wt., ring* (g):	142.95
Location:	Sand Pile - ARP	*Tare wt., epoxy* (g):	0.00
Date/Time Collected:	9/23/05 11:42	*Sample volume* (cm^3):	224.67

Saturated weight at 0 cm tension* (g): 564.84
Volume of water† in saturated sample (cm^3): 61.16
Saturated moisture content (% vol): 27.22
Sample bulk density (g/cm^3): 1.49

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Hanging column:	28-Oct-05 / 14:10	564.84	0.00	27.22
	04-Nov-05 / 10:52	560.77	8.50	25.41
	11-Nov-05 / 16:50	519.95	40.50	7.24
	17-Nov-05 / 15:25	514.19	81.50	4.68
Pressure plate:	23-Nov-05 / 09:45	511.80	509.90	3.61

Comments:

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Water Activity Meter/Relative Humidity Box

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Composite (80%)
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Dry weight of water activity meter sample* (g): 154.88
Tare weight, jar (g): 112.86
Sample bulk density (g/cm^3): 1.49

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Water Activity Meter:	11-Nov-05 / 13:55	155.32	9790.1	1.56

Dry weight of relative humidity box sample* (g): 96.73
Tare weight (g): 44.18
Sample bulk density (g/cm^3): 1.49

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Relative humidity box:	31-Oct-05 / 10:00	97.13	851293	1.16

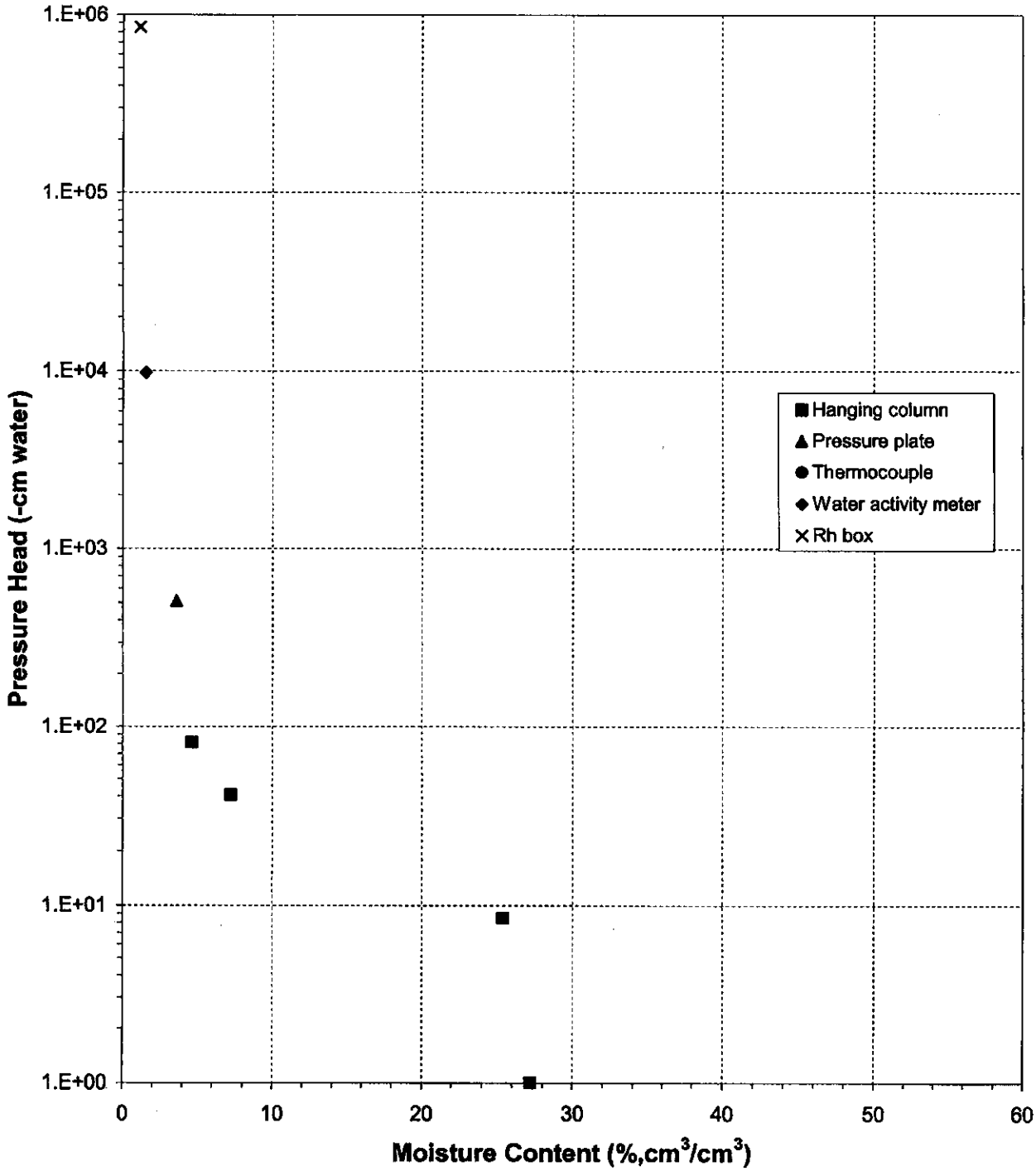
Comments:

* Weight including tares
† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo/O'Dowd/Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Water Retention Data Points

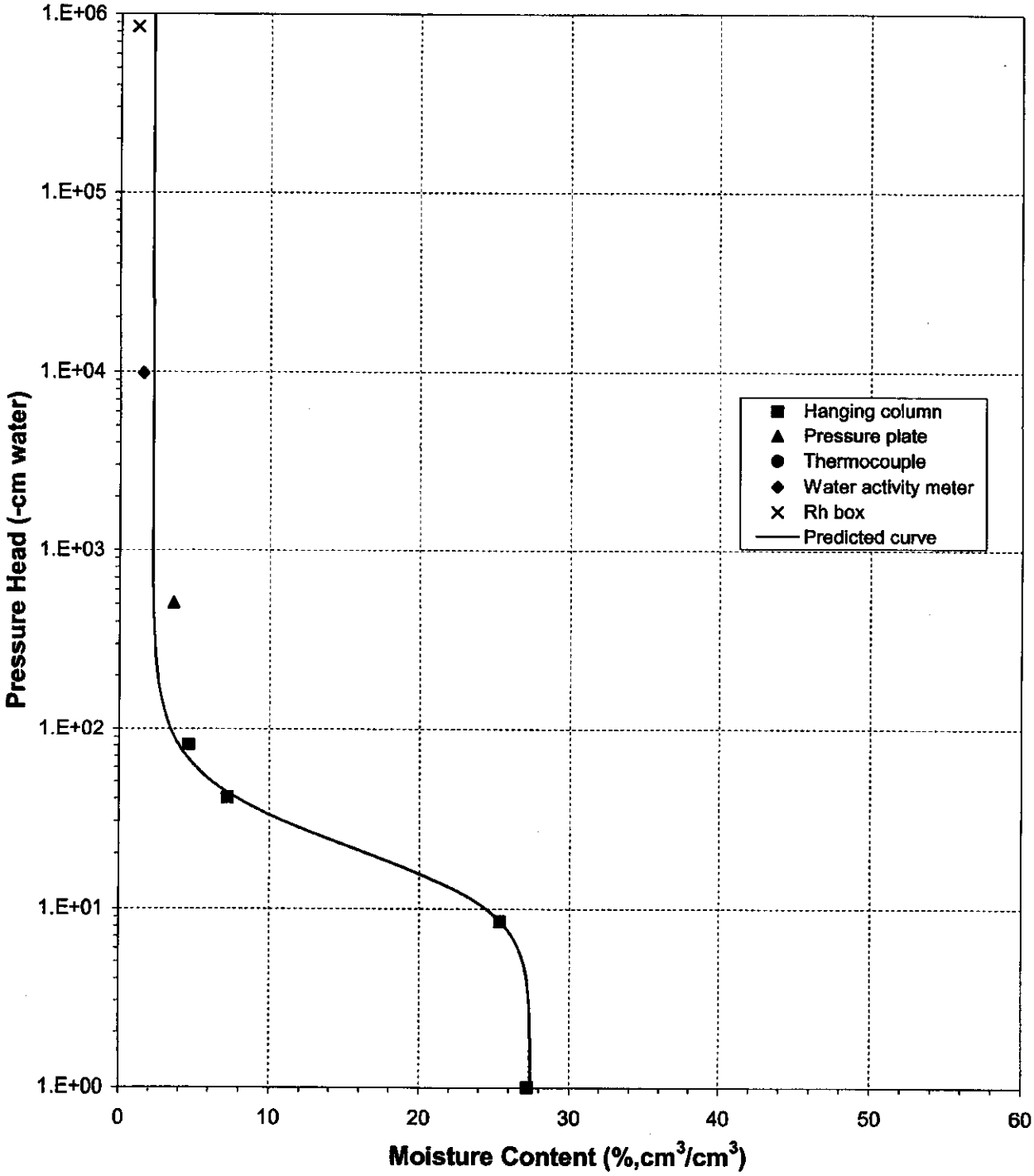
Sample Number: B1F3D4 Composite (80%)



Daniel B. Stephens & Associates, Inc.

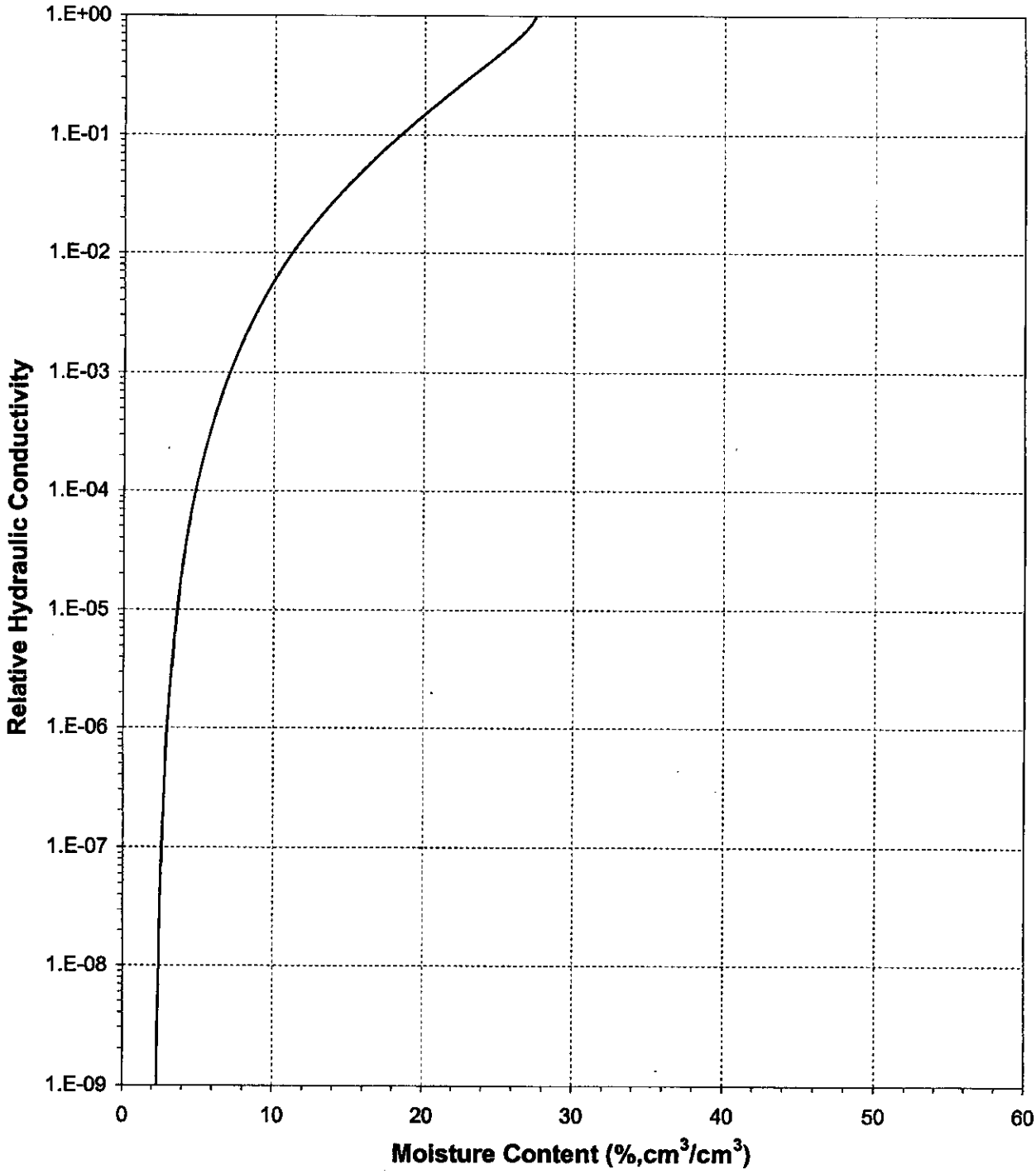
Predicted Water Retention Curve and Data Points

Sample Number: B1F3D4 Composite (80%)



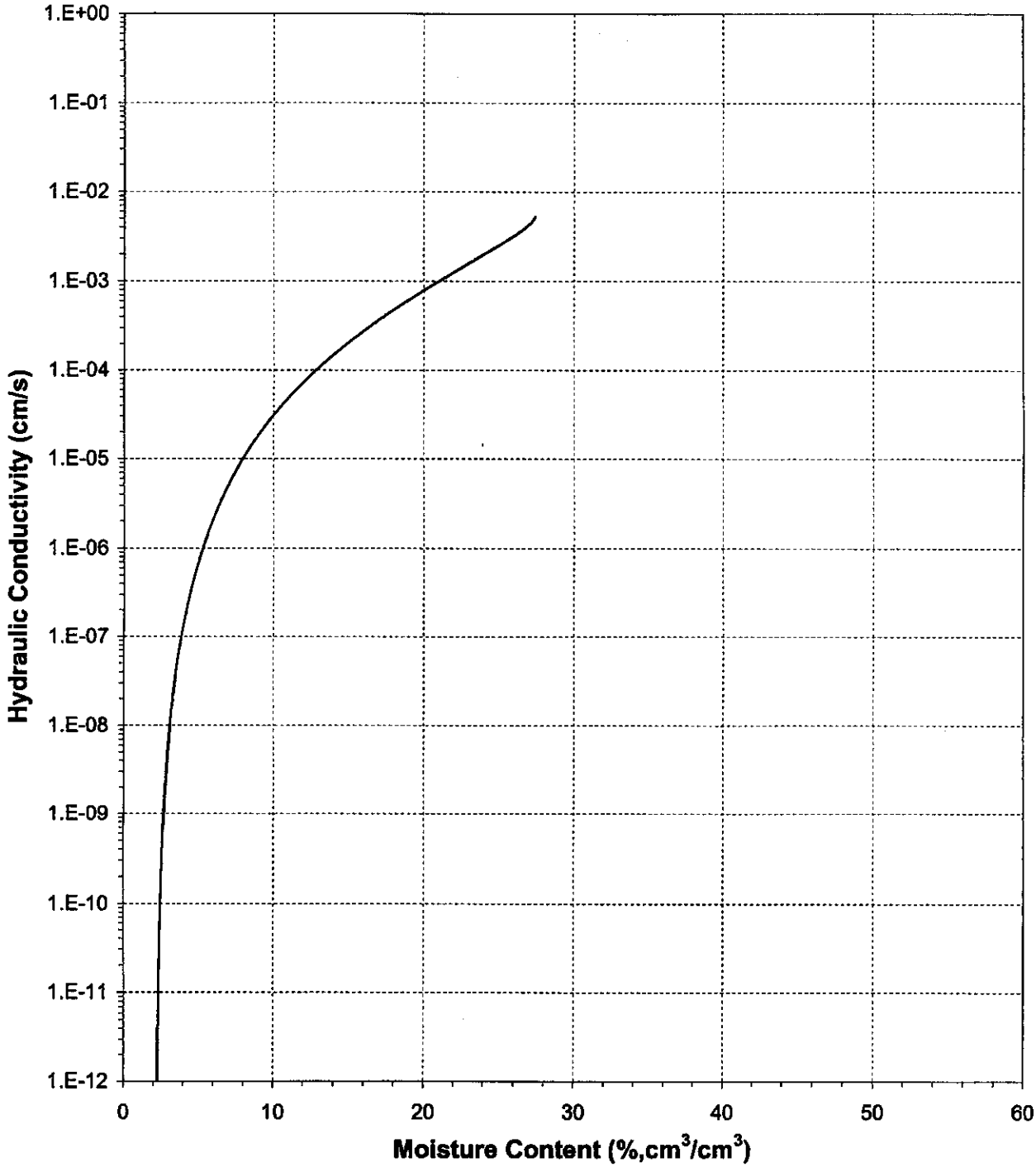
Plot of Relative Hydraulic Conductivity vs Moisture Content

Sample Number: B1F3D4 Composite (80%)



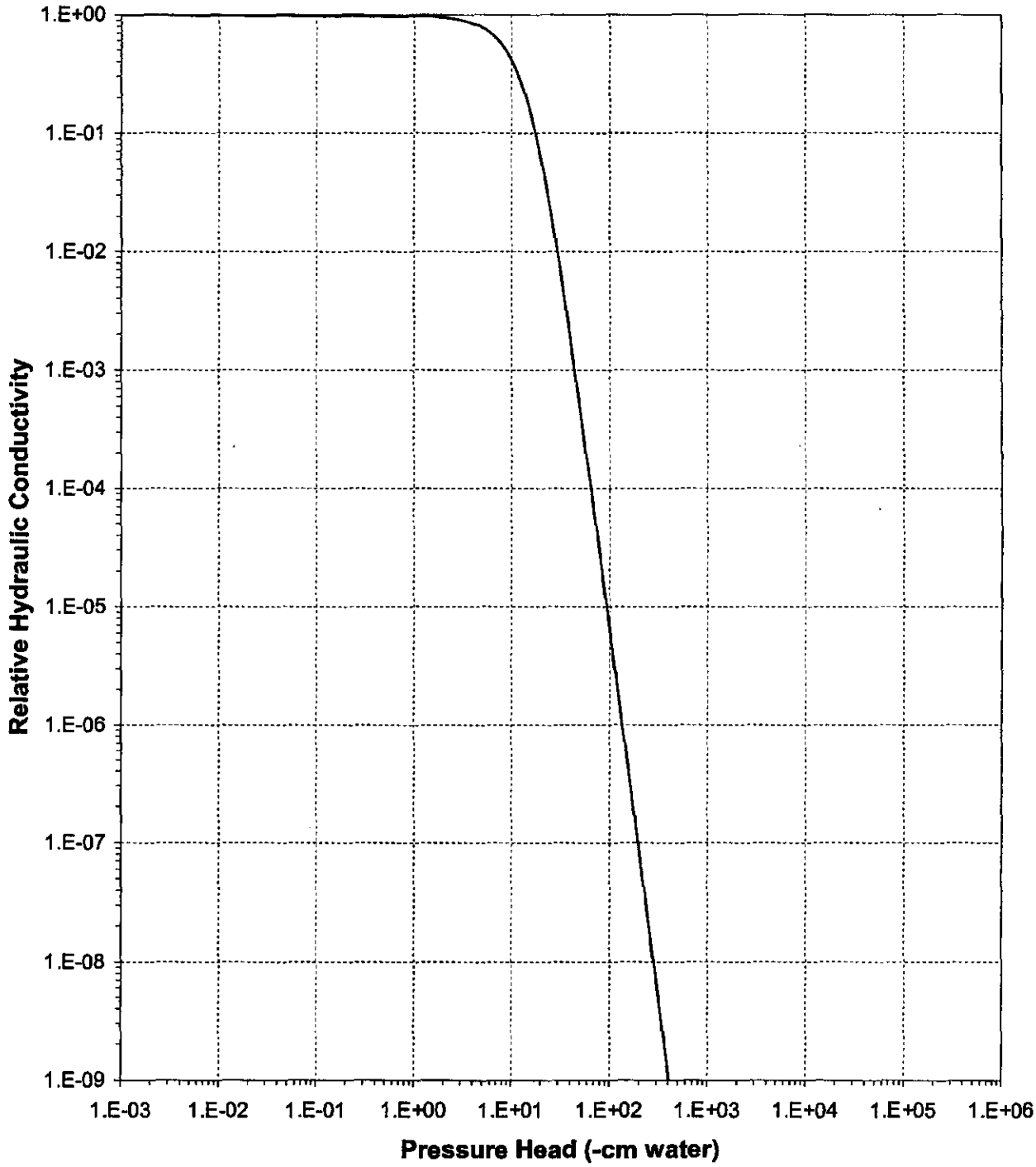
Plot of Hydraulic Conductivity vs Moisture Content

Sample Number: B1F3D4 Composite (80%)



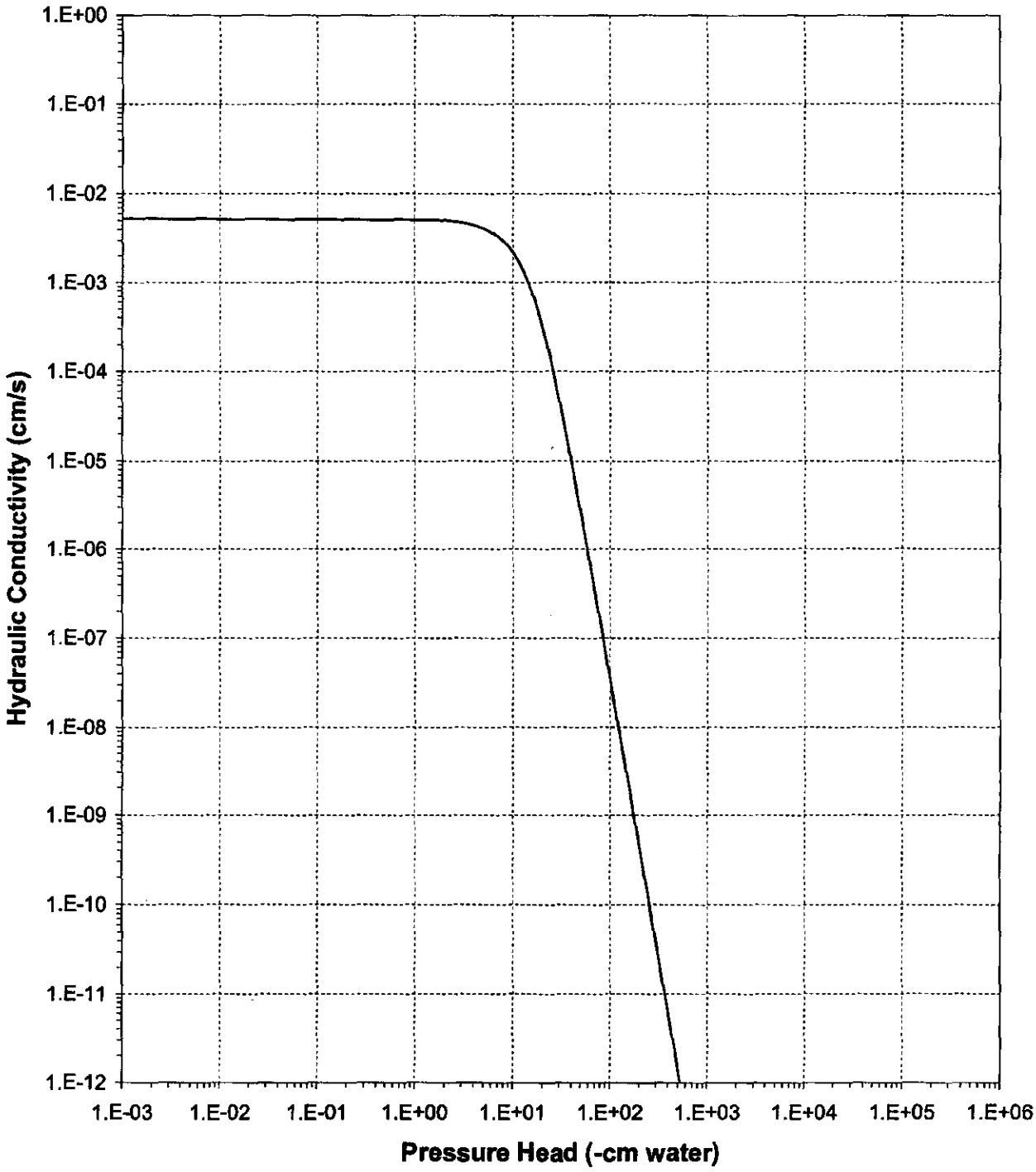
Plot of Relative Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Composite (80%)



Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Composite (80%)



Daniel B. Stephens & Associates, Inc.

Gravel Correction Data Sheet

Job Name: Fluor Hanford
Job Number: LB05.0212.00
Sample Number: B1F3D4 Composite (80%)
Ring Number: NA
Depth: NA
Split: #4

Uncorrected input values		Corrected Values	
Mass (coarse)(g):	753		
Mass (fines)(g):	13069		
Dry bulk density (fines)(g/cm^3):	1.49	Density (composite)(g/cm^3):	1.53
+Density (coarse)(g/cm^3):	2.65		
Ksat value (fines)(cm/sec):	8.3E-02	Ksat composite(cm/sec):	8.0E-02
Theta initial (fines):	0.1430	Theta initial composite:	0.1385
Theta saturated (fines):	0.2743	Theta saturated composite:	0.2657
Theta residual (fines):	0.0220	Theta residual composite:	0.0213
*Theta initial (coarse):	0		
*Theta saturated (coarse):	0		
*Theta residual (coarse):	0		
*Volume (coarse voids)(cm^3):	0		

Volumetric fraction of fines in composite: 0.969
Volumetric fraction of coarse in composite: 0.031
Volumetric fraction of voids in composite: 0.000
Volume (fines)(cm^3): 8771.14
Volume (coarse)(cm^3): 284.15
Volume (composite)(cm^3): 9055.29

Comments:

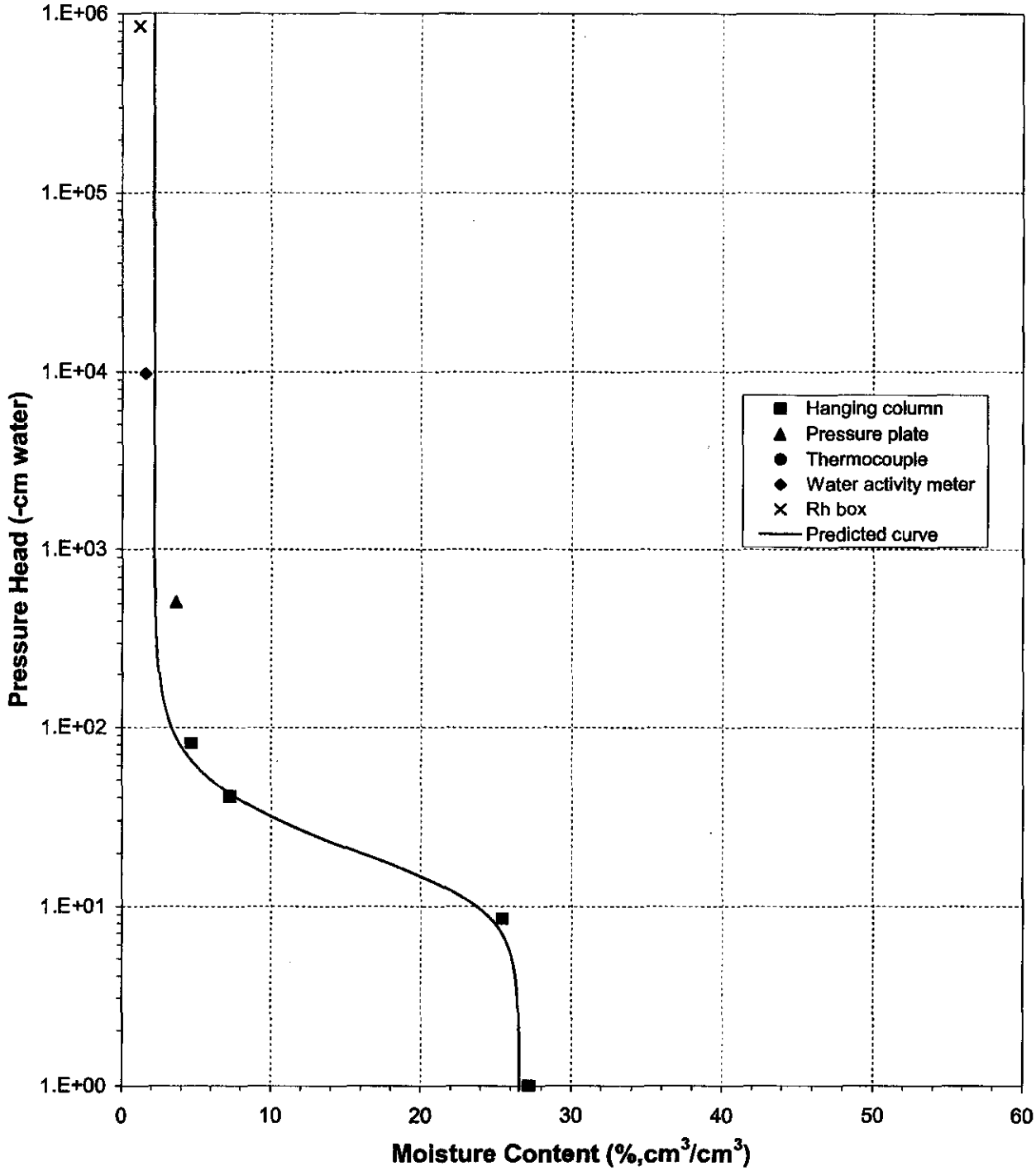
+Assumed to be 2.65, unless measured.

*Values will be zero if the coarse fraction is assumed to hold no water in pores.

Date: 6-Dec-05
Data entered by: D. O'Dowd
Checked by: J. Hines

Predicted Water Retention Curve and Data Points

Sample Number: B1F3D4 Comp (80%) Gravel Corrected



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column/Pressure Plate/Thermocouple

(Main Drainage Curve)

Job Name:	Fluor Hanford, Inc.	*Dry wt. of sample* (g):	335.05
Job Number:	LB05.0212.00	*Tare wt., screen & clamp* (g):	25.68
Sample Number:	B1F3D4 Comp (80%) MSD	*Tare wt., ring* (g):	142.95
Location:	Sand Pile - ARP	*Tare wt., epoxy* (g):	0.00
Date/Time Collected:	9/23/05 11:42	*Sample volume* (cm^3):	182.97

Saturated weight at 0 cm tension* (g): 564.84
Volume of water† in saturated sample (cm^3): 61.16
Saturated moisture content (% vol): 33.43
Sample bulk density (g/cm^3): 1.83

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Hanging column:	28-Oct-05 / 14:10	564.84	0.00	33.43
	04-Nov-05 / 10:52	560.77	8.50	31.20
	11-Nov-05 / 16:50	519.95	40.50	8.89
	17-Nov-05 / 15:25	514.19	81.50	5.74
Pressure plate:	23-Nov-05 / 09:45	511.80	509.90	4.44

Comments:

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Water Activity Meter/Relative Humidity Box

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Comp (80%) MSD
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Dry weight of water activity meter sample* (g): 154.88
Tare weight, jar (g): 112.86
Sample bulk density (g/cm^3): 1.83

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Water Activity Meter:	11-Nov-05 / 13:55	155.32	9790.1	1.92

Dry weight of relative humidity box sample* (g): 96.73
Tare weight (g): 44.18
Sample bulk density (g/cm^3): 1.83

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Relative humidity box:	31-Oct-05 / 10:00	97.13	851293	1.42

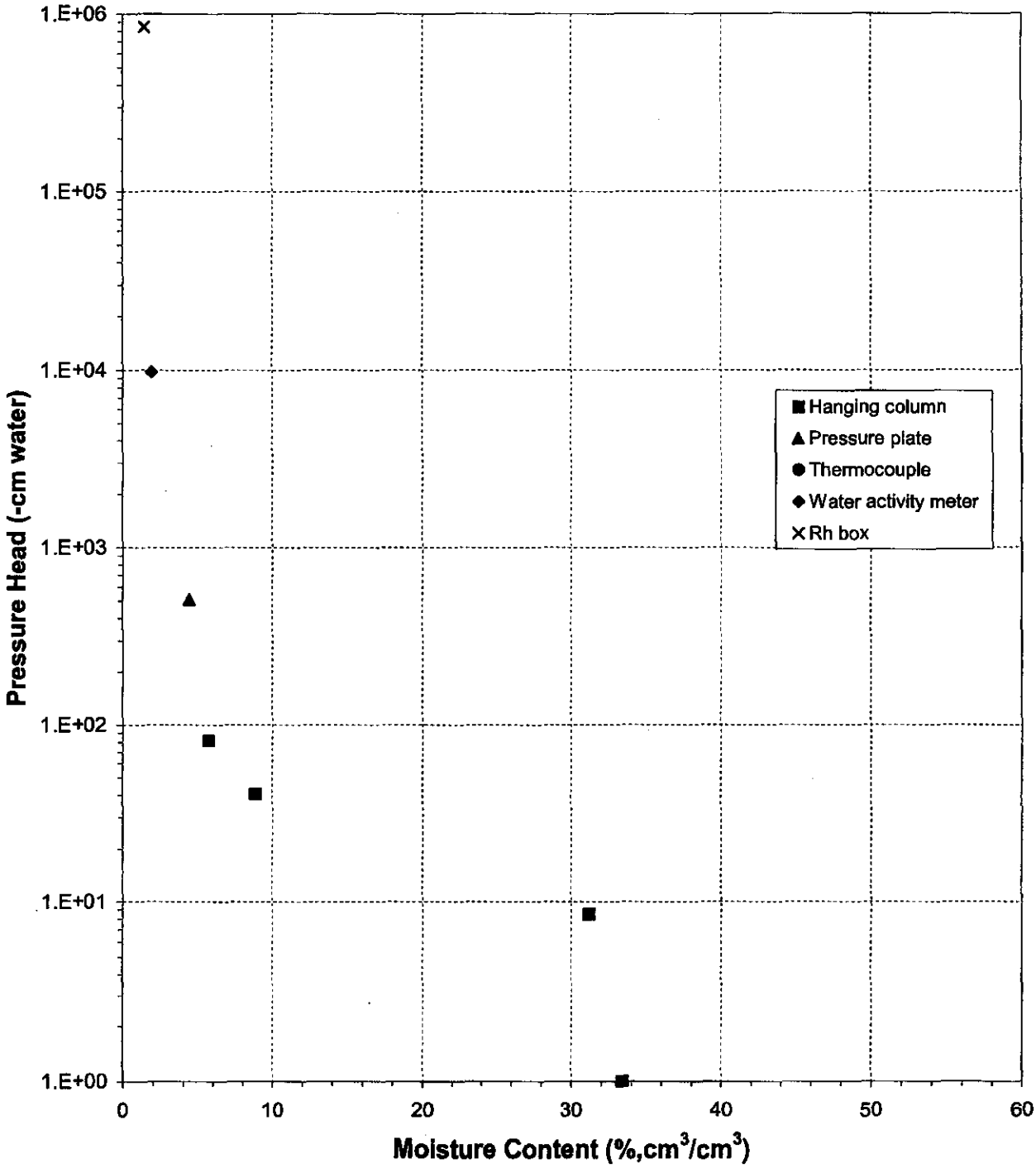
Comments:

* Weight including tares
† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo/O'Dowd/Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Water Retention Data Points

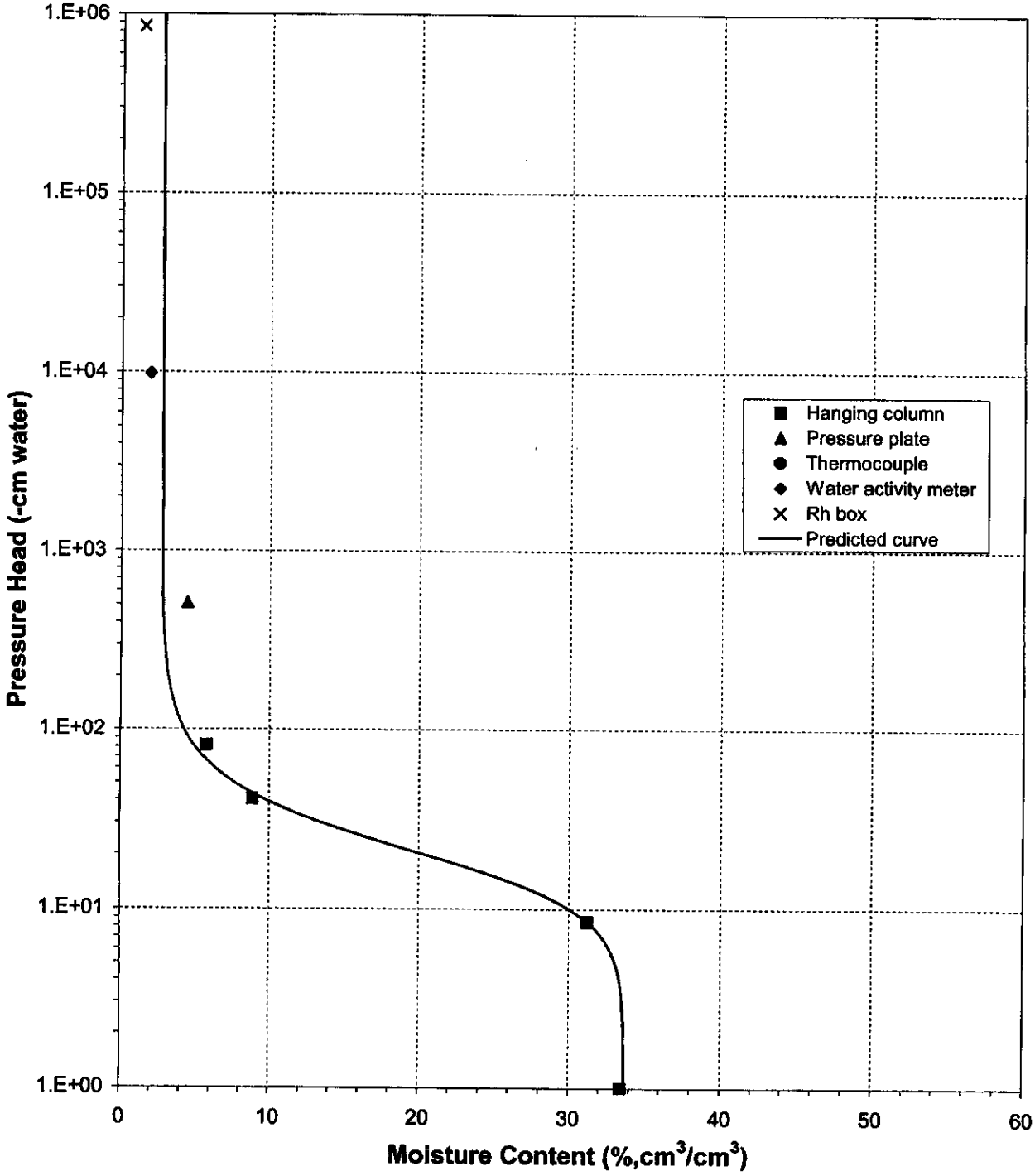
Sample Number: B1F3D4 Comp (80%) MSD



Daniel B. Stephens & Associates, Inc.

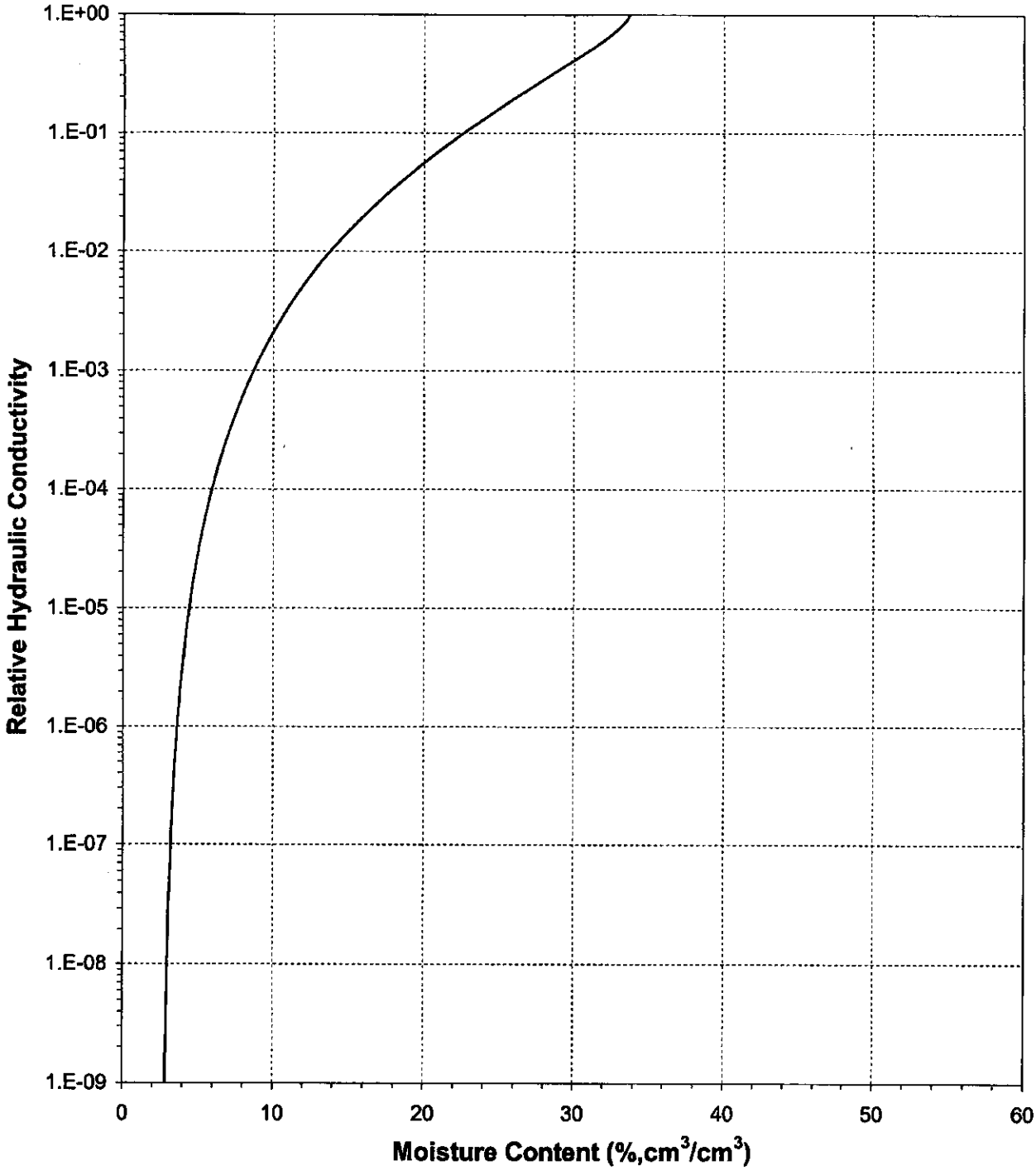
Predicted Water Retention Curve and Data Points

Sample Number: B1F3D4 Comp (80%) MSD



Plot of Relative Hydraulic Conductivity vs Moisture Content

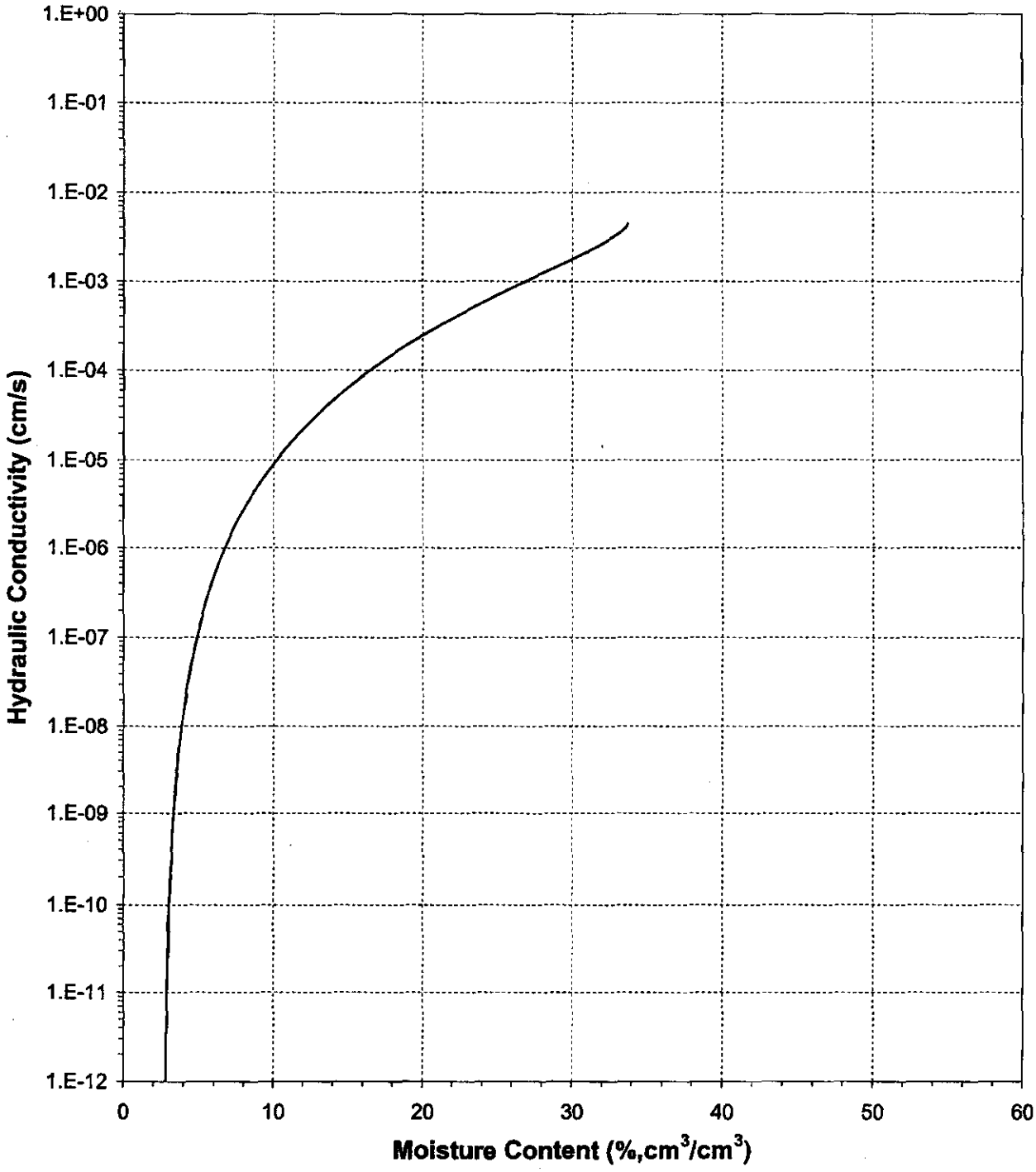
Sample Number: B1F3D4 Comp (80%) MSD



Daniel B. Stephens & Associates, Inc.

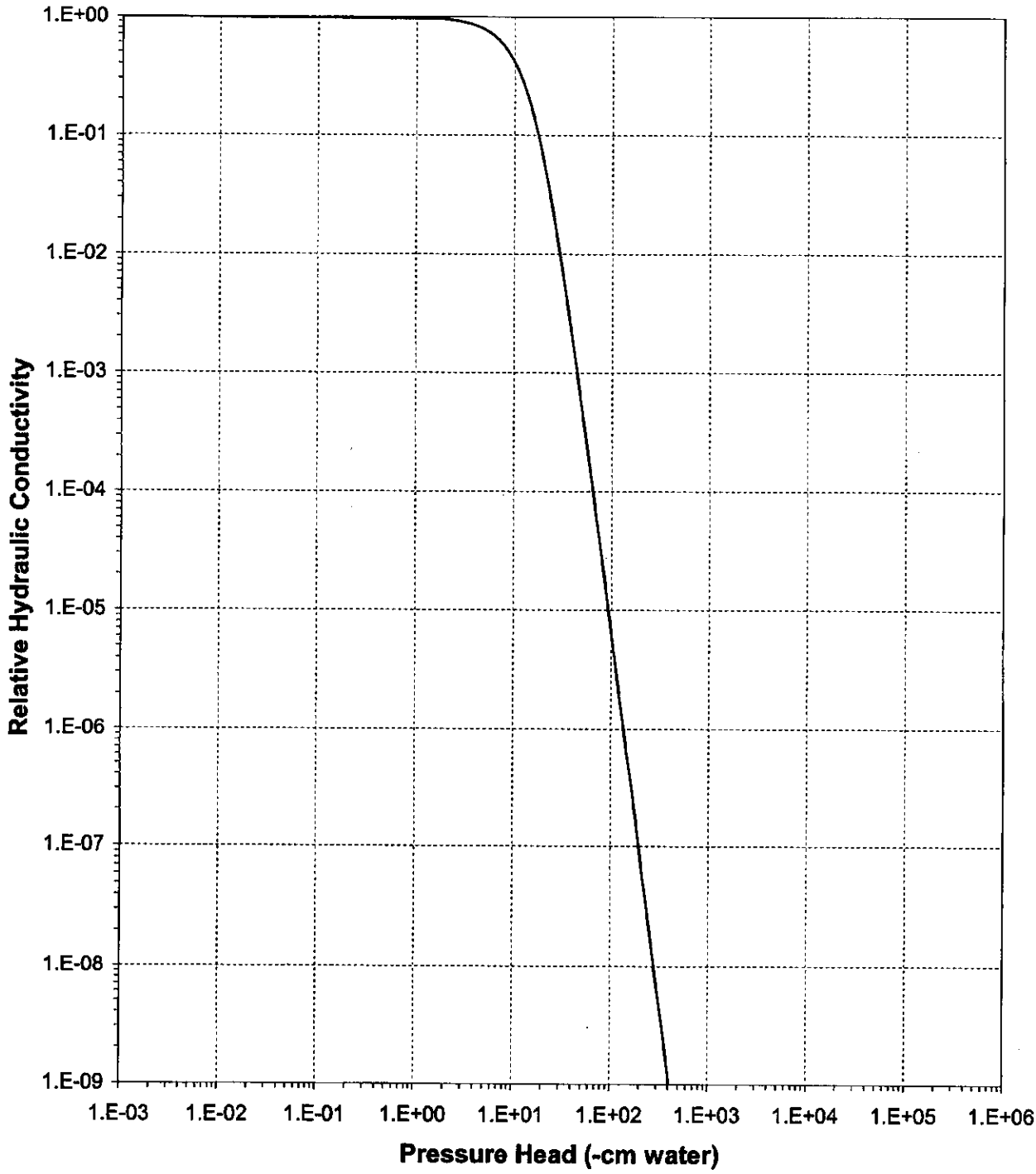
Plot of Hydraulic Conductivity vs Moisture Content

Sample Number: B1F3D4 Comp (80%) MSD



Plot of Relative Hydraulic Conductivity vs Pressure Head

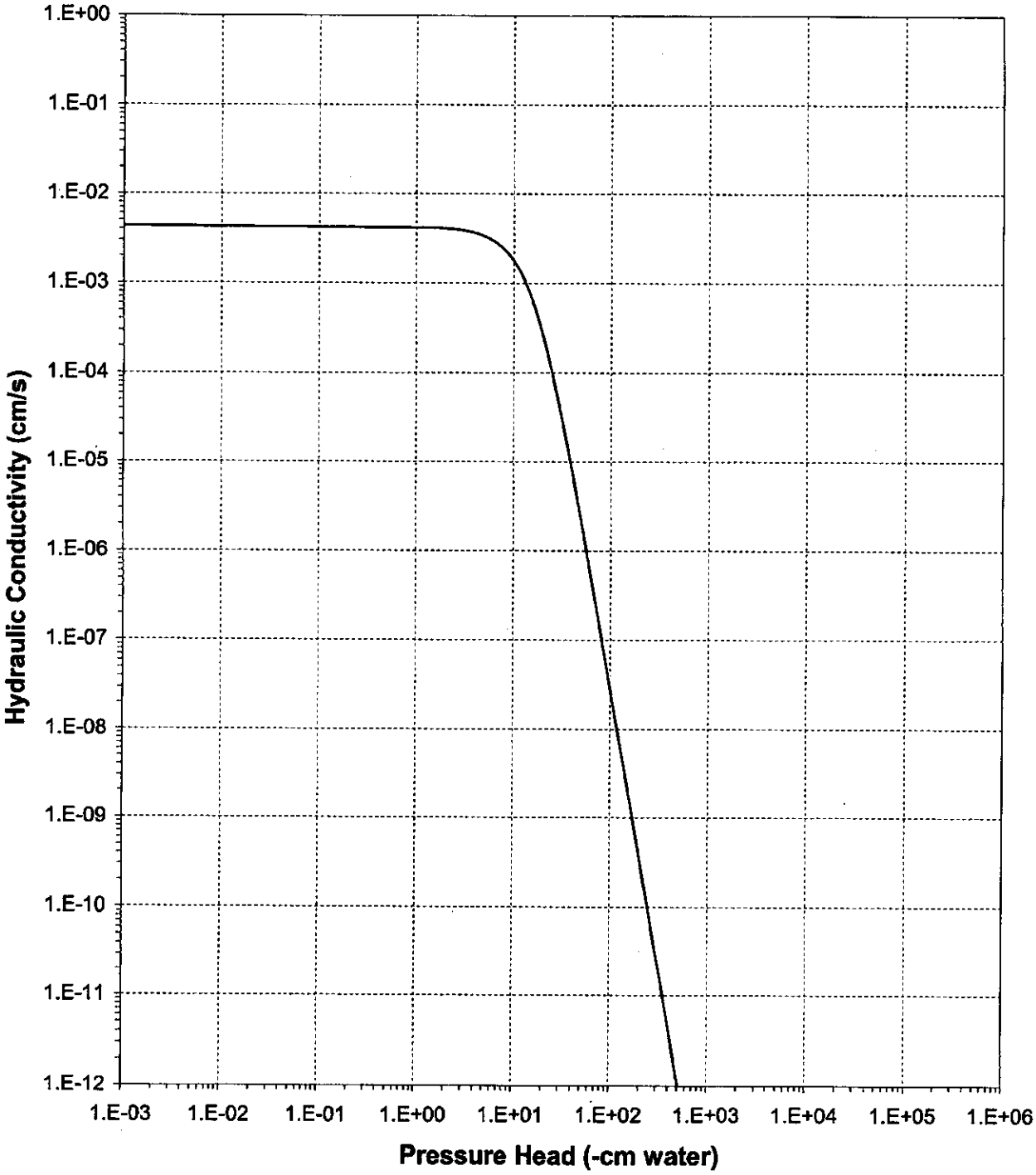
Sample Number: B1F3D4 Comp (80%) MSD



Daniel B. Stephens & Associates, Inc.

Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Comp (80%) MSD



Daniel B. Stephens & Associates, Inc.

Gravel Correction Data Sheet

Job Name: Fluor Hanford
Job Number: LB05.0212.00
Sample Number: B1F3D4 Composite (80%) MSD
Ring Number: NA
Depth: NA
Split: #4

Uncorrected input values		Corrected Values	
Mass (coarse)(g):	753		
Mass (fines)(g):	13069		
Dry bulk density (fines)(g/cm^3):	1.83	Density (composite)(g/cm^3):	1.86
+Density (coarse)(g/cm^3):	2.65		
Ksat value (fines)(cm/sec):	6.7E-02	Ksat composite(cm/sec):	6.4E-02
Theta initial (fines):	0.1760	Theta initial composite:	0.1693
Theta saturated (fines):	0.3369	Theta saturated composite:	0.3240
Theta residual (fines):	0.0270	Theta residual composite:	0.0260
*Theta initial (coarse):	0		
*Theta saturated (coarse):	0		
*Theta residual (coarse):	0		
*Volume (coarse voids)(cm^3):	0		

Volumetric fraction of fines in composite: 0.962
Volumetric fraction of coarse in composite: 0.038
Volumetric fraction of voids in composite: 0.000
Volume (fines)(cm^3): 7141.53
Volume (coarse)(cm^3): 284.15
Volume (composite)(cm^3): 7425.68

Comments:

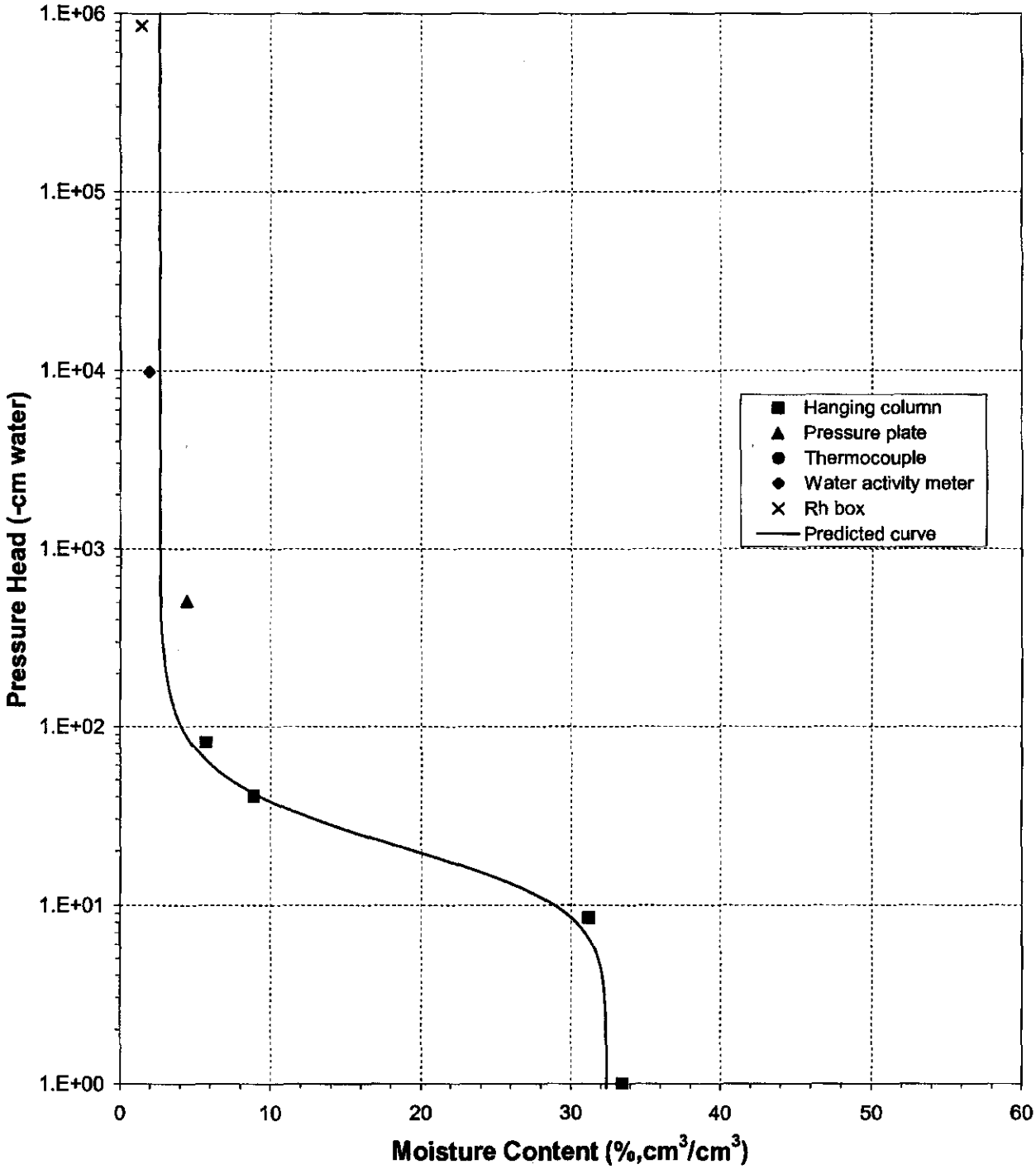
+Assumed to be 2.65, unless measured.
*Values will be zero if the coarse fraction is assumed to hold no water in pores.

Date: 6-Dec-05
Data entered by: D. O'Dowd
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Predicted Water Retention Curve and Data Points

Sample Number: B1F3D4 Comp (80%) MSD Gravel Corrected



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column/Pressure Plate/Thermocouple

(Main Drainage Curve)

Job Name:	Fluor Hanford, Inc.	*Dry wt. of sample* (g):	365.39
Job Number:	LB05.0212.00	*Tare wt., screen & clamp* (g):	27.79
Sample Number:	B1F3D4 Composite (90%)	*Tare wt., ring* (g):	142.95
Location:	Sand Pile - ARP	*Tare wt., epoxy* (g):	0.00
Date/Time Collected:	9/23/05 11:42	*Sample volume* (cm^3):	222.47

Saturated weight at 0 cm tension* (g): 610.24
Volume of water† in saturated sample (cm^3): 74.11
Saturated moisture content (% vol): 33.31
Sample bulk density (g/cm^3): 1.64

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Hanging column:	29-Nov-05 / 13:55	610.24	0.00	33.31
	05-Dec-05 / 10:30	606.04	4.00	31.42
	05-Dec-05 / 10:30	589.11	14.50	23.81
	05-Dec-05 / 10:30	547.16	81.00	4.96
Pressure plate:	05-Dec-05 / 10:30	544.89	509.90	3.94

Comments:

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo
Data entered by: C. Fillwock
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Water Activity Meter/Relative Humidity Box

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Composite (90%)
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Dry weight of water activity meter sample* (g): 149.35
Tare weight, jar (g): 112.88
Sample bulk density (g/cm^3): 1.64

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Water Activity Meter:	10-Nov-05 / 12:15	150.11	14583.1	3.42

Dry weight of relative humidity box sample* (g): 102.73
Tare weight (g): 38.33
Sample bulk density (g/cm^3): 1.64

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Relative humidity box:	31-Oct-05 / 10:00	103.26	851293	1.35

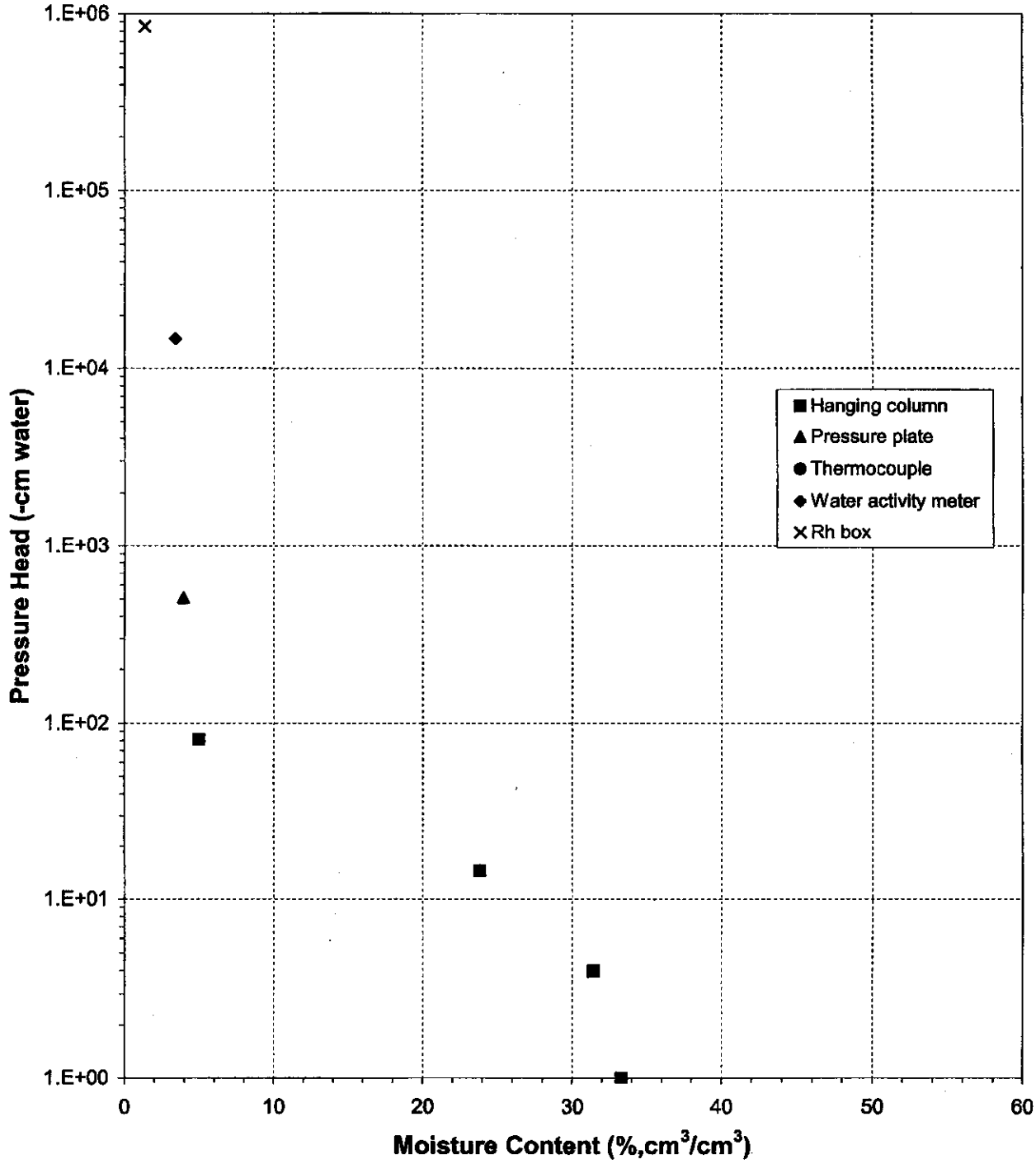
Comments:

* Weight including tares
† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo/O'Dowd/Carrillo
Data entered by: C. Fillwock
Checked by: J. Hines

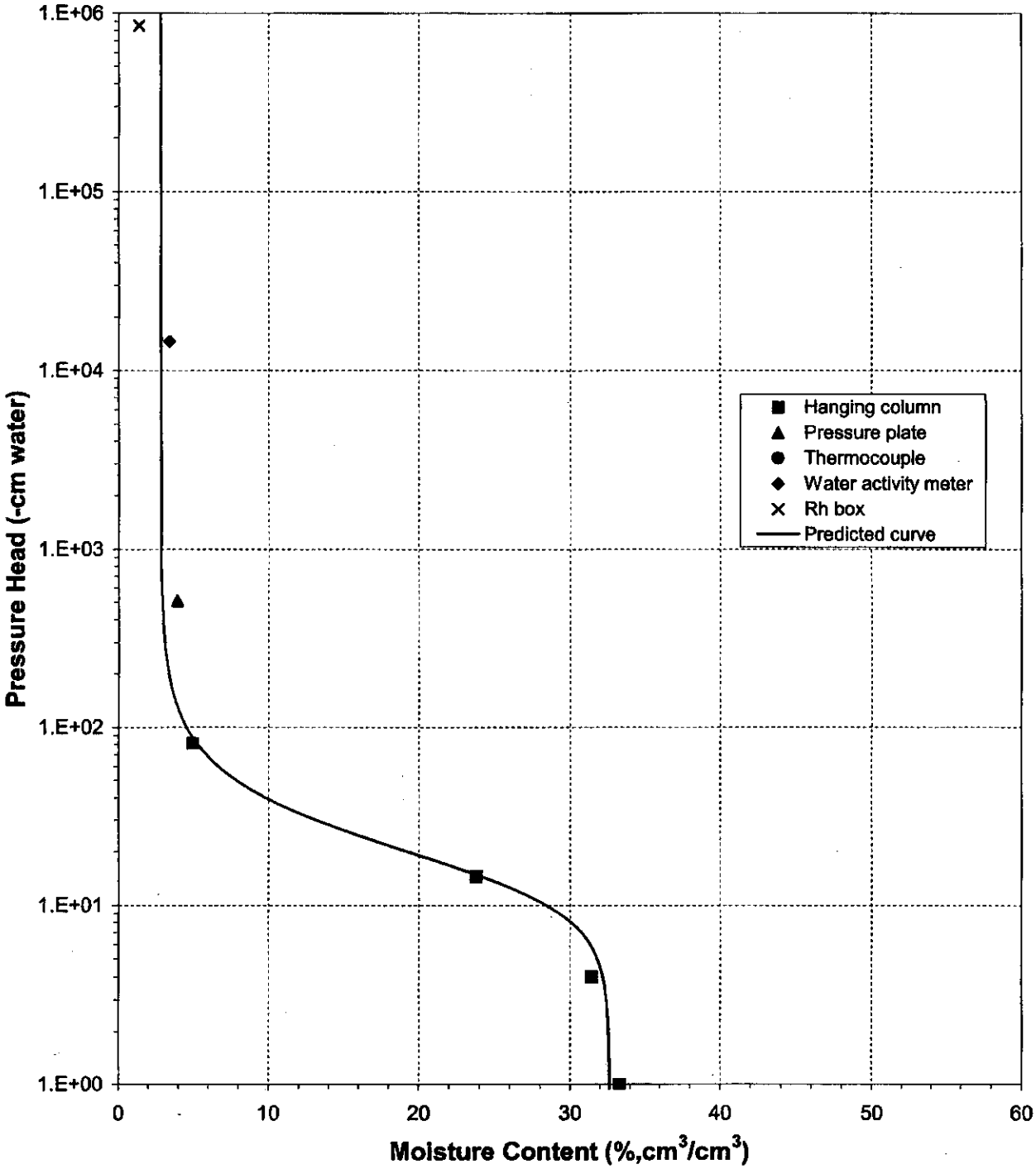
Water Retention Data Points

Sample Number: B1F3D4 Composite (90%)



Predicted Water Retention Curve and Data Points

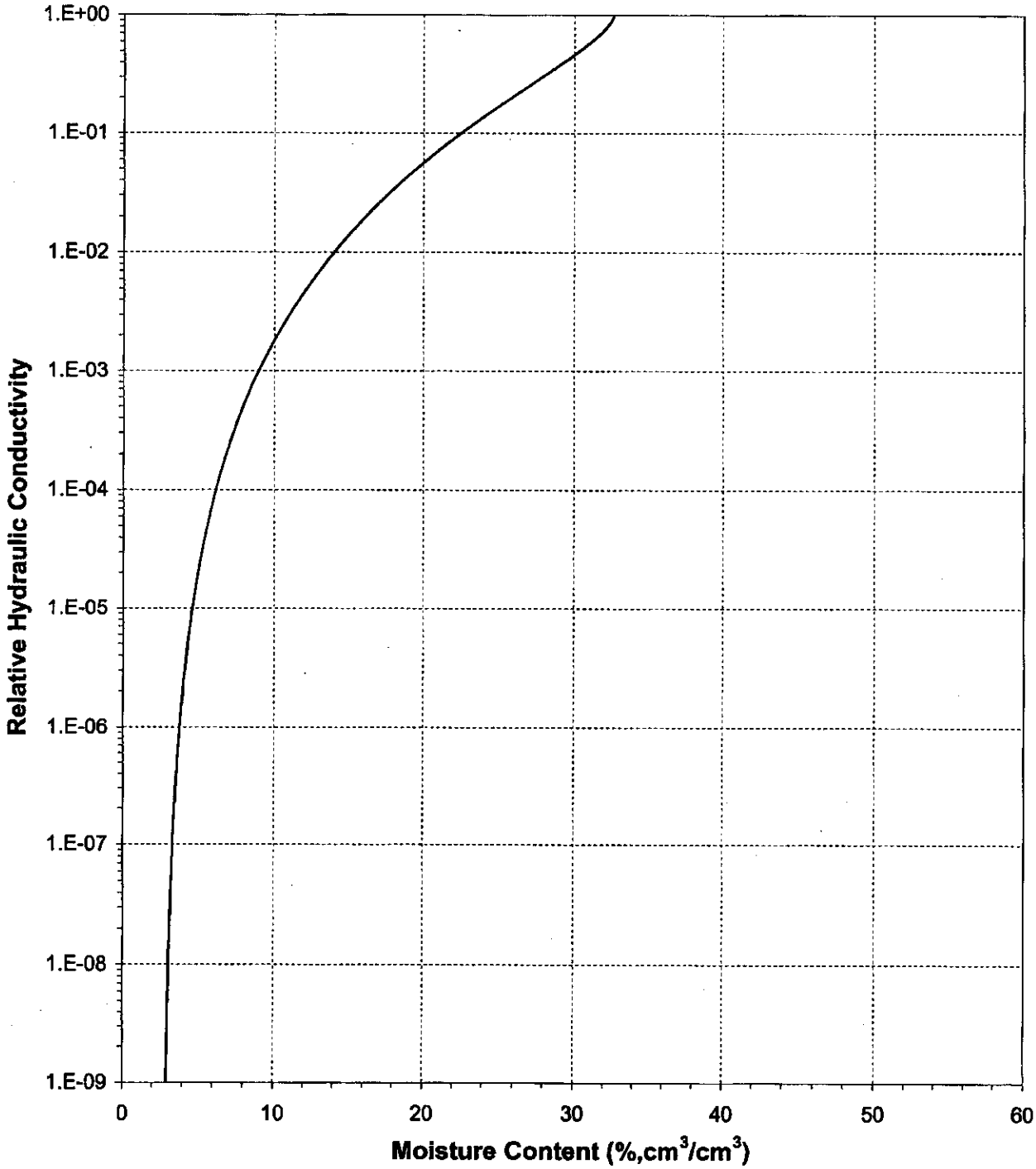
Sample Number: B1F3D4 Composite (90%)



Daniel B. Stephens & Associates, Inc.

Plot of Relative Hydraulic Conductivity vs Moisture Content

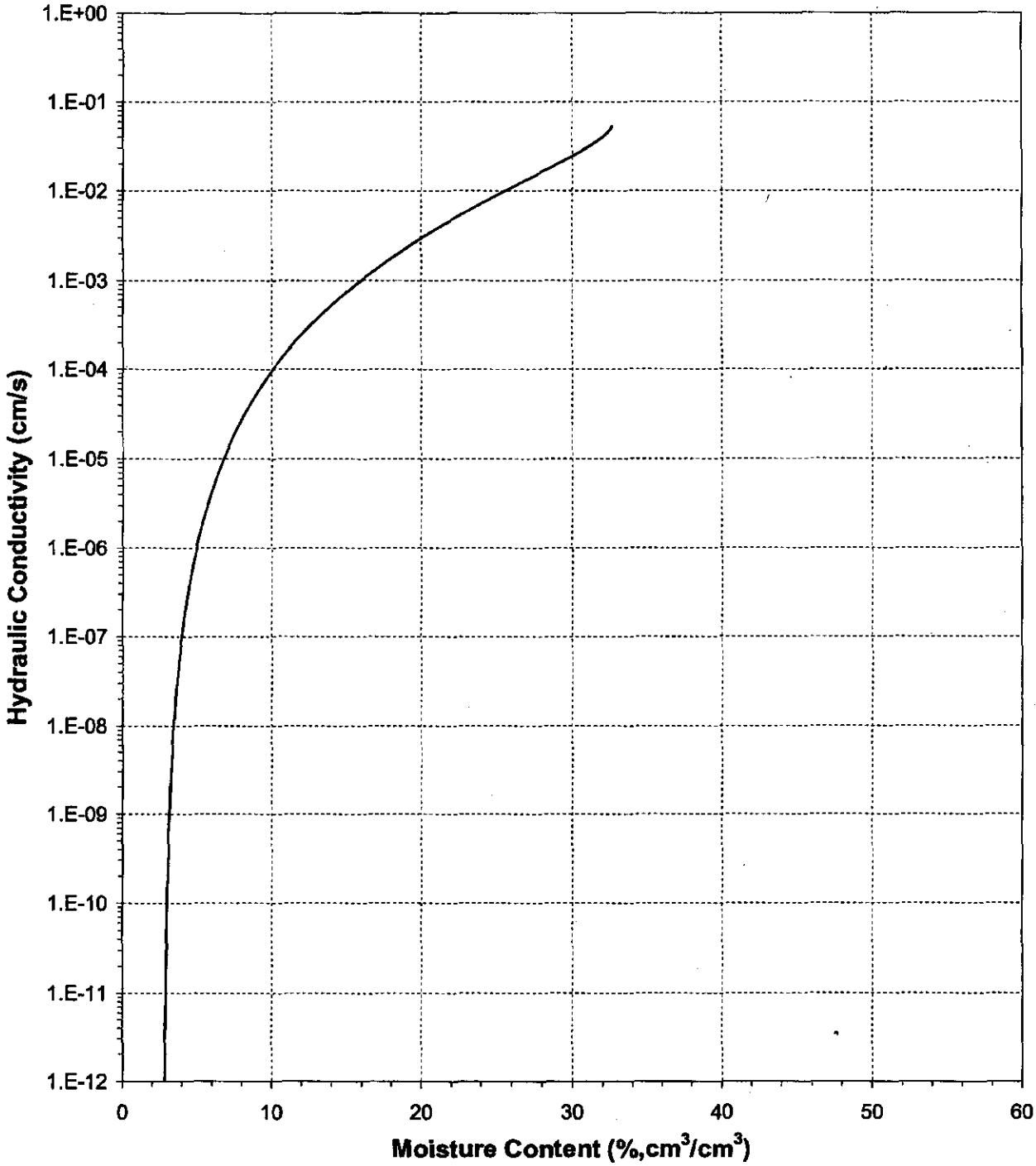
Sample Number: B1F3D4 Composite (90%)



Daniel B. Stephens & Associates, Inc.

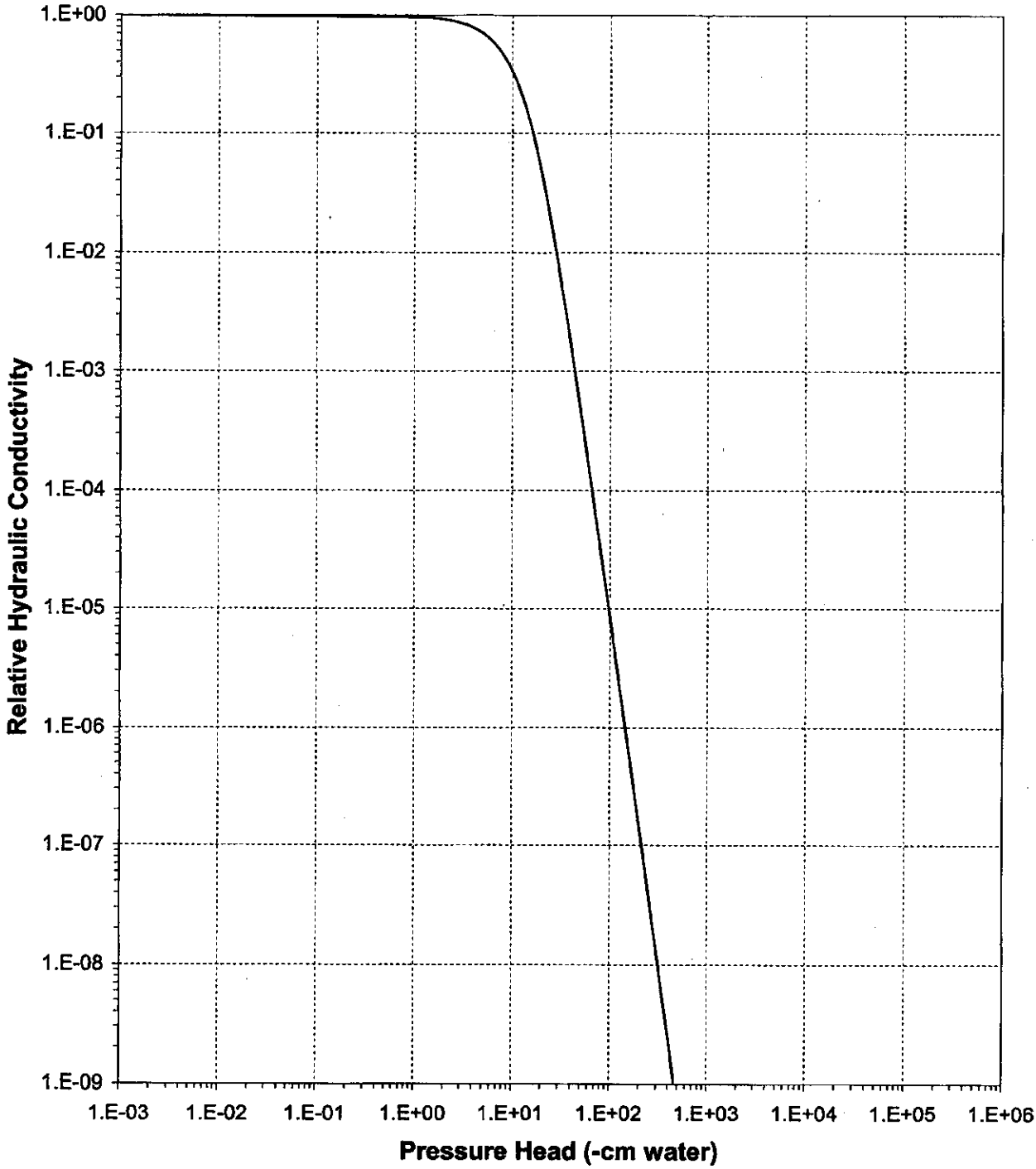
Plot of Hydraulic Conductivity vs Moisture Content

Sample Number: B1F3D4 Composite (90%)



Plot of Relative Hydraulic Conductivity vs Pressure Head

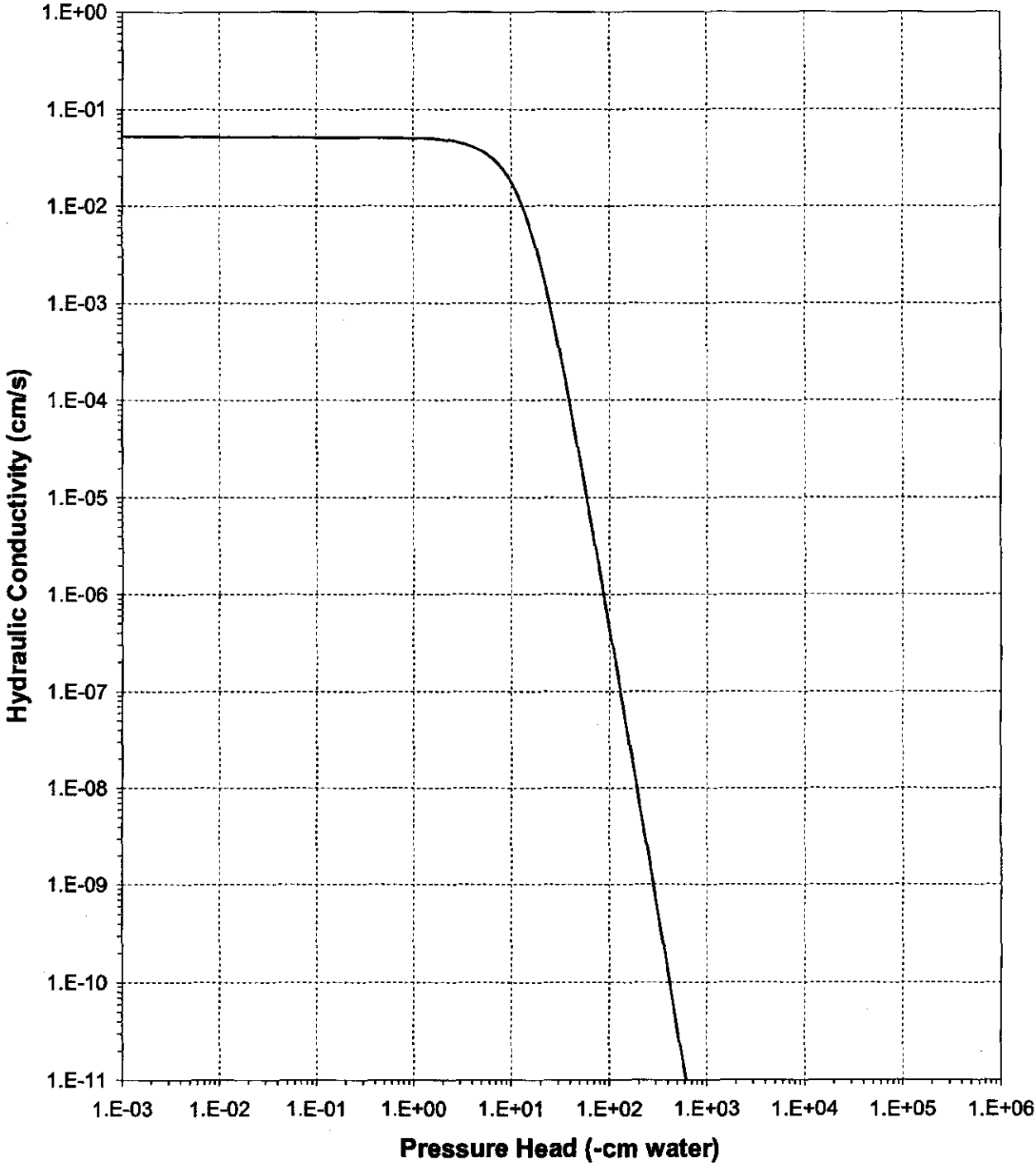
Sample Number: B1F3D4 Composite (90%)



Daniel B. Stephens & Associates, Inc.

Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Composite (90%)



Daniel B. Stephens & Associates, Inc.

Gravel Correction Data Sheet

Job Name: Fluor Hanford
Job Number: LB05.0212.00
Sample Number: B1F3D4 Composite (90%)
Ring Number: NA
Depth: NA
Split: #4

Uncorrected input values		Corrected Values	
Mass (coarse)(g):	753		
Mass (fines)(g):	13069		
Dry bulk density (fines)(g/cm^3):	1.64	Density (composite)(g/cm^3):	1.67
+Density (coarse)(g/cm^3):	2.65		
Ksat value (fines)(cm/sec):	5.2E-02	Ksat composite(cm/sec):	5.0E-02
Theta initial (fines):	0.0870	Theta initial composite:	0.0840
Theta saturated (fines):	0.3264	Theta saturated composite:	0.3152
Theta residual (fines):	0.0278	Theta residual composite:	0.0268
*Theta initial (coarse):	0		
*Theta saturated (coarse):	0		
*Theta residual (coarse):	0		
*Volume (coarse voids)(cm^3):	0		

Volumetric fraction of fines in composite: 0.966
Volumetric fraction of coarse in composite: 0.034
Volumetric fraction of voids in composite: 0.000
Volume (fines)(cm^3): 7968.90
Volume (coarse)(cm^3): 284.15
Volume (composite)(cm^3): 8253.05

Comments:

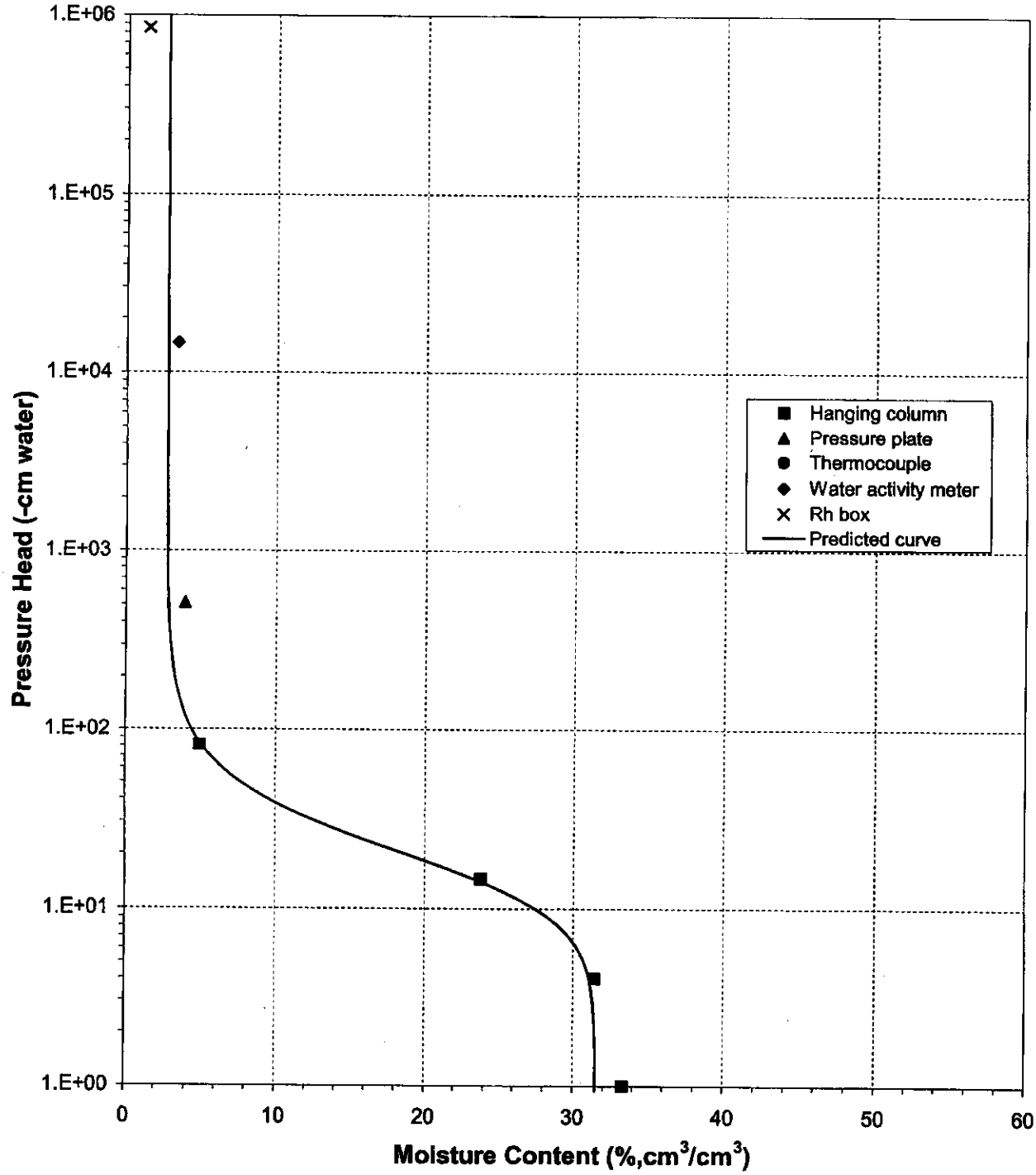
+Assumed to be 2.65, unless measured.
*Values will be zero if the coarse fraction is assumed to hold no water in pores.

Date: 6-Dec-05
Data entered by: D. O'Dowd
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Predicted Water Retention Curve and Data Points

Sample Number: B1F3D4 Composite (90%) Gravel Corrected



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column/Pressure Plate/Thermocouple

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Comp (90%) MSD
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Dry wt. of sample (g): 365.39
Tare wt., screen & clamp (g): 27.79
Tare wt., ring (g): 142.95
Tare wt., epoxy (g): 0.00
Sample volume (cm^3): 199.41

Saturated weight at 0 cm tension* (g): 610.24
Volume of water† in saturated sample (cm^3): 74.11
Saturated moisture content (% vol): 37.17
Sample bulk density (g/cm^3): 1.83

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Hanging column:	29-Nov-05 / 13:55	610.24	0.00	37.17
	05-Dec-05 / 10:30	606.04	4.00	35.06
	05-Dec-05 / 10:30	589.11	14.50	26.57
	05-Dec-05 / 10:30	547.16	81.00	5.53
Pressure plate:	05-Dec-05 / 10:30	544.89	509.90	4.39

Comments:

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo
Data entered by: C. Fillwock
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Water Activity Meter/Relative Humidity Box

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Comp (90%) MSD
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Dry weight of water activity meter sample* (g): 149.35
Tare weight, jar (g): 112.88
Sample bulk density (g/cm^3): 1.83

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Water Activity Meter:	10-Nov-05 / 12:15	150.11	14583.1	3.82

Dry weight of relative humidity box sample* (g): 102.73
Tare weight (g): 38.33
Sample bulk density (g/cm^3): 1.83

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Relative humidity box:	31-Oct-05 / 10:00	103.26	851293	1.51

Comments:

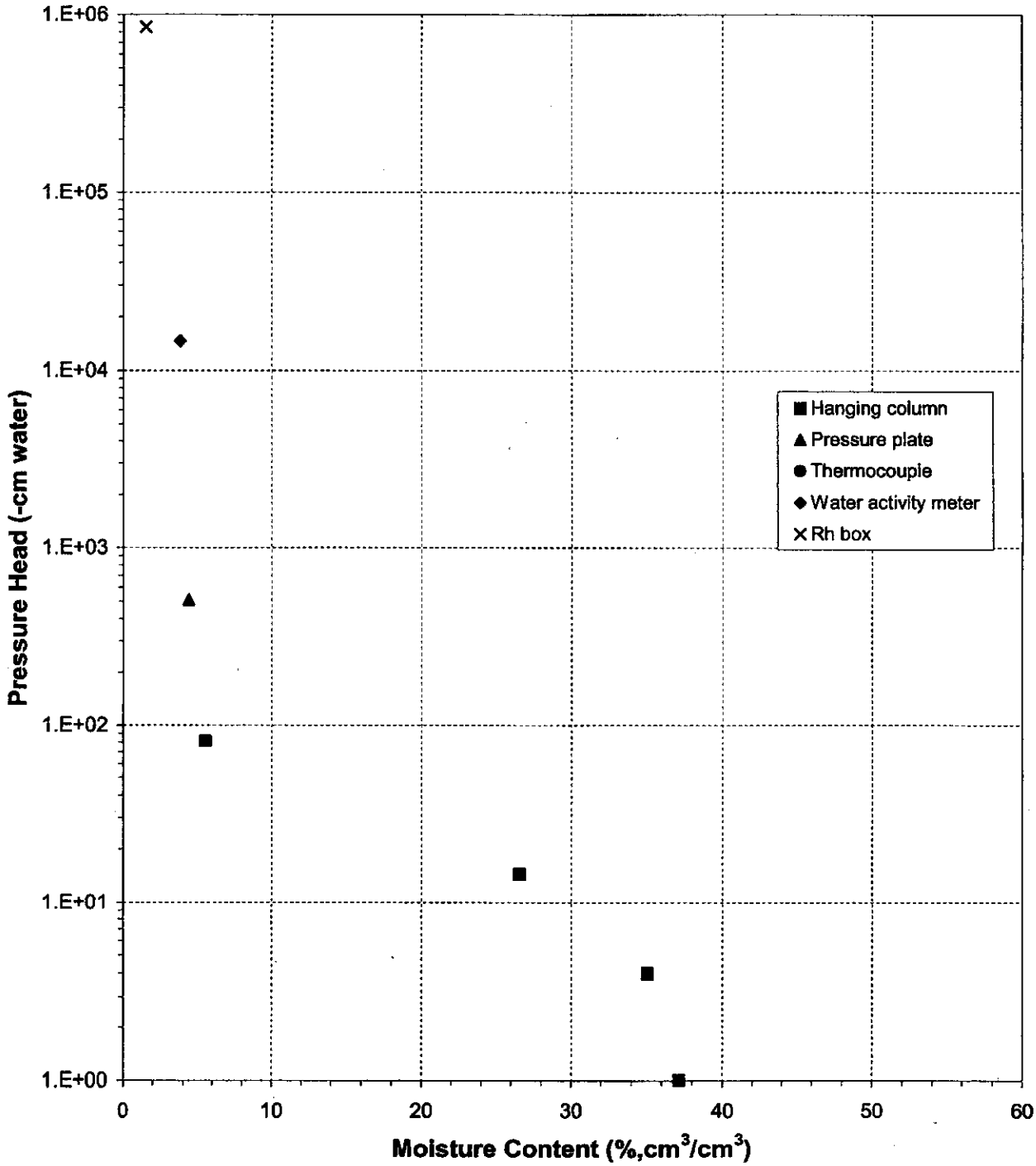
* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo/O'Dowd/Carrillo
Data entered by: C. Fillwock
Checked by: J. Hines

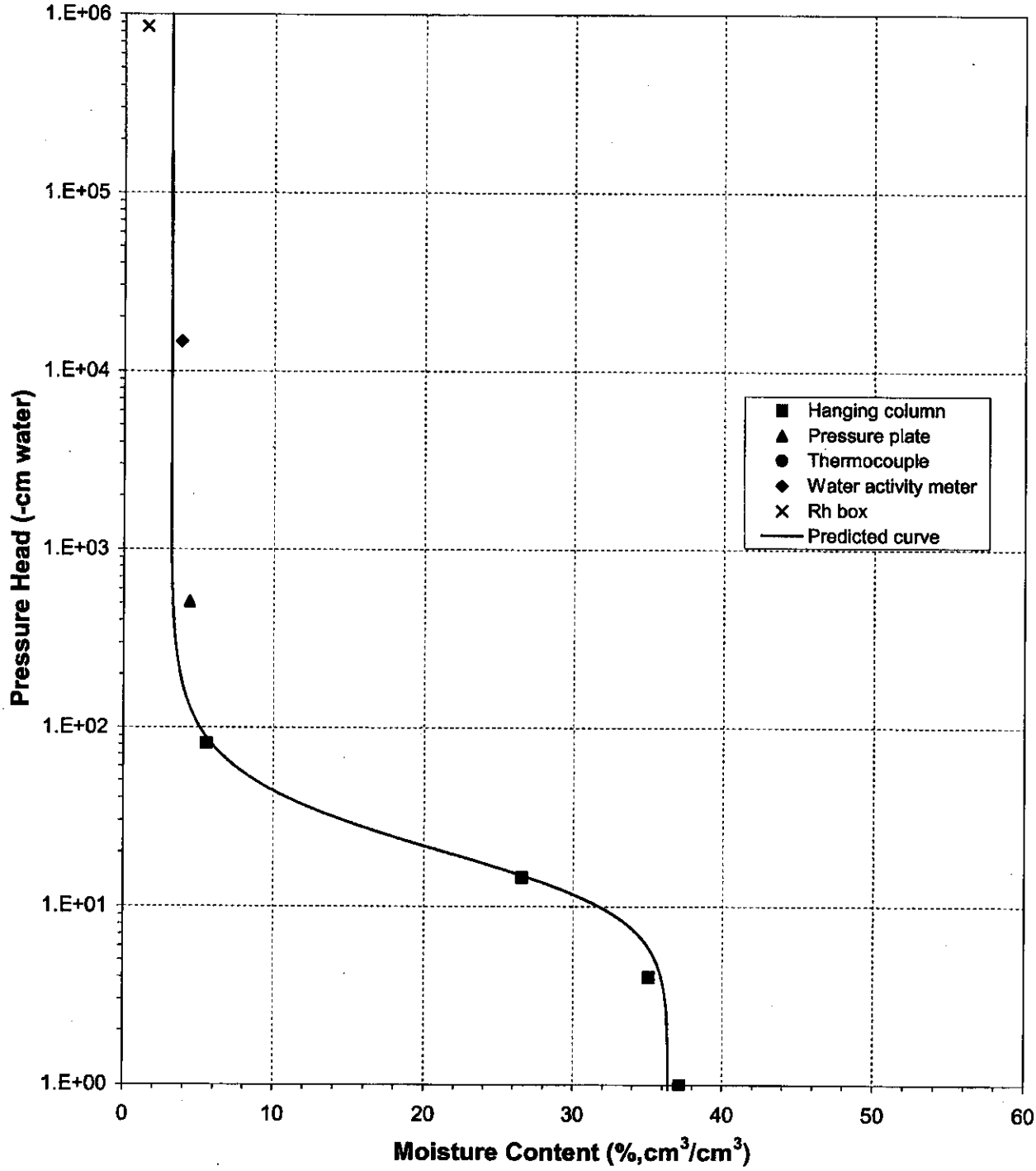
Water Retention Data Points

Sample Number: B1F3D4 Comp (90%) MSD



Predicted Water Retention Curve and Data Points

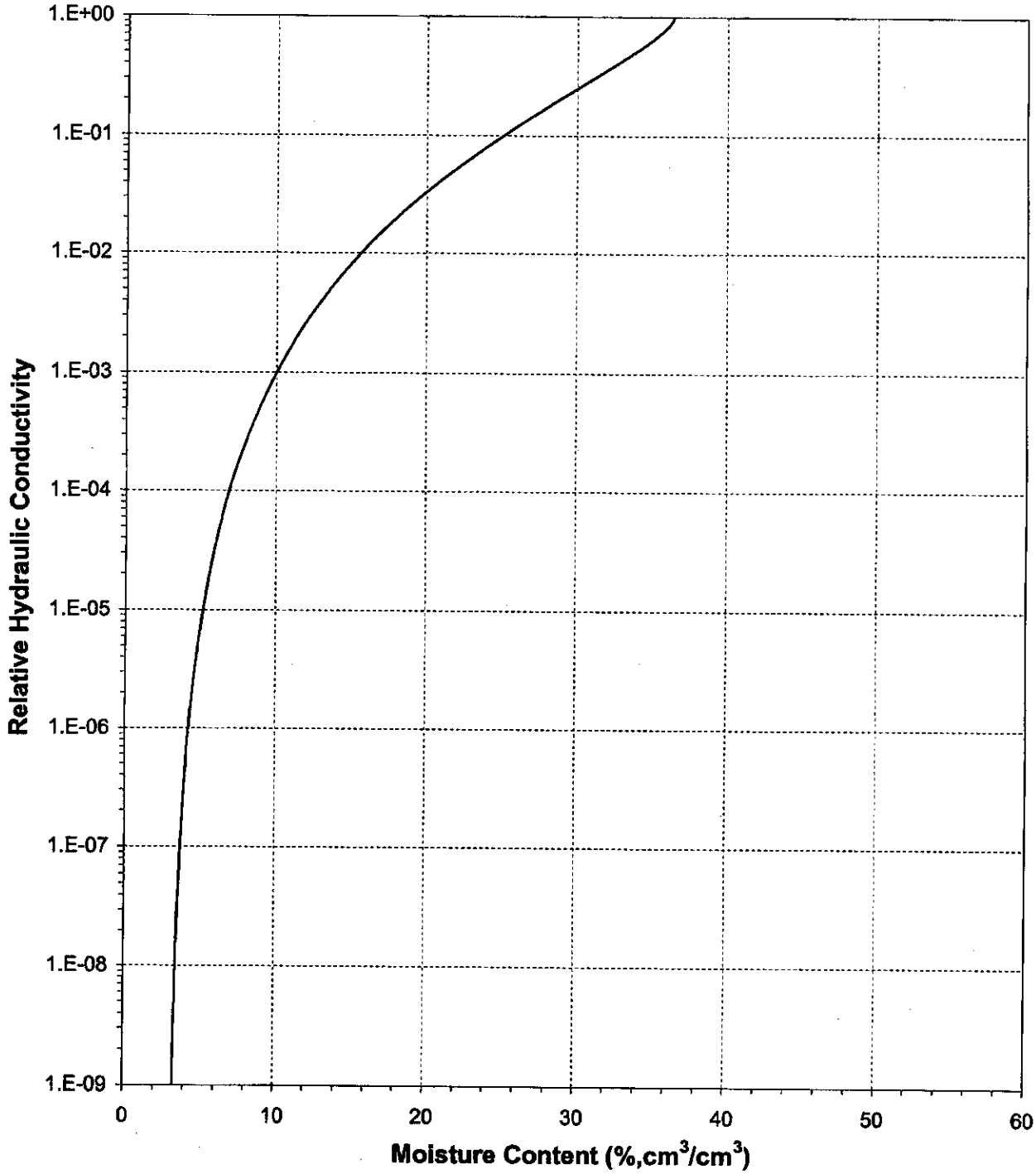
Sample Number: B1F3D4 Comp (90%) MSD



Daniel B. Stephens & Associates, Inc.

Plot of Relative Hydraulic Conductivity vs Moisture Content

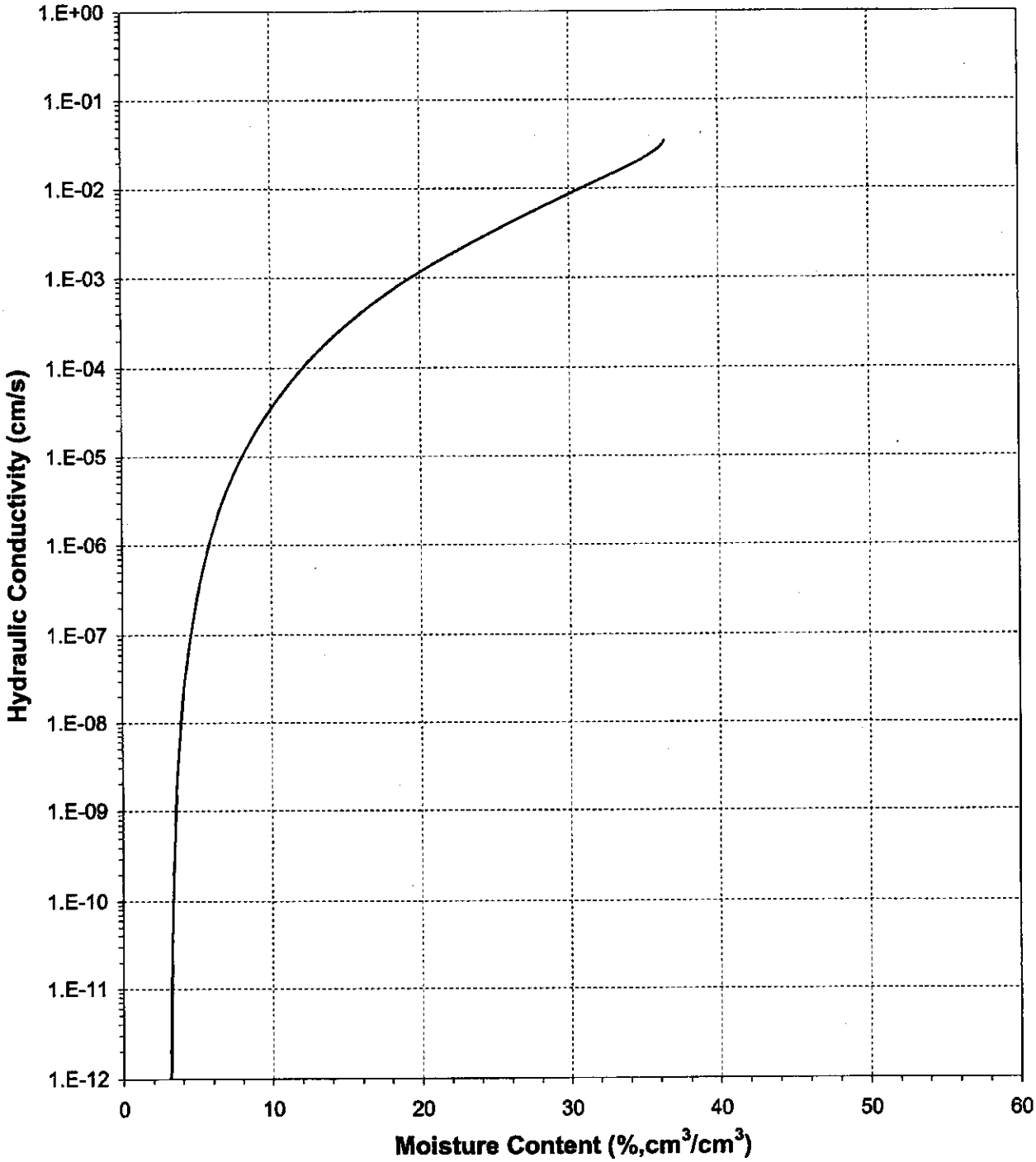
Sample Number: B1F3D4 Comp (90%) MSD



Daniel B. Stephens & Associates, Inc.

Plot of Hydraulic Conductivity vs Moisture Content

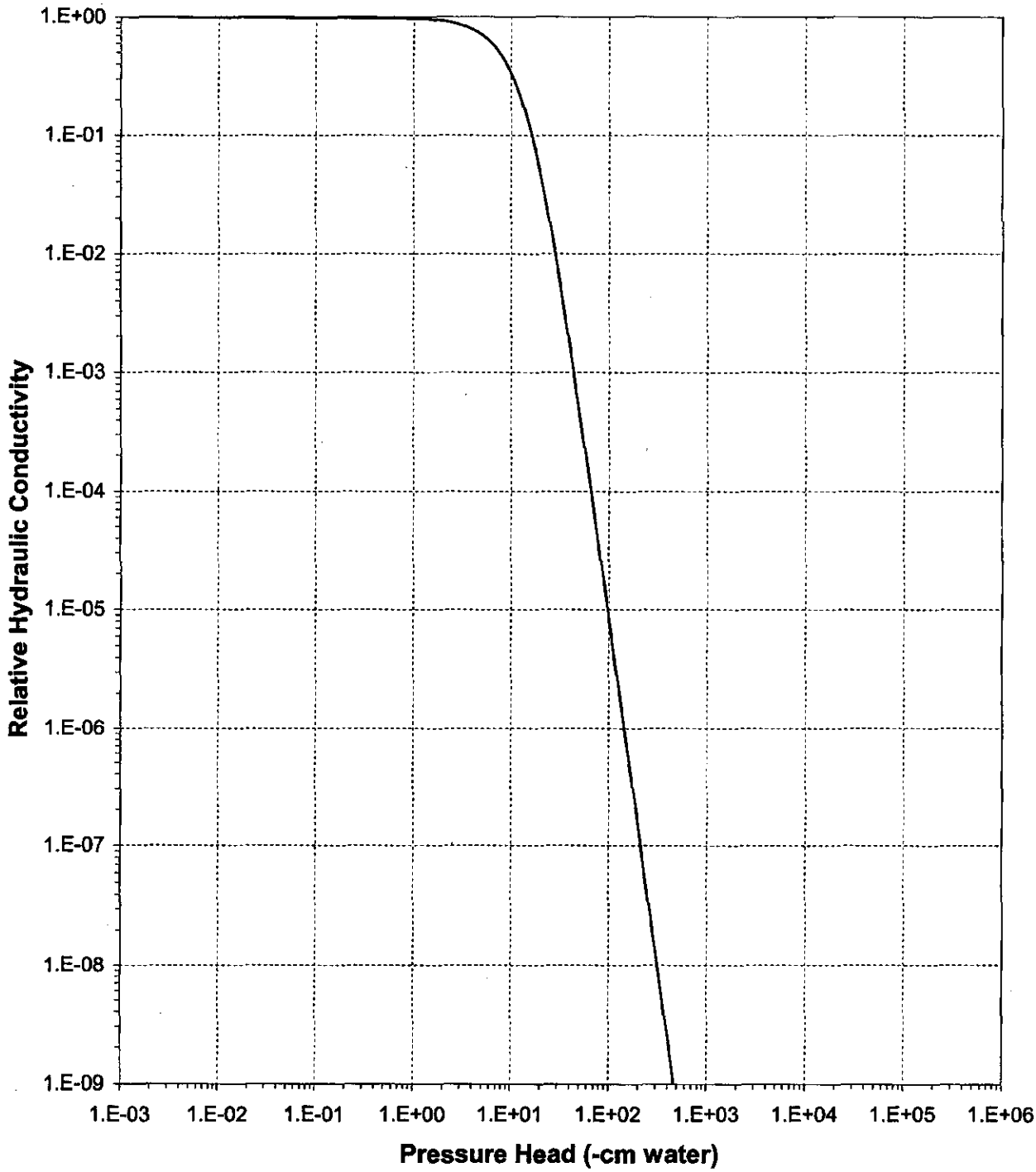
Sample Number: B1F3D4 Comp (90%) MSD



Daniel B. Stephens & Associates, Inc.

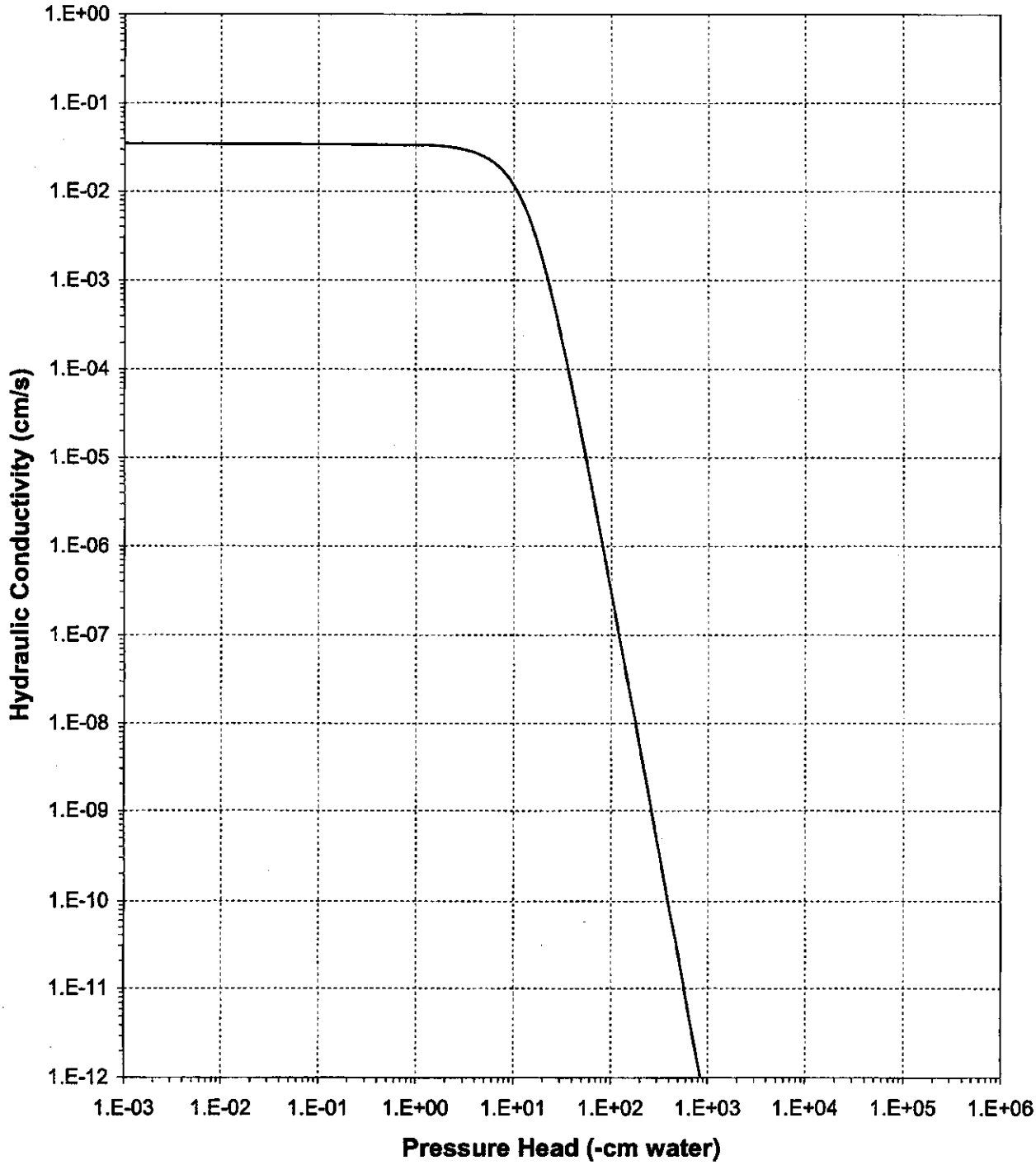
Plot of Relative Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Comp (90%) MSD



Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Comp (90%) MSD



Daniel B. Stephens & Associates, Inc.

Gravel Correction Data Sheet

Job Name: Fluor Hanford
Job Number: LB05.0212.00
Sample Number: B1F3D4 Composite (90%) MSD
Ring Number: NA
Depth: NA
Split: #4

Uncorrected input values		Corrected Values	
Mass (coarse)(g):	753		
Mass (fines)(g):	13069		
Dry bulk density (fines)(g/cm^3):	1.83	Density (composite)(g/cm^3):	1.86
+Density (coarse)(g/cm^3):	2.65		
Ksat value (fines)(cm/sec):	3.5E-02	Ksat composite(cm/sec):	3.4E-02
Theta initial (fines):	0.0970	Theta initial composite:	0.0933
Theta saturated (fines):	0.3643	Theta saturated composite:	0.3504
Theta residual (fines):	0.0310	Theta residual composite:	0.0298
*Theta initial (coarse):	0		
*Theta saturated (coarse):	0		
*Theta residual (coarse):	0		
*Volume (coarse voids)(cm^3):	0		

Volumetric fraction of fines in composite: 0.962
Volumetric fraction of coarse in composite: 0.038
Volumetric fraction of voids in composite: 0.000
Volume (fines)(cm^3): 7141.53
Volume (coarse)(cm^3): 284.15
Volume (composite)(cm^3): 7425.68

Comments:

+Assumed to be 2.65, unless measured.

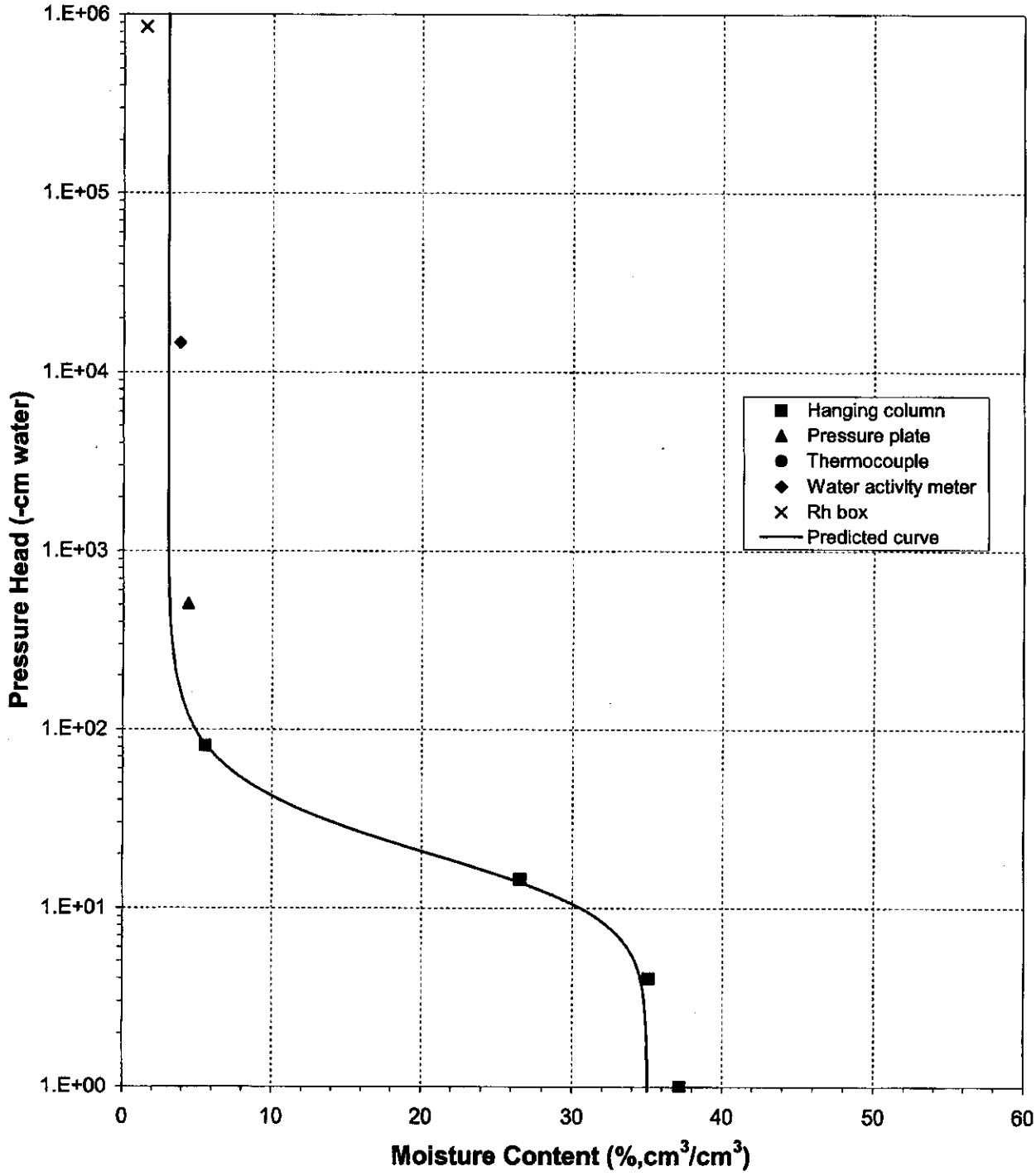
*Values will be zero if the coarse fraction is assumed to hold no water in pores.

Date: 6-Dec-05
Data entered by: D. O'Dowd
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Predicted Water Retention Curve and Data Points

Sample Number: B1F3D4 Comp (90%) MSD Gravel Corrected



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column/Pressure Plate/Thermocouple

(Main Drainage Curve)

Job Name:	Fluor Hanford, Inc.	*Dry wt. of sample* (g):	402.94
Job Number:	LB05.0212.00	*Tare wt., screen & clamp* (g):	26.71
Sample Number:	B1F3D4 Composite (95%)	*Tare wt., ring* (g):	101.62
Location:	Sand Pile - ARP	*Tare wt., epoxy* (g):	0.00
Date/Time Collected:	9/23/05 11:42	*Sample volume* (cm^3):	230.67

Saturated weight at 0 cm tension* (g): 607.39
Volume of water† in saturated sample (cm^3): 76.12
Saturated moisture content (% vol): 33.00
Sample bulk density (g/cm^3): 1.75

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Hanging column:	01-Nov-05 / 15:50	607.39	0.00	33.00
	07-Nov-05 / 14:05	601.81	10.50	30.58
	14-Nov-05 / 10:35	551.93	37.00	8.96
	21-Nov-05 / 11:15	543.80	84.00	5.43
Pressure plate:	28-Nov-05 / 09:15	541.18	509.90	4.30

Comments:

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Water Activity Meter/Relative Humidity Box

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Composite (95%)
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Dry weight of water activity meter sample* (g): 146.85
Tare weight, jar (g): 113.03
Sample bulk density (g/cm^3): 1.75

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Water Activity Meter:	08-Nov-05 / 08:50	147.36	7750.5	2.63

Dry weight of relative humidity box sample* (g): 76.70
Tare weight (g): 44.42
Sample bulk density (g/cm^3): 1.75

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Relative humidity box:	31-Oct-05 / 10:00	76.95	851293	1.36

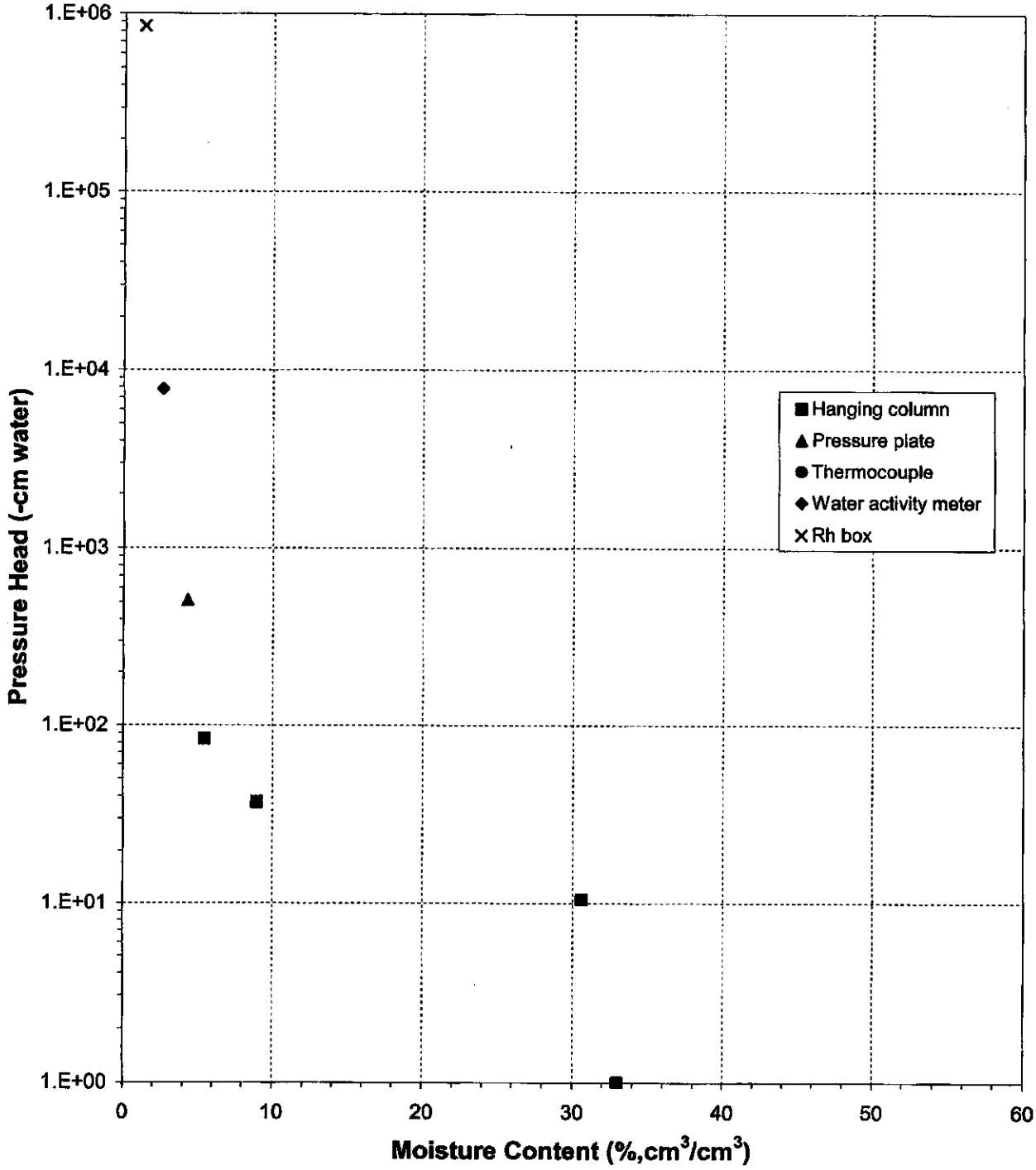
Comments:

* Weight including tares
† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: Carrillo/O'Dowd/Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

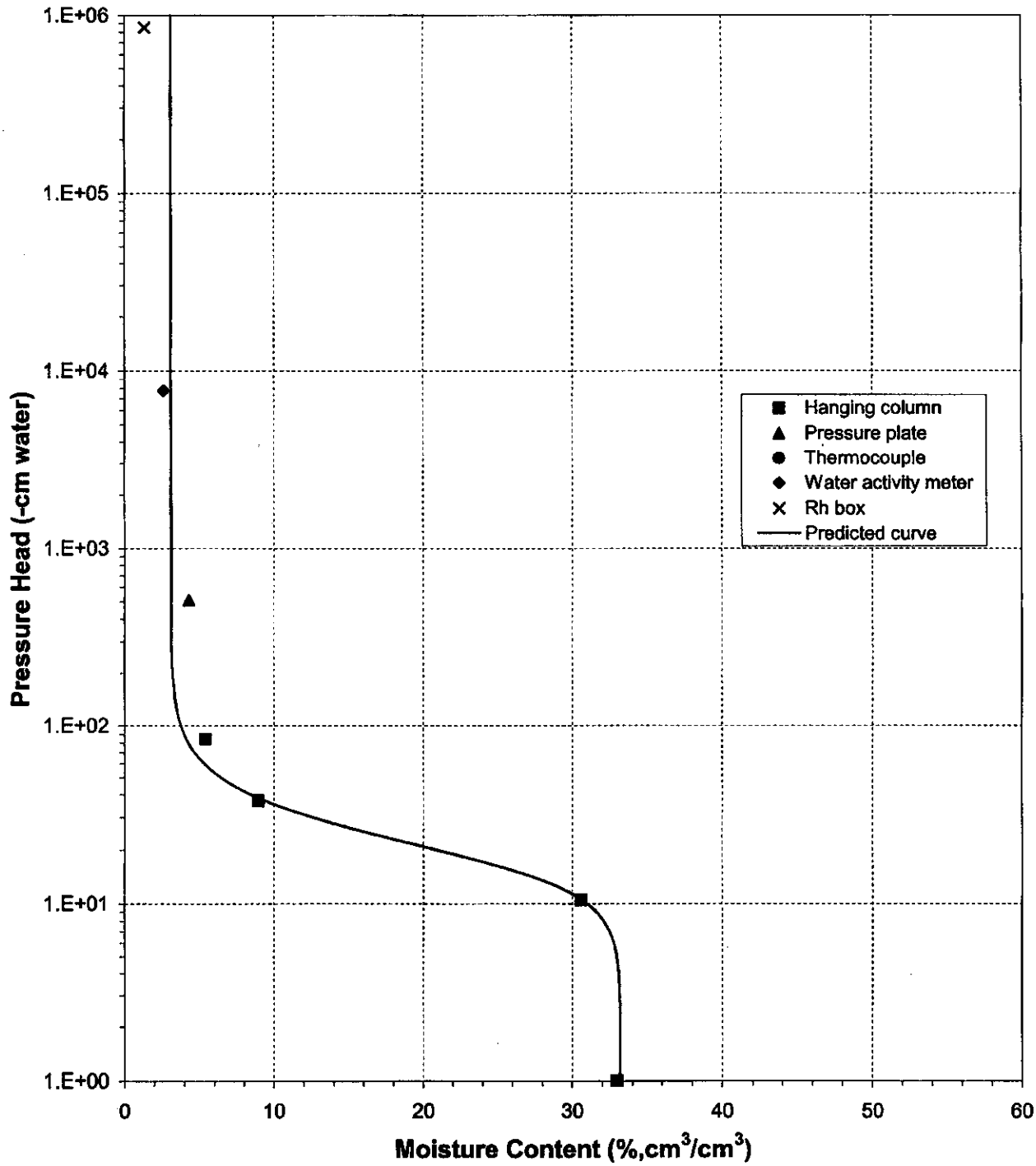
Water Retention Data Points

Sample Number: B1F3D4 Composite (95%)



Predicted Water Retention Curve and Data Points

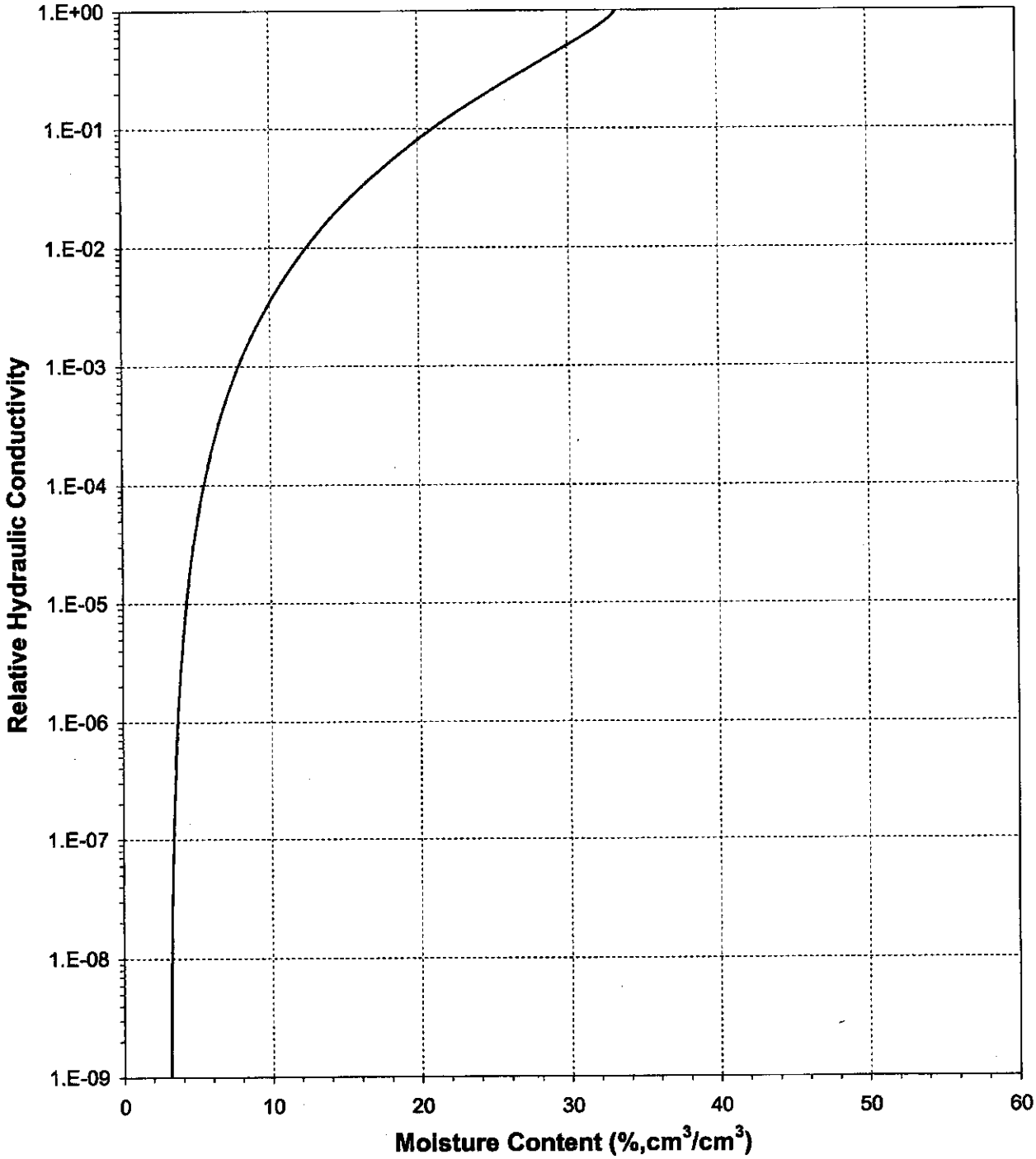
Sample Number: B1F3D4 Composite (95%)



Daniel B. Stephens & Associates, Inc.

Plot of Relative Hydraulic Conductivity vs Moisture Content

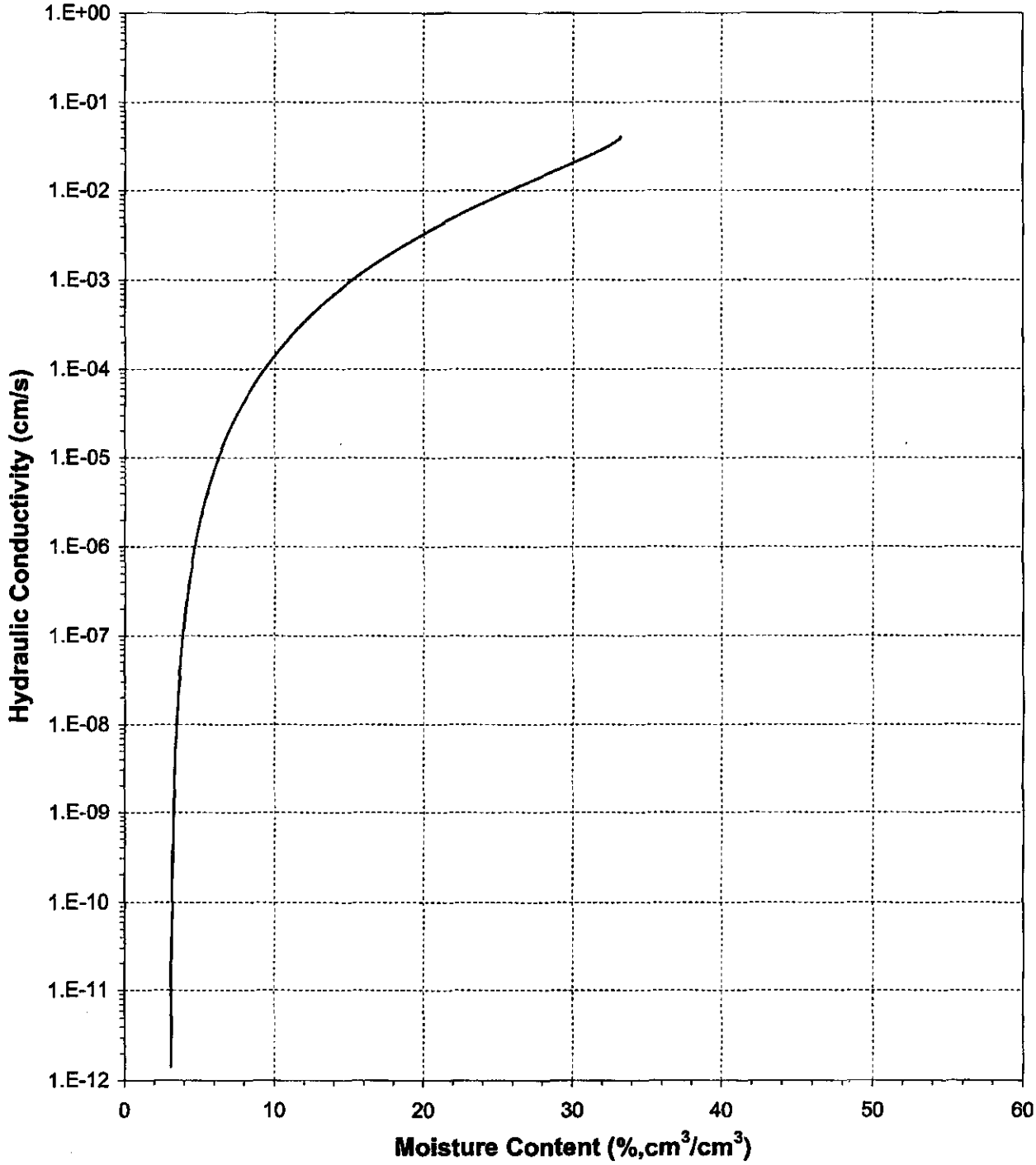
Sample Number: B1F3D4 Composite (95%)



Daniel B. Stephens & Associates, Inc.

Plot of Hydraulic Conductivity vs Moisture Content

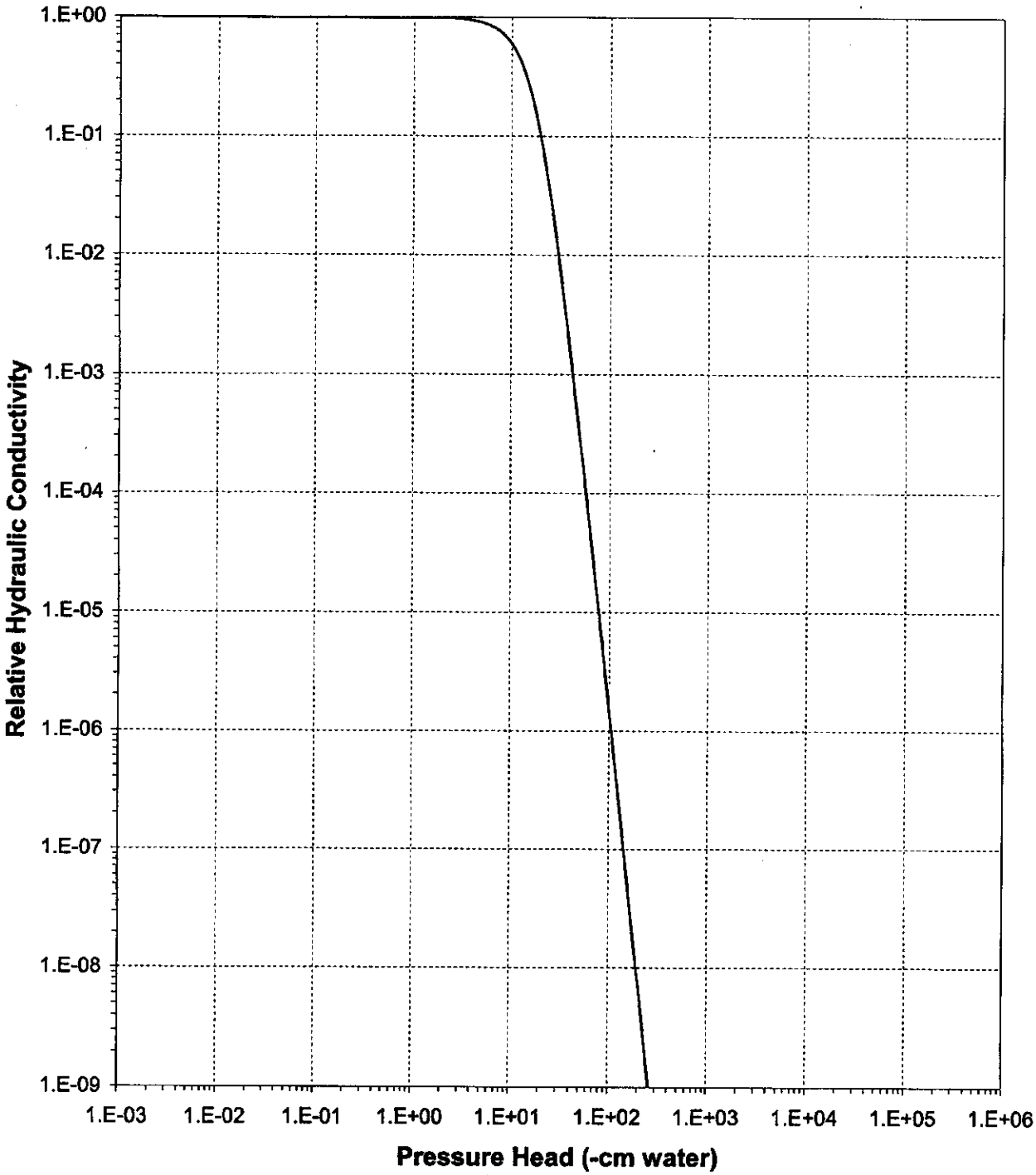
Sample Number: B1F3D4 Composite (95%)



Daniel B. Stephens & Associates, Inc.

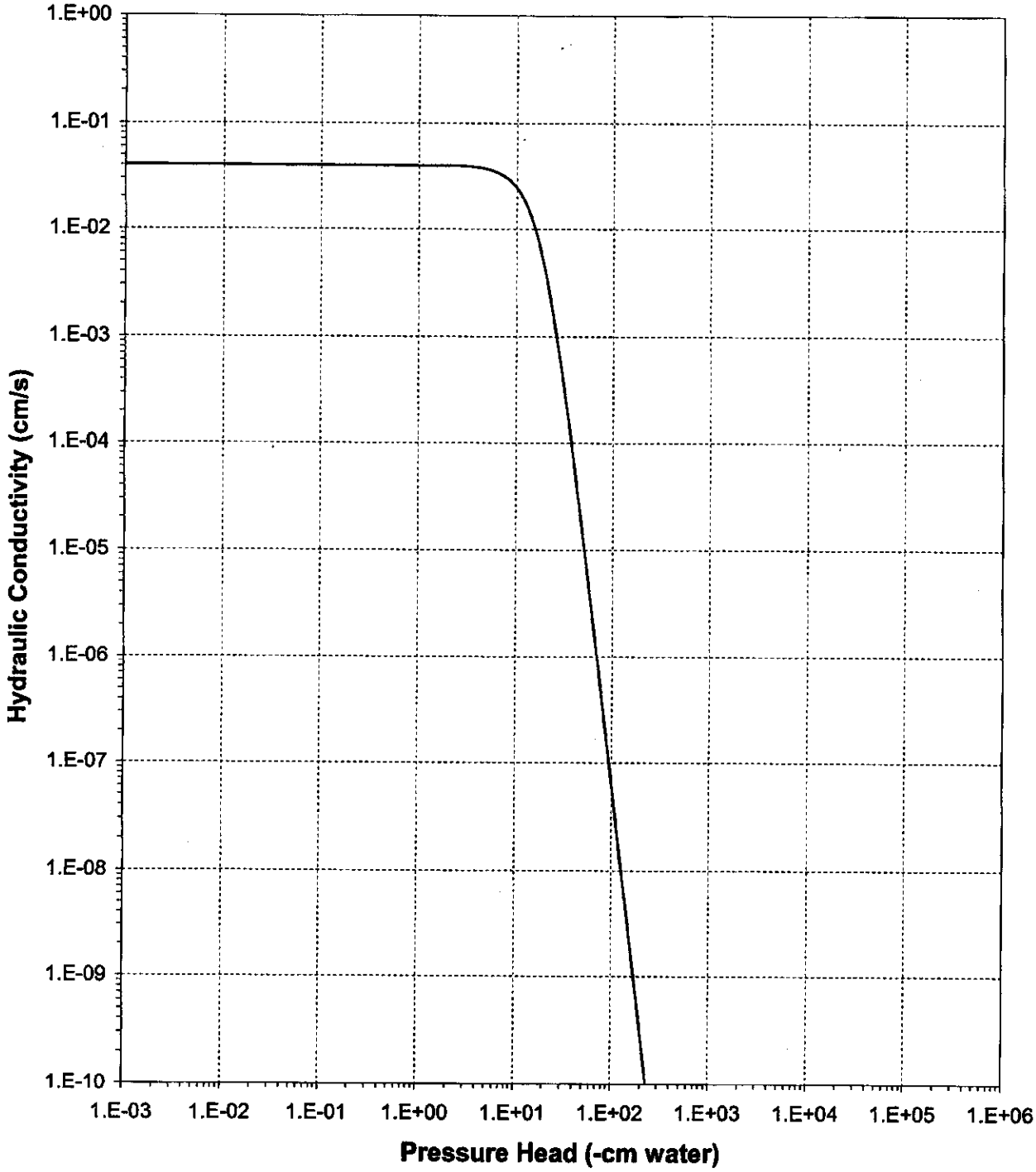
Plot of Relative Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Composite (95%)



Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Composite (95%)



Daniel B. Stephens & Associates, Inc.

Gravel Correction Data Sheet

Job Name: Fluor Hanford
Job Number: LB05.0212.00
Sample Number: B1F3D4 Composite (95%)
Ring Number: NA
Depth: NA
Split: #4

Uncorrected input values		Corrected Values	
Mass (coarse)(g):	753		
Mass (fines)(g):	13069		
Dry bulk density (fines)(g/cm^3):	1.75	Density (composite)(g/cm^3):	1.78
+Density (coarse)(g/cm^3):	2.65		
Ksat value (fines)(cm/sec):	4.0E-02	Ksat composite(cm/sec):	3.9E-02
Theta initial (fines):	0.1930	Theta initial composite:	0.1859
Theta saturated (fines):	0.3323	Theta saturated composite:	0.3201
Theta residual (fines):	0.0307	Theta residual composite:	0.0296
*Theta initial (coarse):	0		
*Theta saturated (coarse):	0		
*Theta residual (coarse):	0		
*Volume (coarse voids)(cm^3):	0		

Volumetric fraction of fines in composite: 0.963
Volumetric fraction of coarse in composite: 0.037
Volumetric fraction of voids in composite: 0.000
Volume (fines)(cm^3): 7468.00
Volume (coarse)(cm^3): 284.15
Volume (composite)(cm^3): 7752.15

Comments:

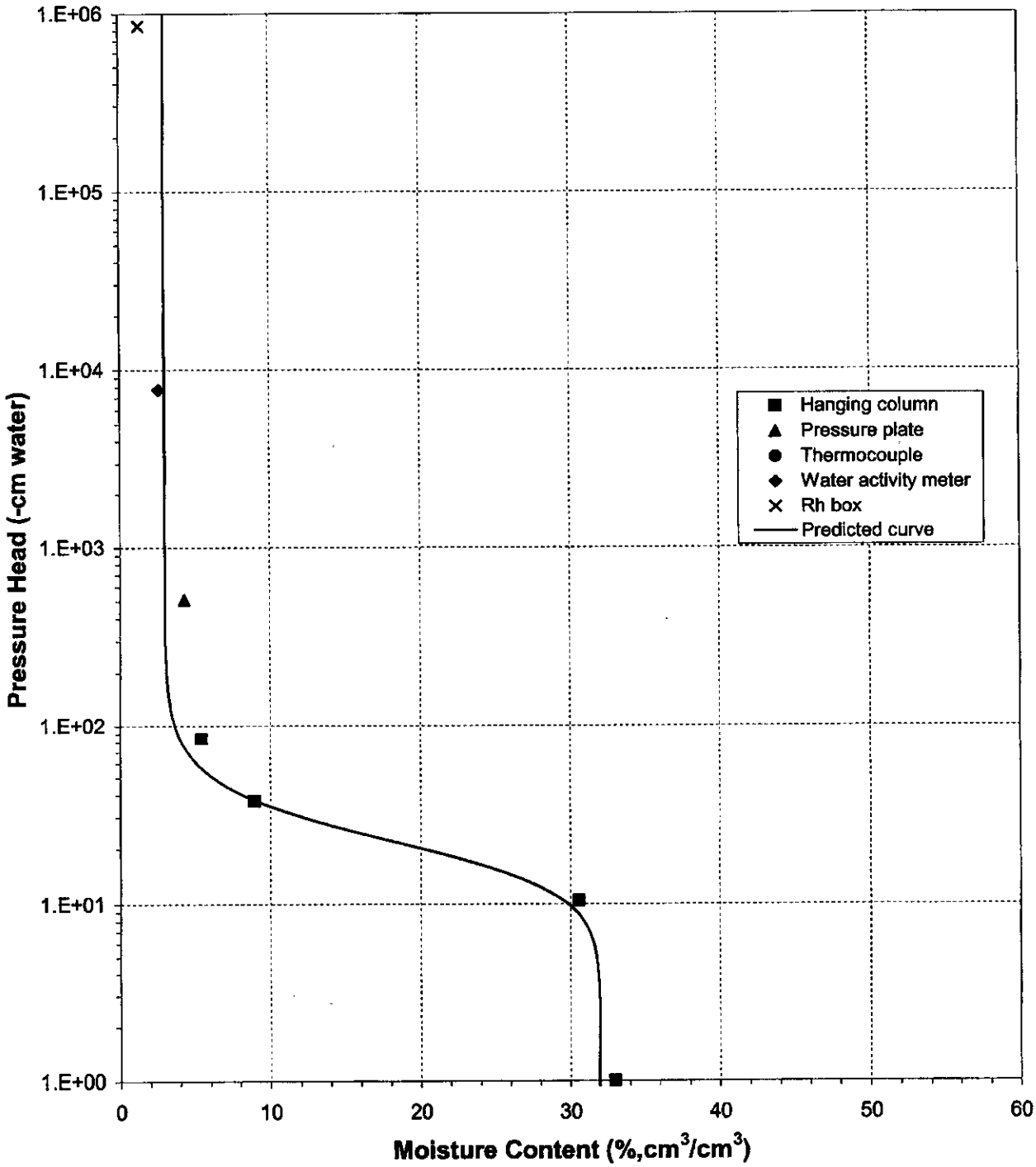
+Assumed to be 2.65, unless measured.

*Values will be zero if the coarse fraction is assumed to hold no water in pores.

Date: 6-Dec-05
Data entered by: D. O'Dowd
Checked by: J. Hines

Predicted Water Retention Curve and Data Points

Sample Number: B1F3D4 Comp (95%) Gravel Corrected



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column/Pressure Plate/Thermocouple

(Main Drainage Curve)

Job Name:	Fluor Hanford, Inc.	*Dry wt. of sample* (g):	402.94
Job Number:	LB05.0212.00	*Tare wt., screen & clamp* (g):	26.71
Sample Number:	B1F3D4 Comp (95%) MSD	*Tare wt., ring* (g):	101.62
Location:	Sand Pile - ARP	*Tare wt., epoxy* (g):	0.00
Date/Time Collected:	9/23/05 11:42	*Sample volume* (cm^3):	217.77

Saturated weight at 0 cm tension* (g): 607.39
Volume of water† in saturated sample (cm^3): 76.12
Saturated moisture content (% vol): 34.95
Sample bulk density (g/cm^3): 1.85

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Hanging column:	01-Nov-05 / 15:50	607.39	0.00	34.95
	07-Nov-05 / 14:05	601.81	10.50	32.39
	14-Nov-05 / 10:35	551.93	37.00	9.49
	21-Nov-05 / 11:15	543.80	84.00	5.75
Pressure plate:	28-Nov-05 / 09:15	541.18	509.90	4.55

Comments:

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Water Activity Meter/Relative Humidity Box

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Comp (95%) MSD
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Dry weight of water activity meter sample* (g): 146.85
Tare weight, jar (g): 113.03
Sample bulk density (g/cm^3): 1.85

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Water Activity Meter:	08-Nov-05 / 08:50	147.36	7750.5	2.79

Dry weight of relative humidity box sample* (g): 76.70
Tare weight (g): 44.42
Sample bulk density (g/cm^3): 1.85

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Relative humidity box:	31-Oct-05 / 10:00	76.95	851293	1.44

Comments:

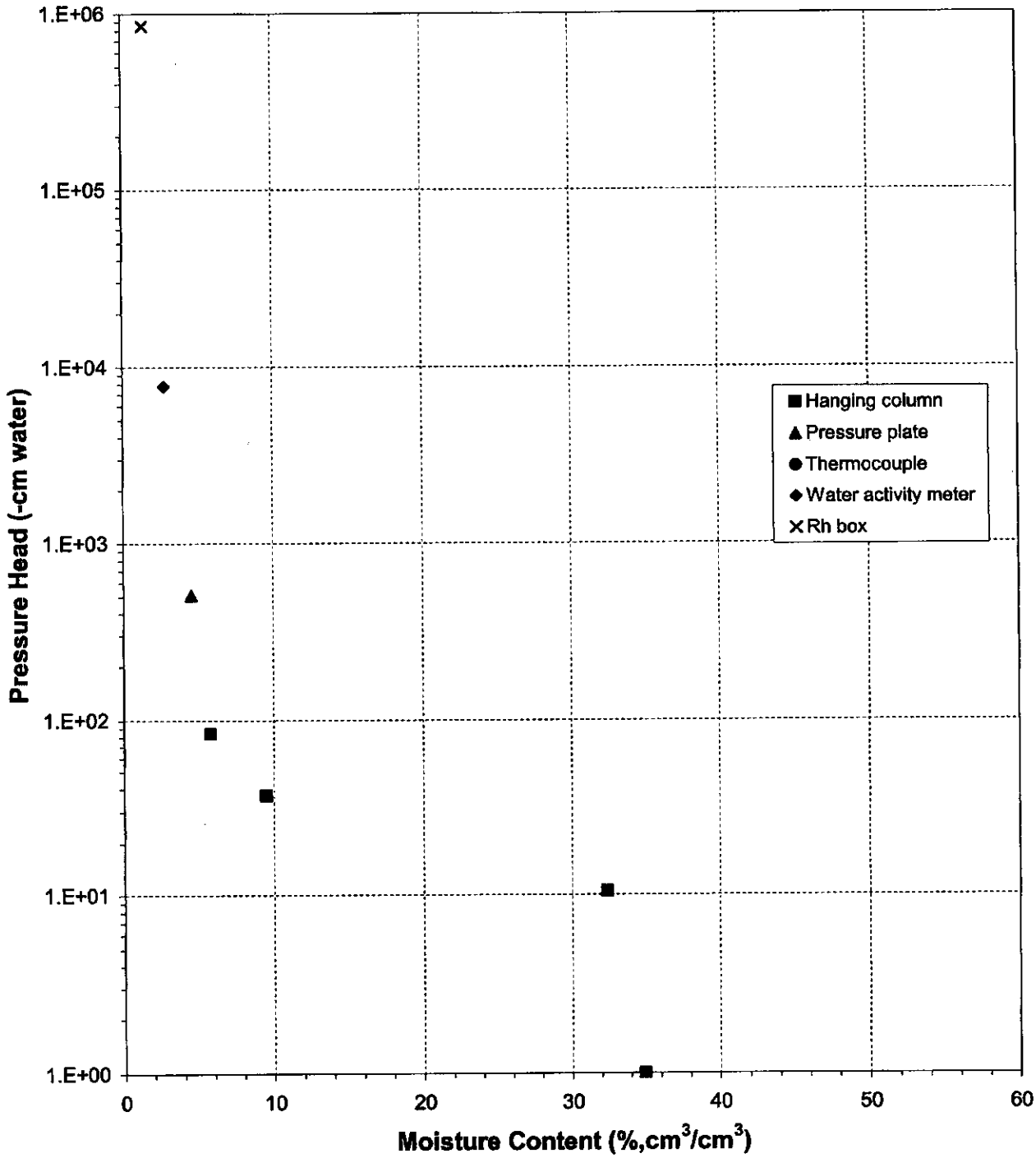
* Weight including tares
† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: Carrillo/O'Dowd/Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Water Retention Data Points

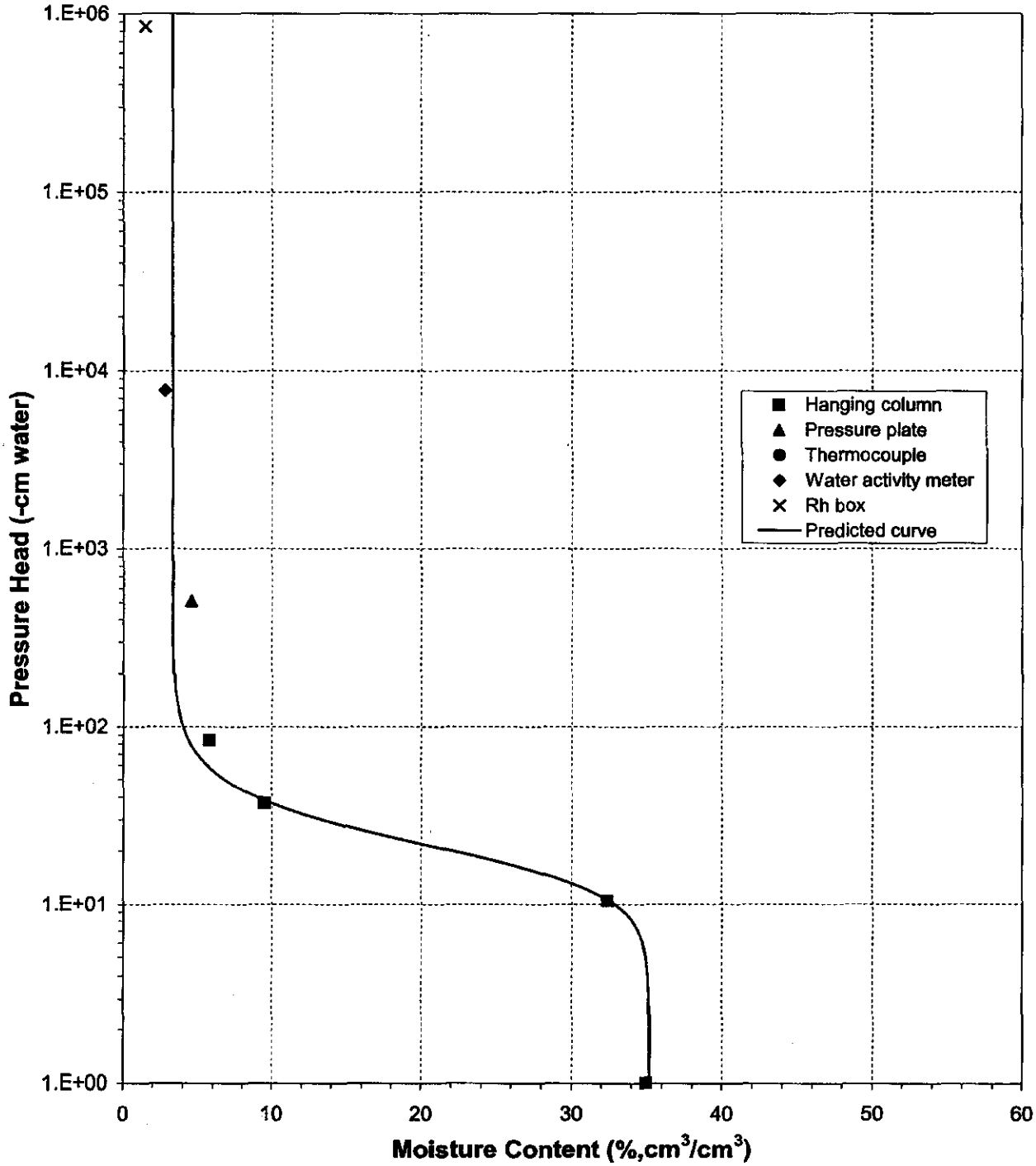
Sample Number: B1F3D4 Comp (95%) MSD



Daniel B. Stephens & Associates, Inc.

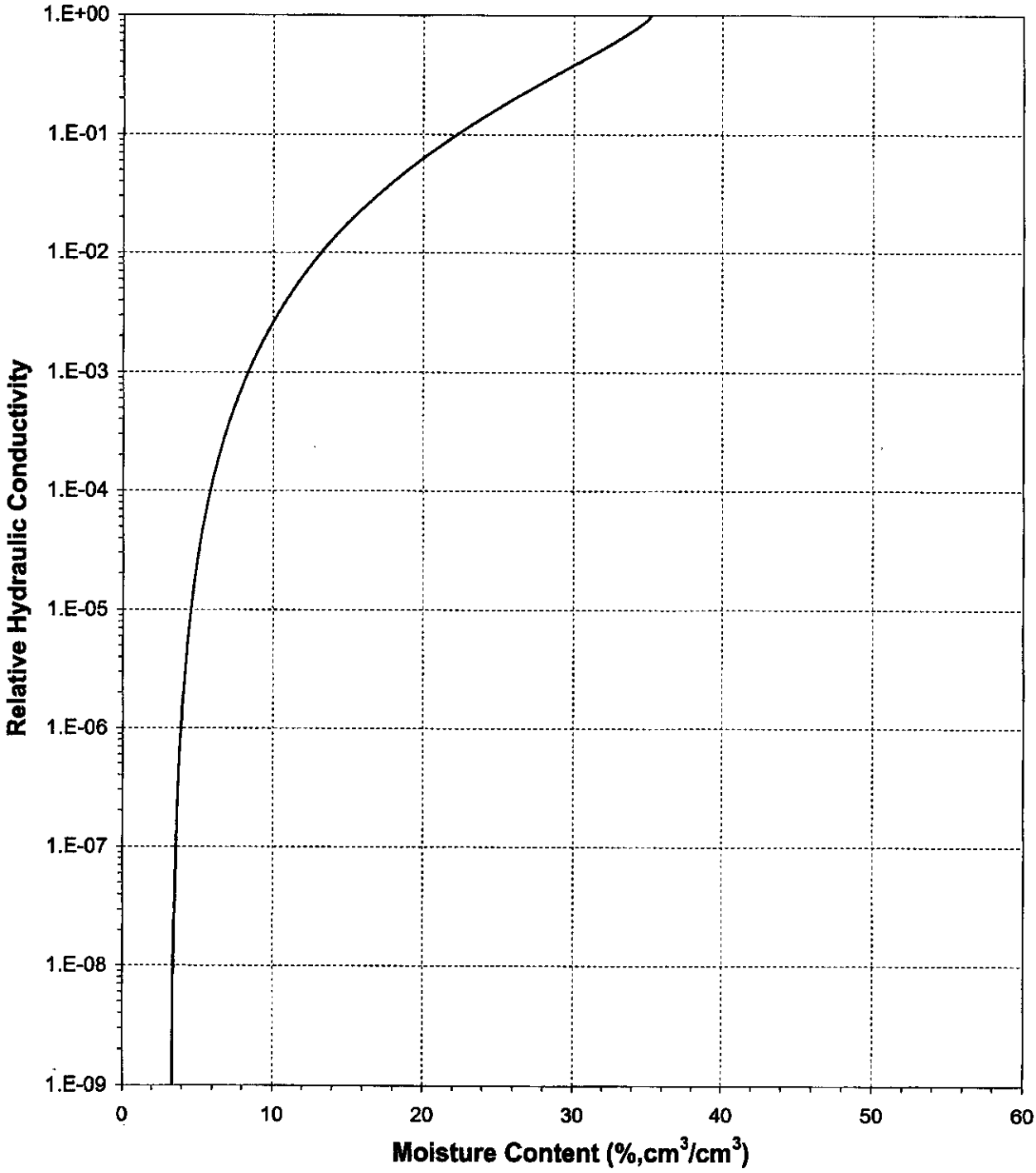
Predicted Water Retention Curve and Data Points

Sample Number: B1F3D4 Comp (95%) MSD



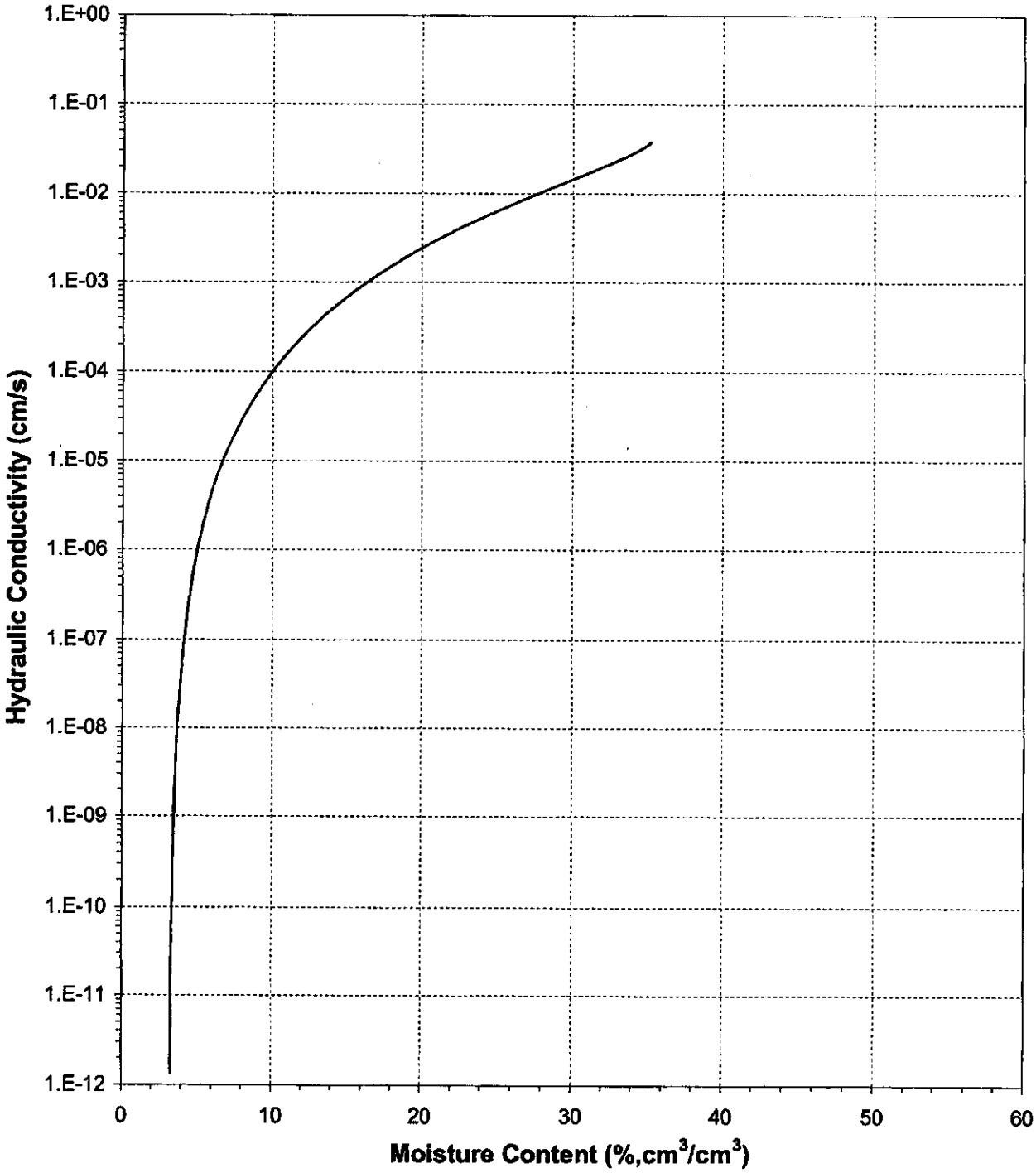
Plot of Relative Hydraulic Conductivity vs Moisture Content

Sample Number: B1F3D4 Comp (95%) MSD



Plot of Hydraulic Conductivity vs Moisture Content

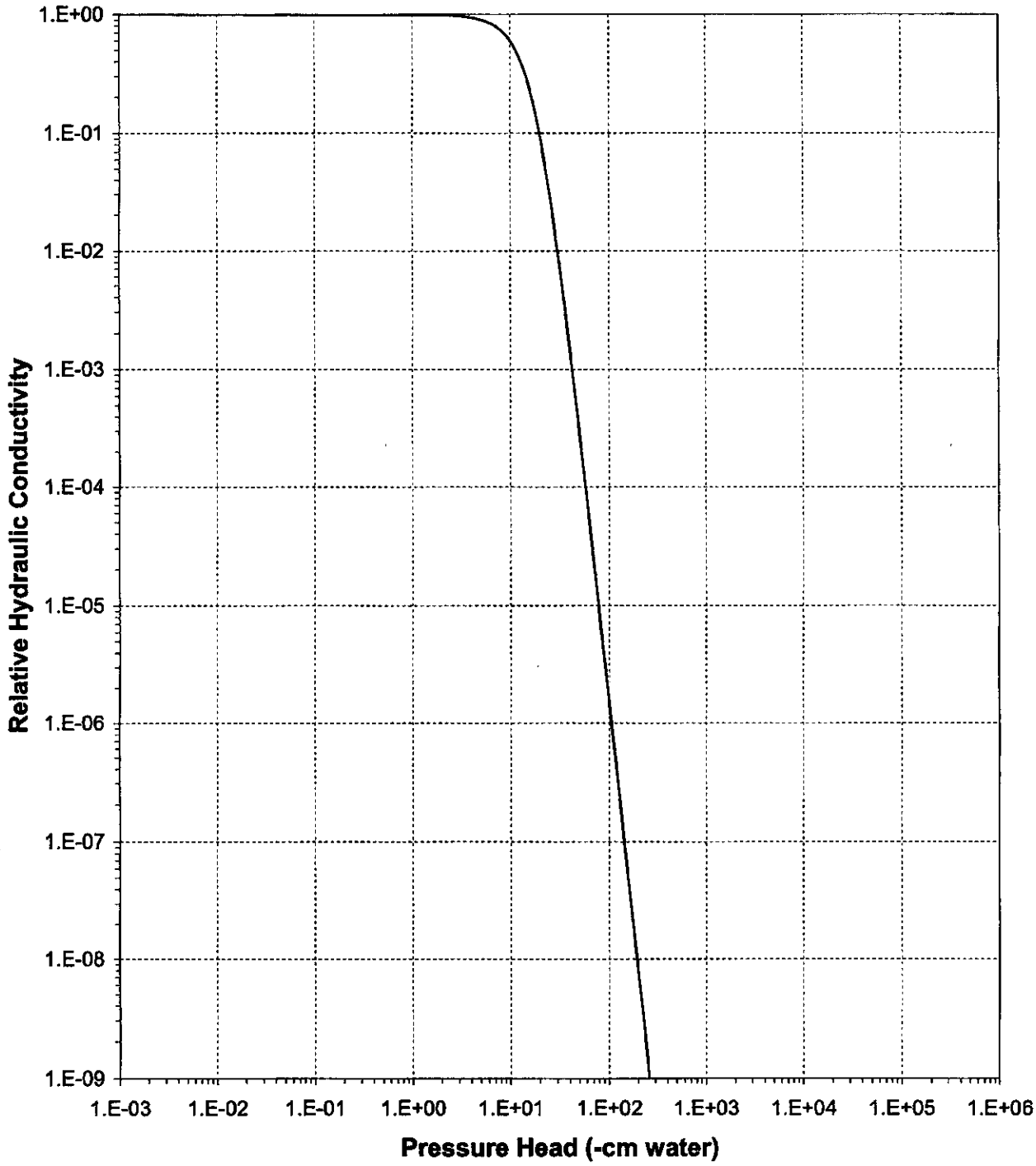
Sample Number: B1F3D4 Comp (95%) MSD



Daniel B. Stephens & Associates, Inc.

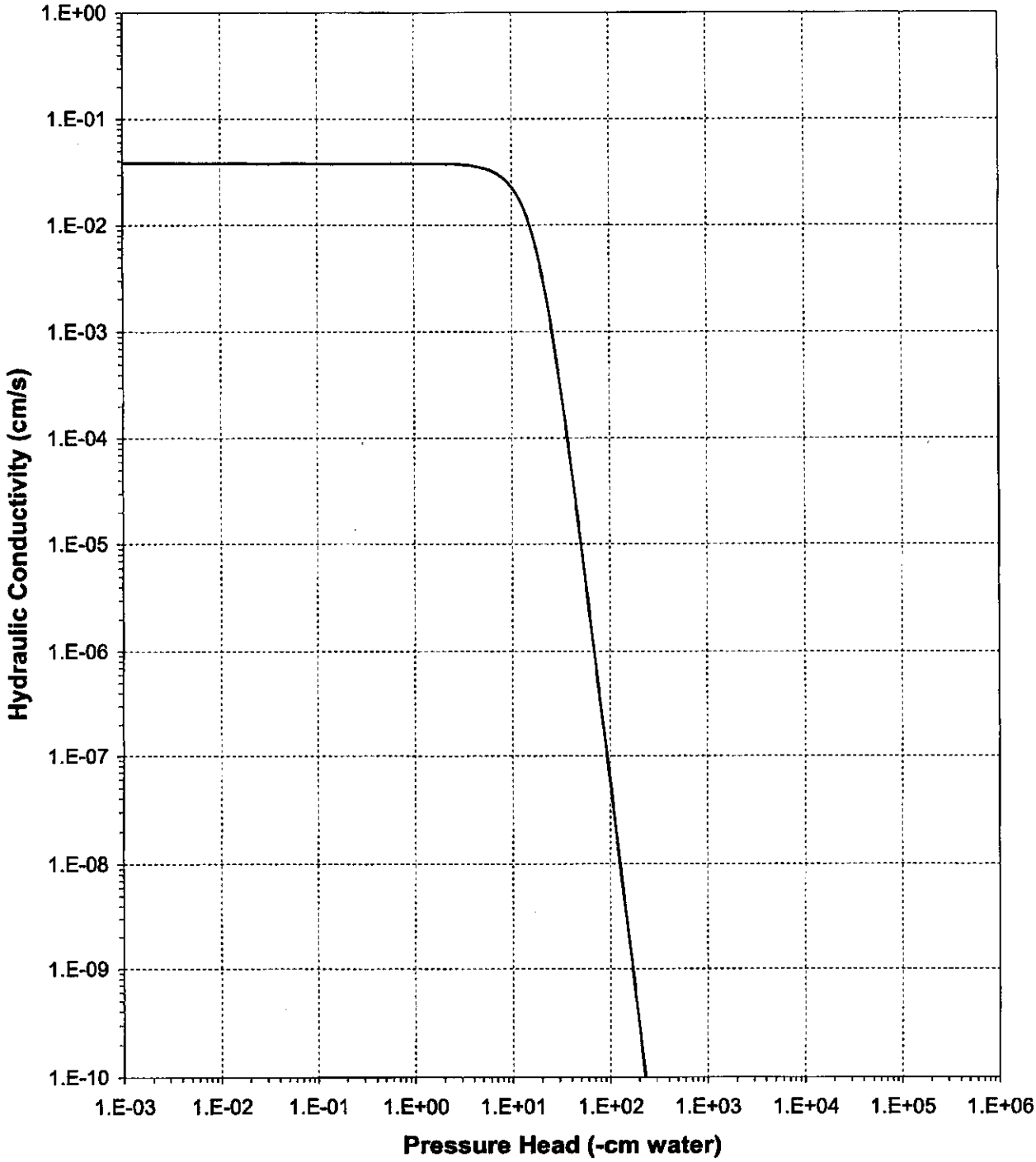
Plot of Relative Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Comp (95%) MSD



Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Comp (95%) MSD



Daniel B. Stephens & Associates, Inc.

Gravel Correction Data Sheet

Job Name: Fluor Hanford
Job Number: LB05.0212.00
Sample Number: B1F3D4 Composite (95%) MSD
Ring Number: NA
Depth: NA
Split: #4

Uncorrected input values		Corrected Values	
Mass (coarse)(g):	753		
Mass (fines)(g):	13069		
Dry bulk density (fines)(g/cm^3):	1.85	Density (composite)(g/cm^3):	1.88
+Density (coarse)(g/cm^3):	2.65		
Ksat value (fines)(cm/sec):	3.8E-02	Ksat composite(cm/sec):	3.7E-02
Theta initial (fines):	0.2050	Theta initial composite:	0.1971
Theta saturated (fines):	0.3519	Theta saturated composite:	0.3383
Theta residual (fines):	0.0325	Theta residual composite:	0.0312
*Theta initial (coarse):	0		
*Theta saturated (coarse):	0		
*Theta residual (coarse):	0		
*Volume (coarse voids)(cm^3):	0		

Volumetric fraction of fines in composite: 0.961
Volumetric fraction of coarse in composite: 0.039
Volumetric fraction of voids in composite: 0.000
Volume (fines)(cm^3): 7064.32
Volume (coarse)(cm^3): 284.15
Volume (composite)(cm^3): 7348.48

Comments:

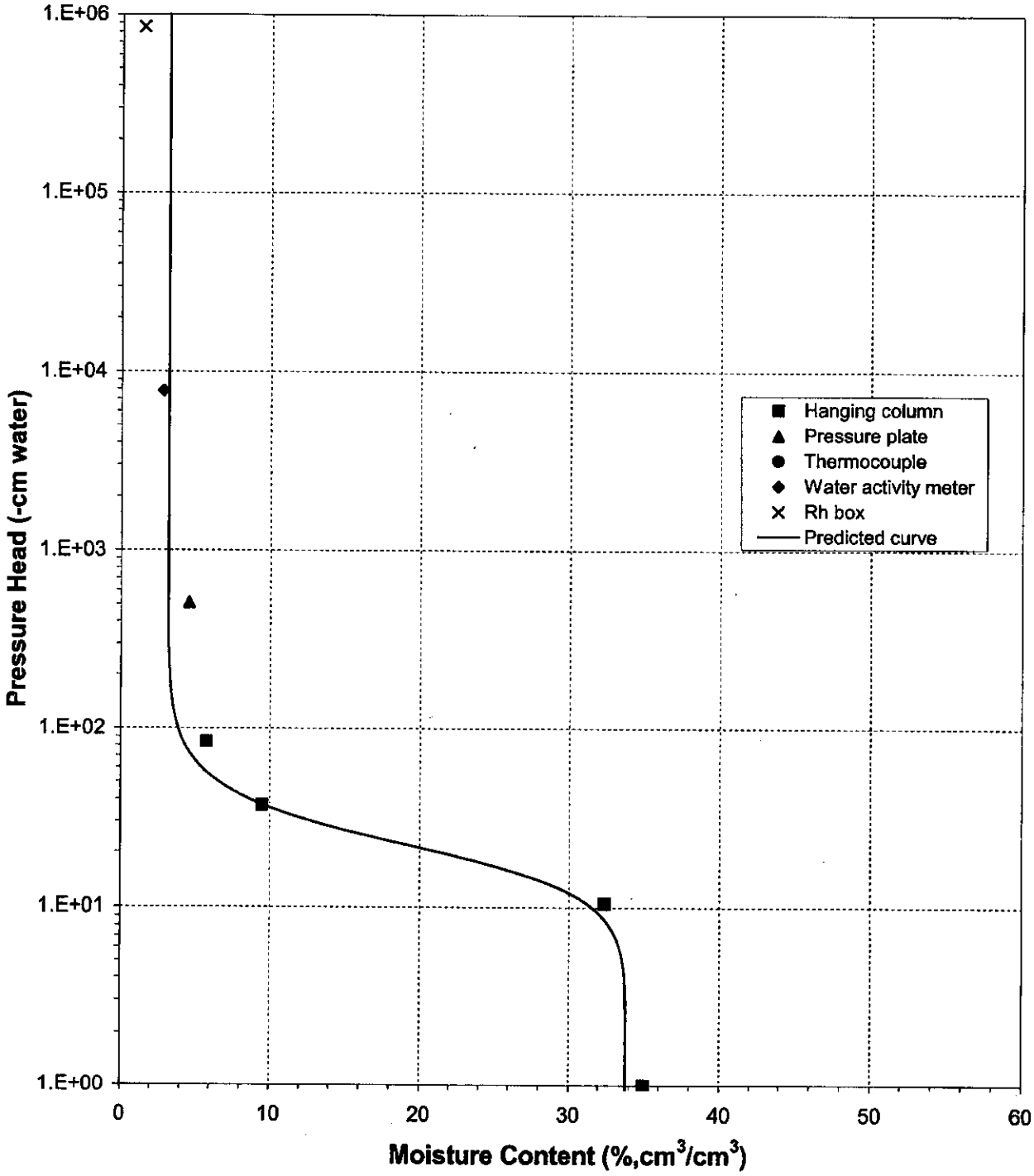
+Assumed to be 2.65, unless measured.

*Values will be zero if the coarse fraction is assumed to hold no water in pores.

Date: 6-Dec-05
Data entered by: D. O'Dowd
Checked by: J. Hines

Predicted Water Retention Curve and Data Points

Sample Number: B1F3D4 Comp (95%) MSD Gravel Corrected



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column/Pressure Plate/Thermocouple

(Main Drainage Curve)

Job Name:	Fluor Hanford, Inc.	*Dry wt. of sample* (g):	313.81
Job Number:	LB05.0212.00	*Tare wt., screen & clamp* (g):	27.66
Sample Number:	B1F3D4 Custom Blend (80%)	*Tare wt., ring* (g):	144.12
Location:	Sand Pile - American Rock Products	*Tare wt., epoxy* (g):	0.00
Date/Time Collected:	9/23/05 11:42	*Sample volume* (cm^3):	224.32

Saturated weight at 0 cm tension* (g): 556.84
Volume of water† in saturated sample (cm^3): 71.25
Saturated moisture content (% vol): 31.76
Sample bulk density (g/cm^3): 1.40

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Hanging column:	03-Nov-05 / 15:45	556.84	0.00	31.76
	09-Nov-05 / 16:30	552.13	10.00	29.66
	16-Nov-05 / 14:40	517.05	35.50	14.02
	22-Nov-05 / 12:30	497.27	90.00	5.21
Pressure plate:	28-Nov-05 / 10:05	494.47	611.88	3.96

Comments:

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Water Activity Meter/Relative Humidity Box

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Custom Blend (80%)
Location: Sand Pile - American Rock Products
Date/Time Collected: 9/23/05 11:42

Dry weight of water activity meter sample* (g): 152.80
Tare weight, jar (g): 113.10
Sample bulk density (g/cm^3): 1.40

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Water Activity Meter:	08-Nov-05 / 16:55	153.56	14787.1	2.68

Dry weight of relative humidity box sample* (g): 83.56
Tare weight (g): 41.62
Sample bulk density (g/cm^3): 1.40

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Relative humidity box:	31-Oct-05 / 10:00	83.95	851293	1.28

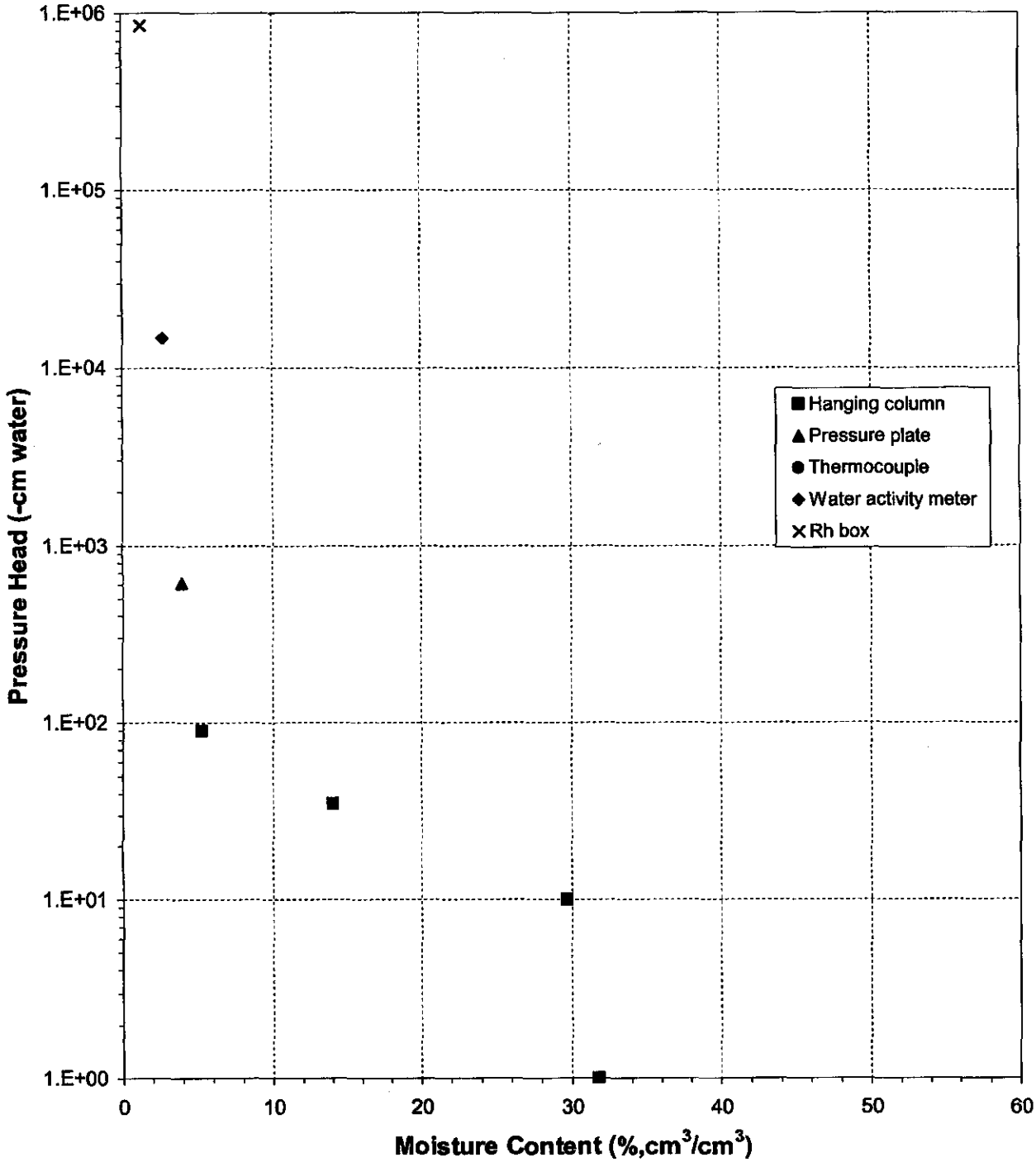
Comments:

* Weight including tares
† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: Carrillo/O'Dowd/Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

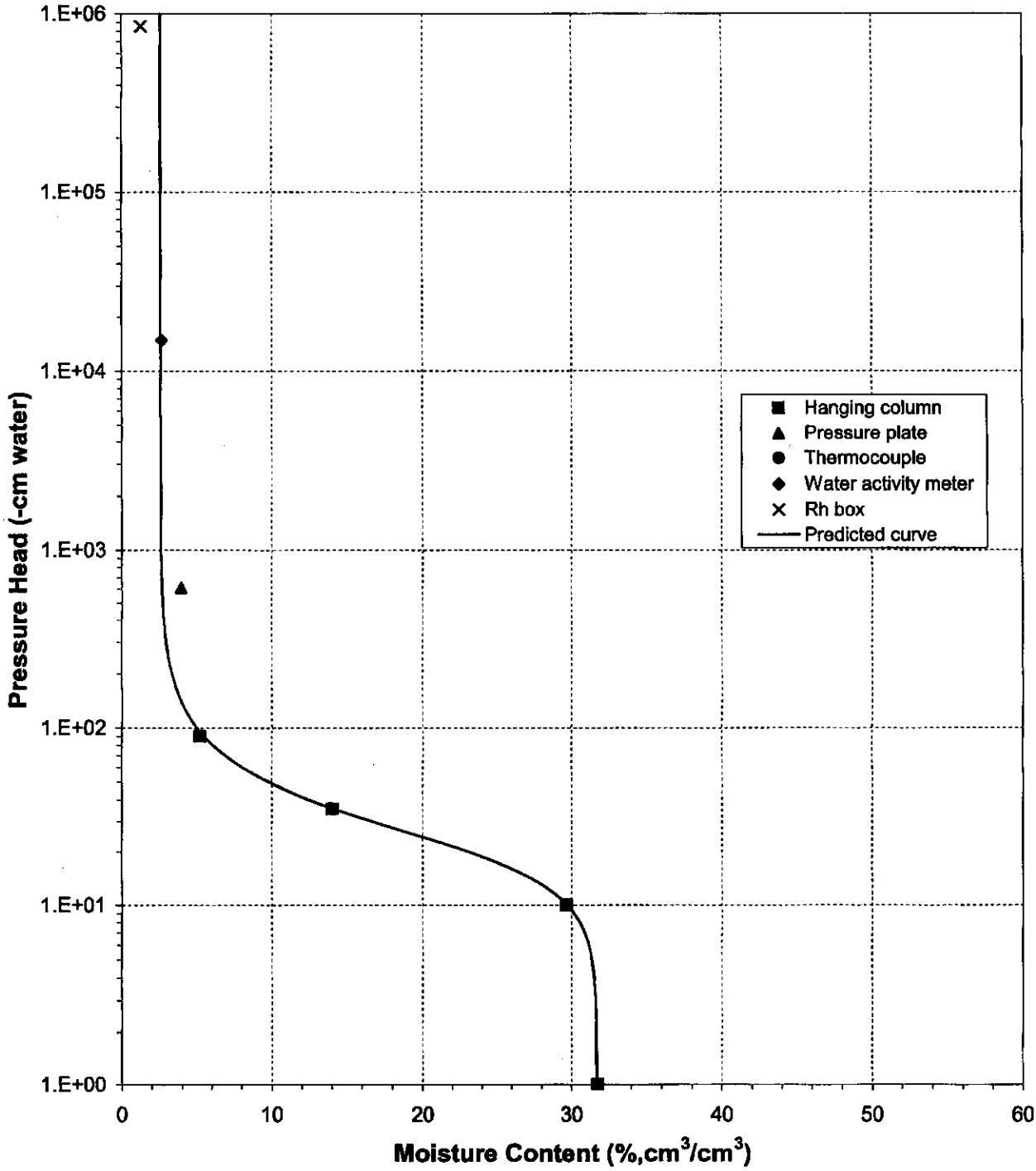
Water Retention Data Points

Sample Number: B1F3D4 Custom Blend (80%)



Predicted Water Retention Curve and Data Points

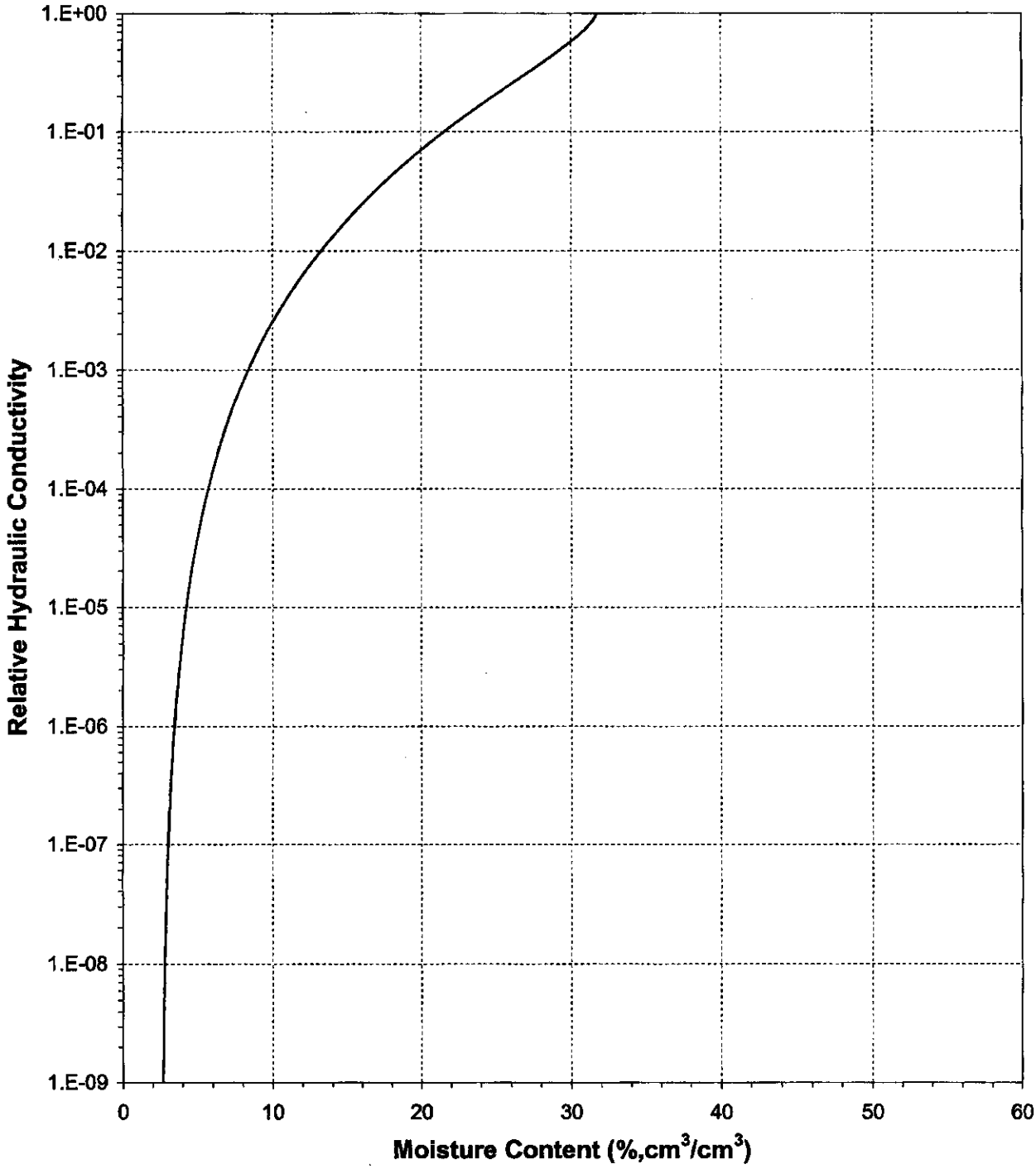
Sample Number: B1F3D4 Custom Blend (80%)



Daniel B. Stephens & Associates, Inc.

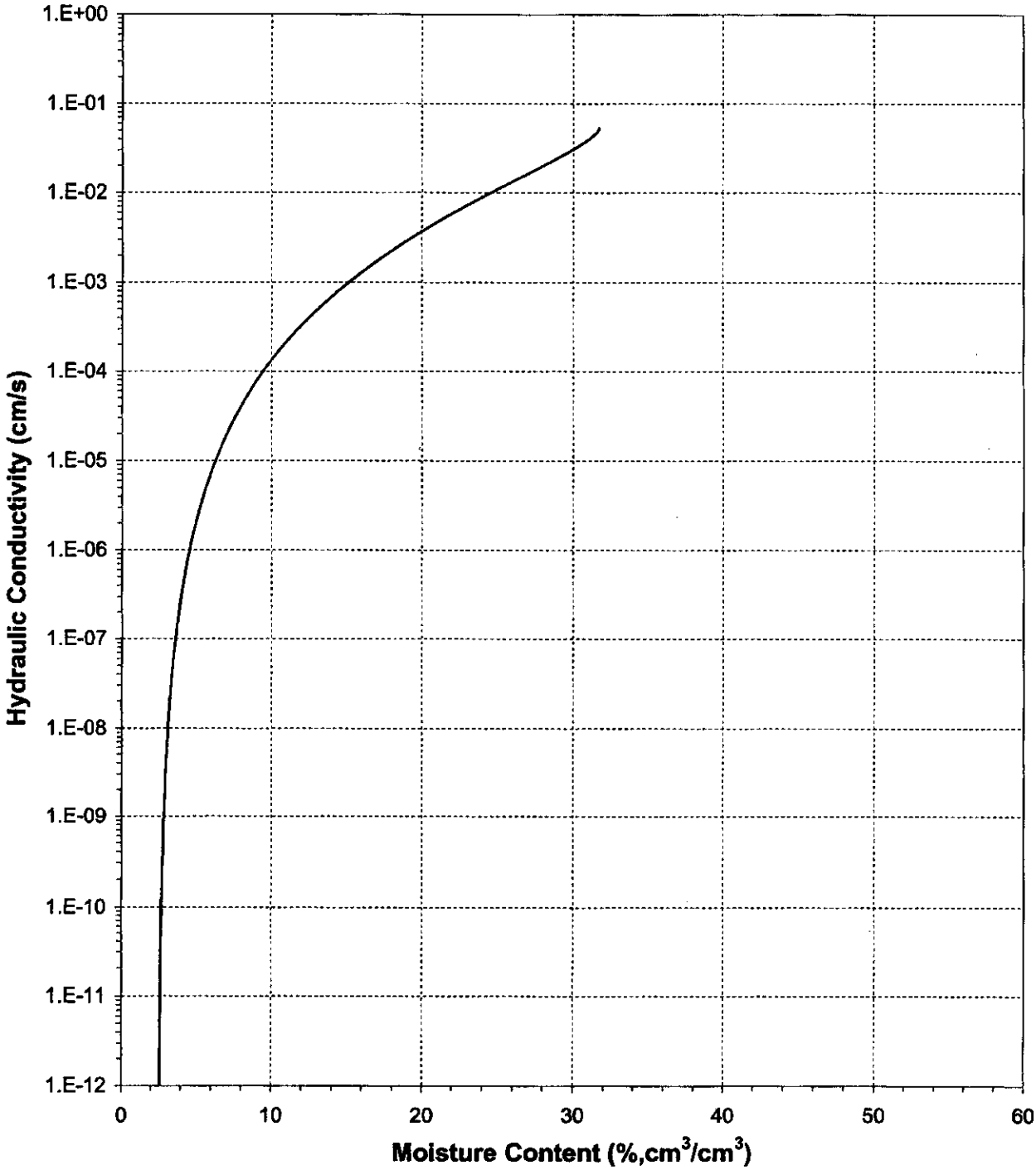
Plot of Relative Hydraulic Conductivity vs Moisture Content

Sample Number: B1F3D4 Custom Blend (80%)



Plot of Hydraulic Conductivity vs Moisture Content

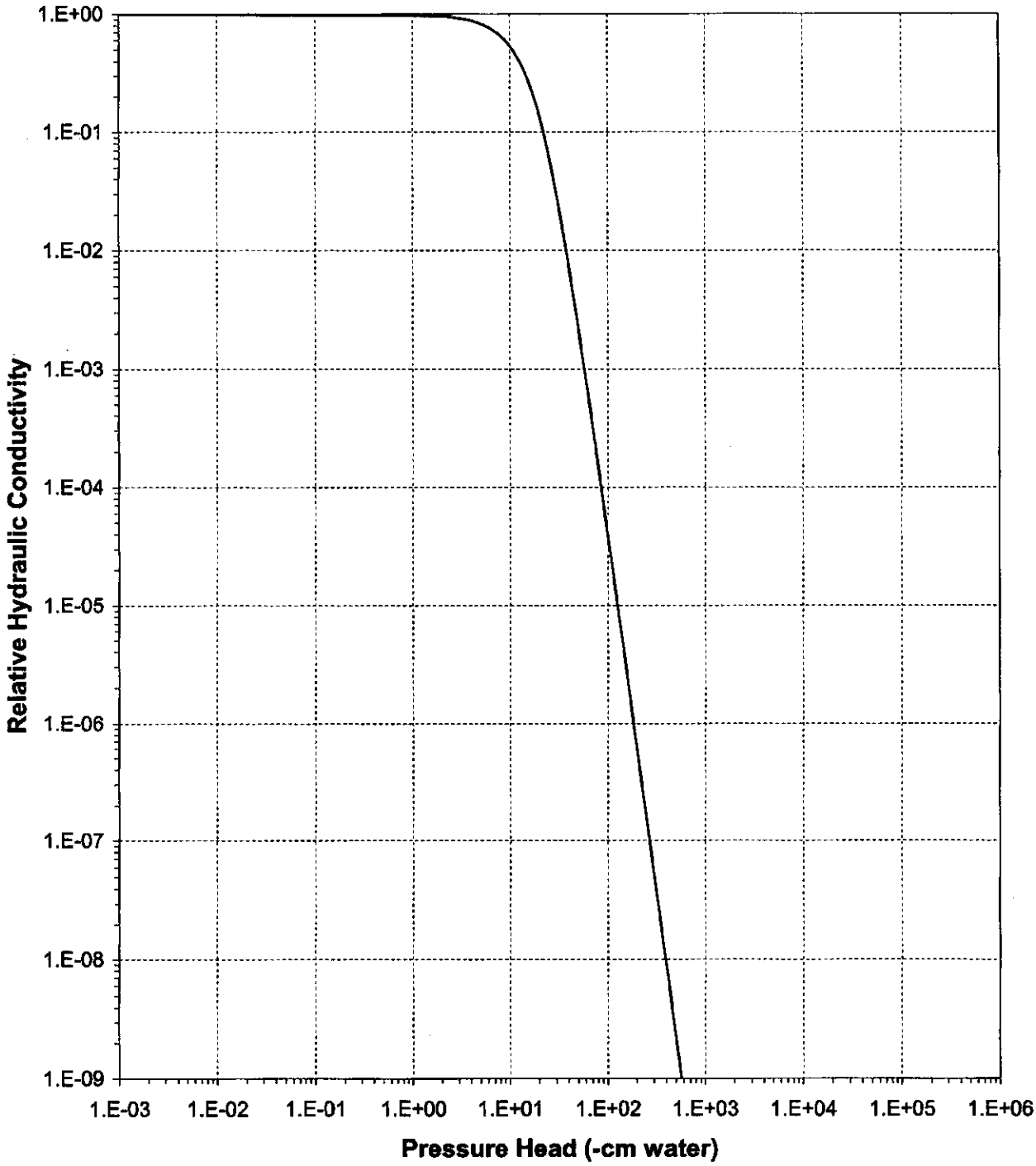
Sample Number: B1F3D4 Custom Blend (80%)



Daniel B. Stephens & Associates, Inc.

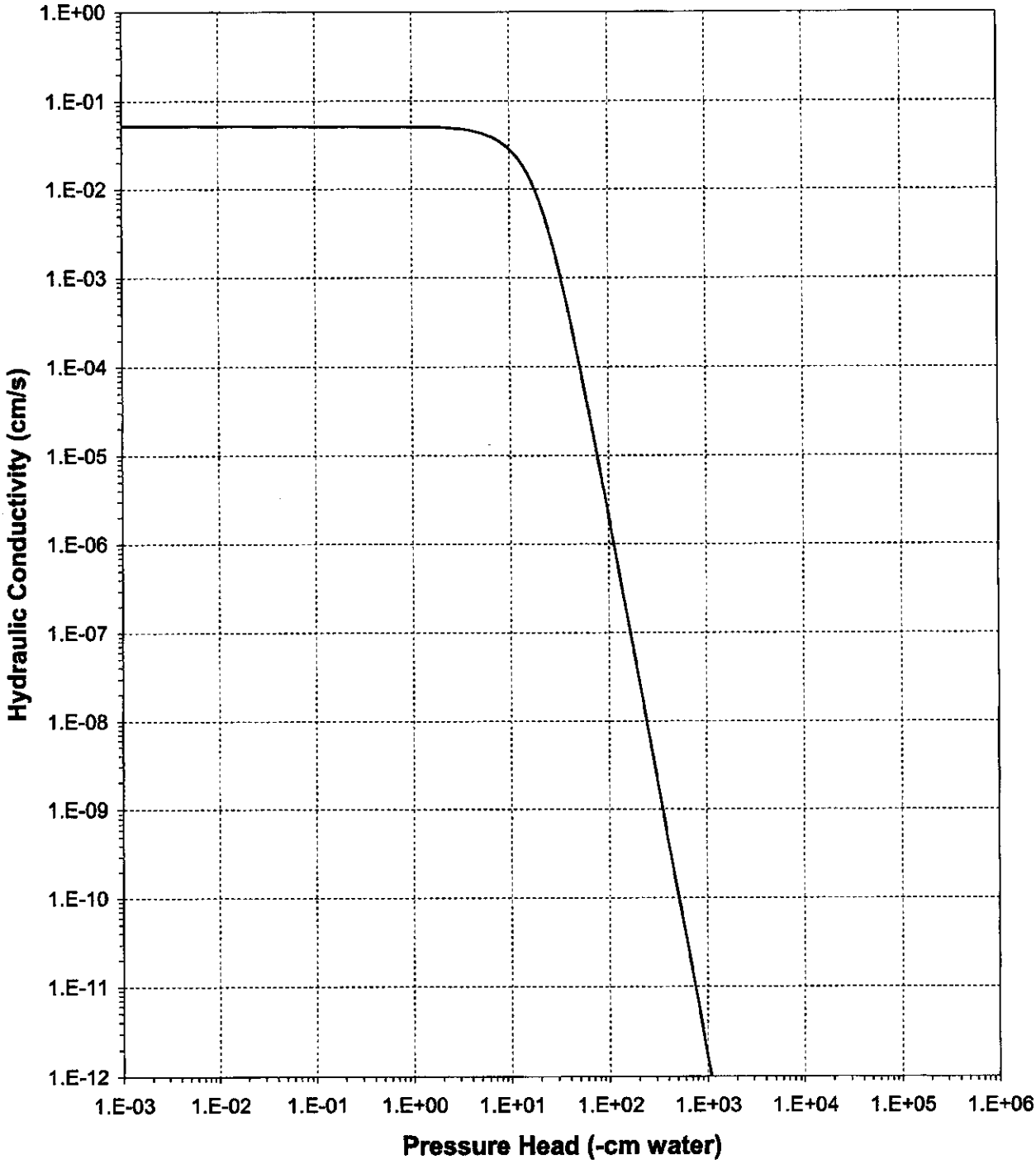
Plot of Relative Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Custom Blend (80%)



Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Custom Blend (80%)



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column/Pressure Plate/Thermocouple

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Blend (80%) MSD
Ring Number: Sand Pile - American Rock Products
Depth: 9/23/05 11:42

Dry wt. of sample (g): 313.81
Tare wt., screen & clamp (g): 27.66
Tare wt., ring (g): 144.12
Tare wt., epoxy (g): 0.00
Sample volume (cm^3): 182.41

Saturated weight at 0 cm tension* (g): 556.84
Volume of water† in saturated sample (cm^3): 71.25
Saturated moisture content (% vol): 39.06
Sample bulk density (g/cm^3): 1.72

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Hanging column:	03-Nov-05 / 15:45	556.84	0.00	39.06
	09-Nov-05 / 16:30	552.13	10.00	36.48
	16-Nov-05 / 14:40	517.05	35.50	17.25
	22-Nov-05 / 12:30	497.27	90.00	6.40
Pressure plate:	28-Nov-05 / 10:05	494.47	611.88	4.87

Comments:

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Water Activity Meter/Relative Humidity Box

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Blend (80%) MSD
Ring Number: Sand Pile - American Rock Products
Depth: 9/23/05 11:42

Dry weight of water activity meter sample* (g): 152.80
Tare weight, jar (g): 113.10
Sample bulk density (g/cm^3): 1.72

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Water Activity Meter:	08-Nov-05 / 16:55	153.56	14787.1	3.29

Dry weight of relative humidity box sample* (g): 83.56
Tare weight (g): 41.62
Sample bulk density (g/cm^3): 1.72

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Relative humidity box:	31-Oct-05 / 10:00	83.95	851293	1.57

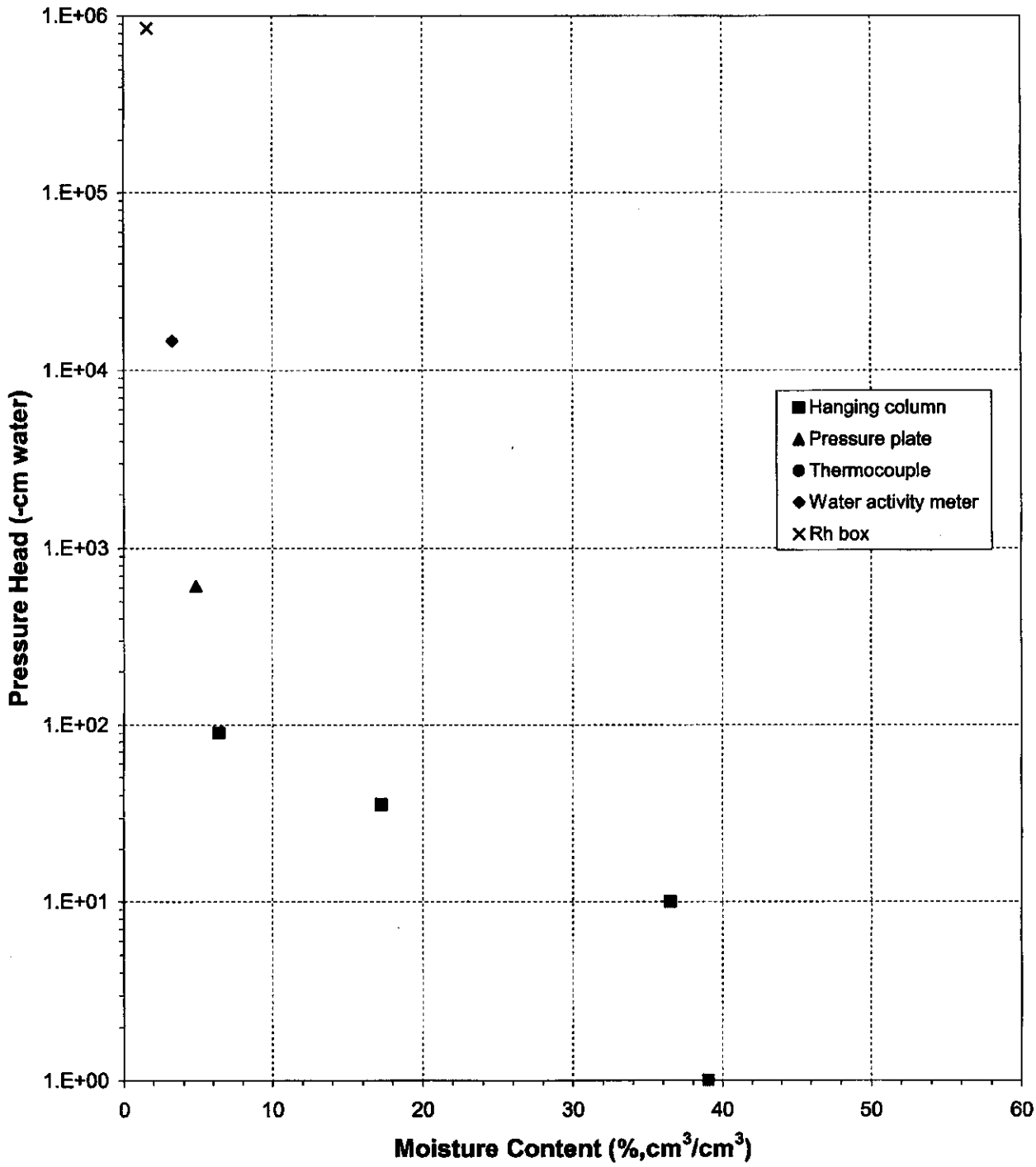
Comments:

* Weight including tares
† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: Carrillo/O'Dowd/Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

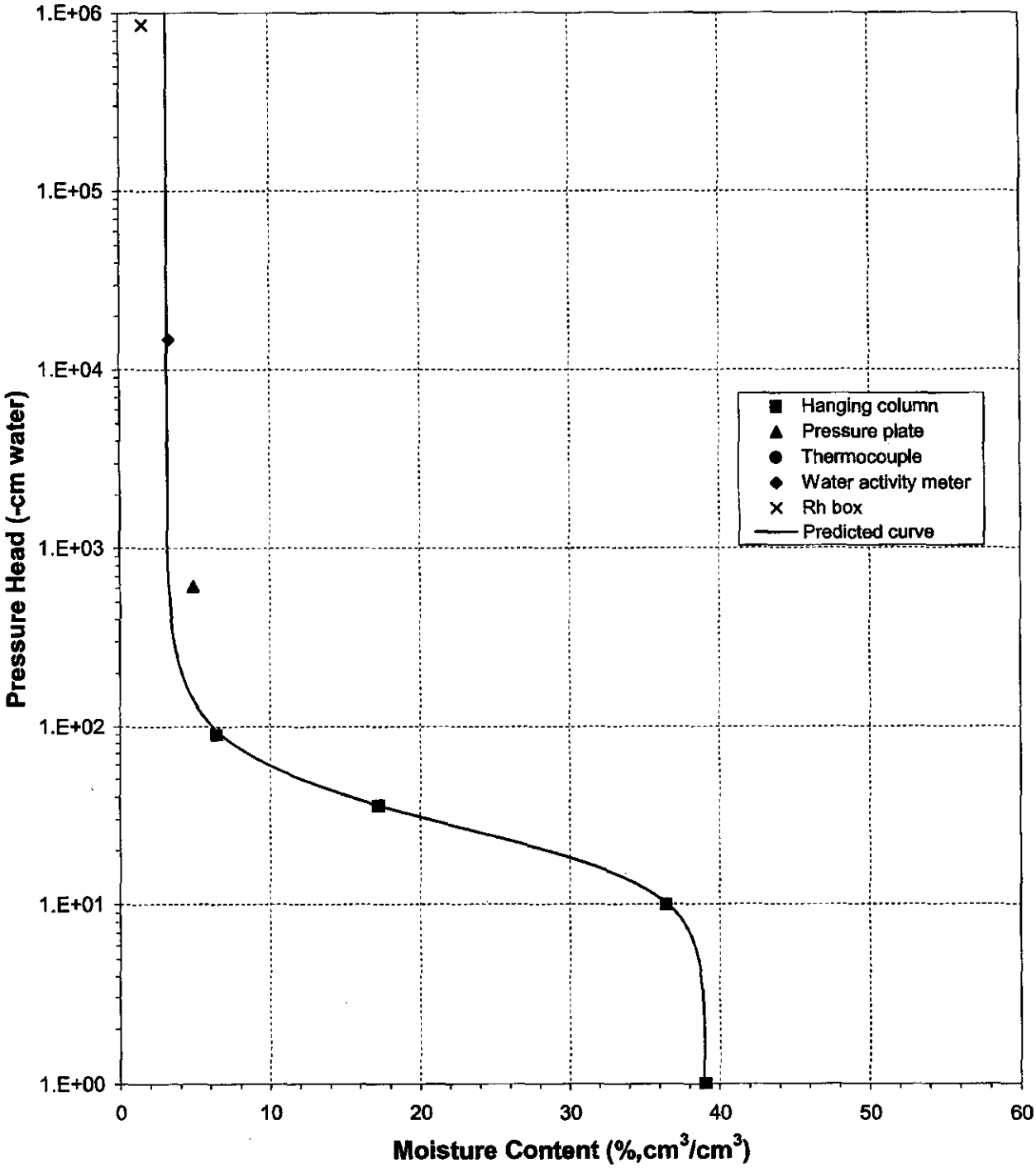
Water Retention Data Points

Sample Number: B1F3D4 Blend (80%) MSD



Predicted Water Retention Curve and Data Points

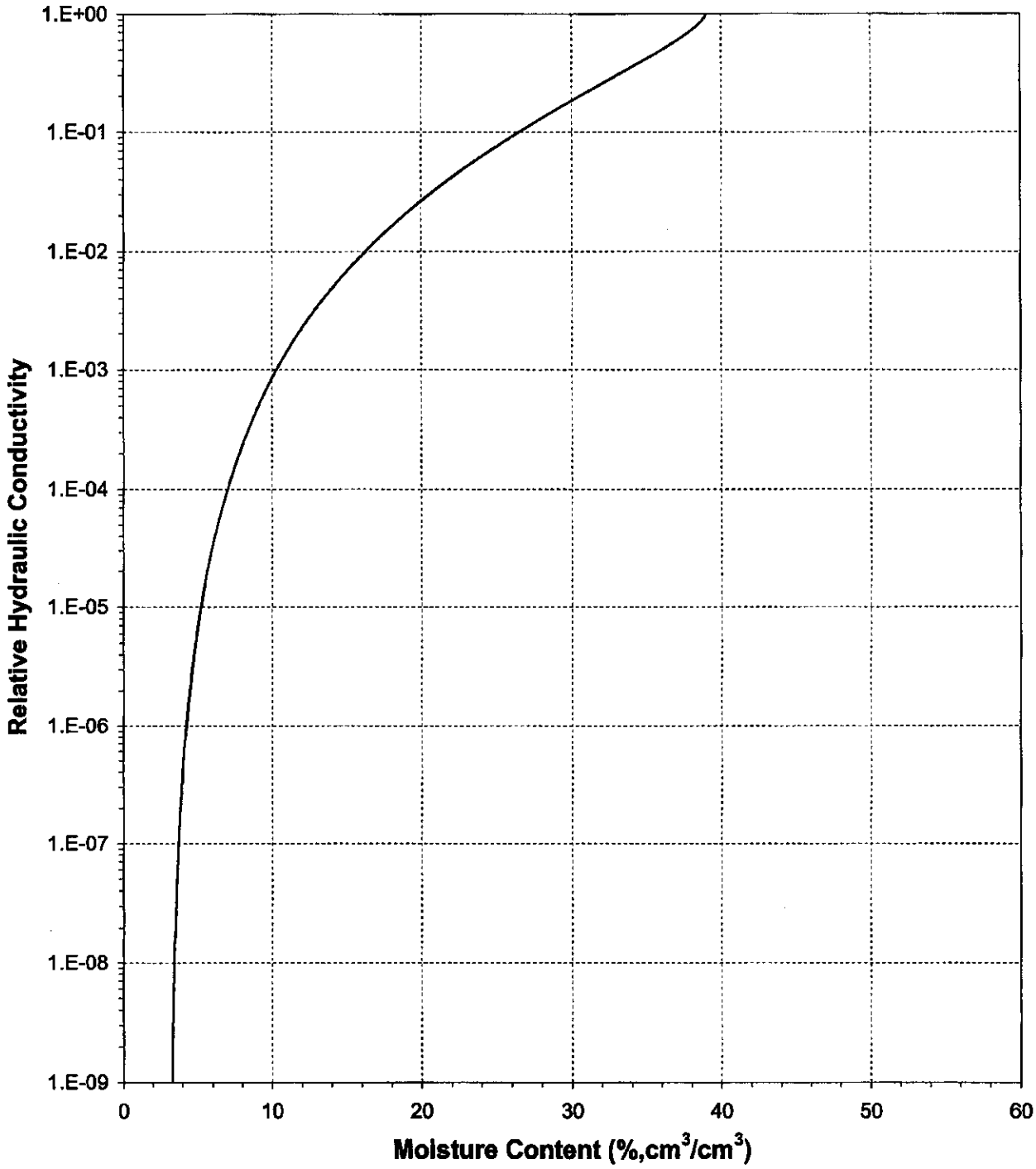
Sample Number: B1F3D4 Blend (80%) MSD



Daniel B. Stephens & Associates, Inc.

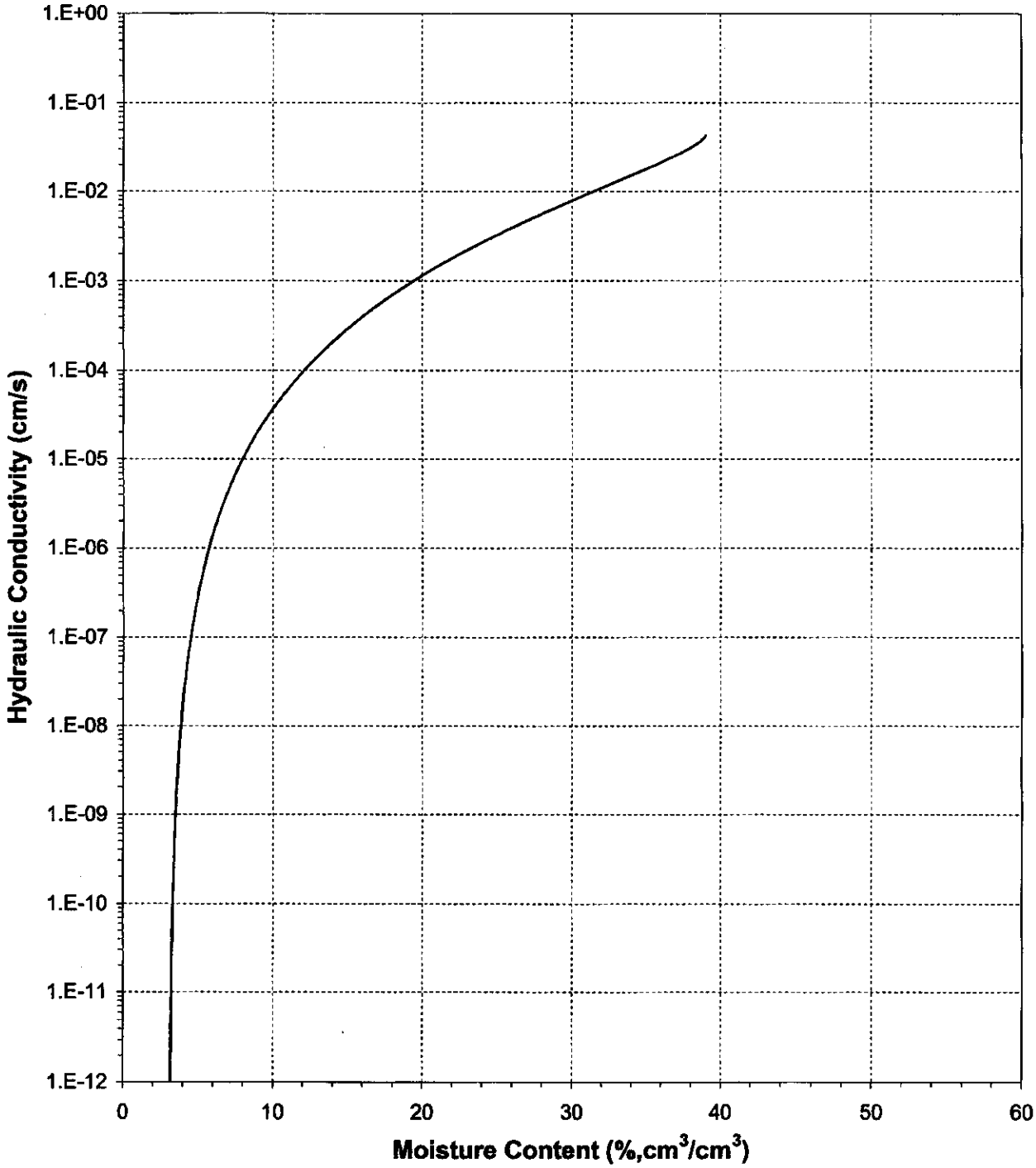
Plot of Relative Hydraulic Conductivity vs Moisture Content

Sample Number: B1F3D4 Blend (80%) MSD



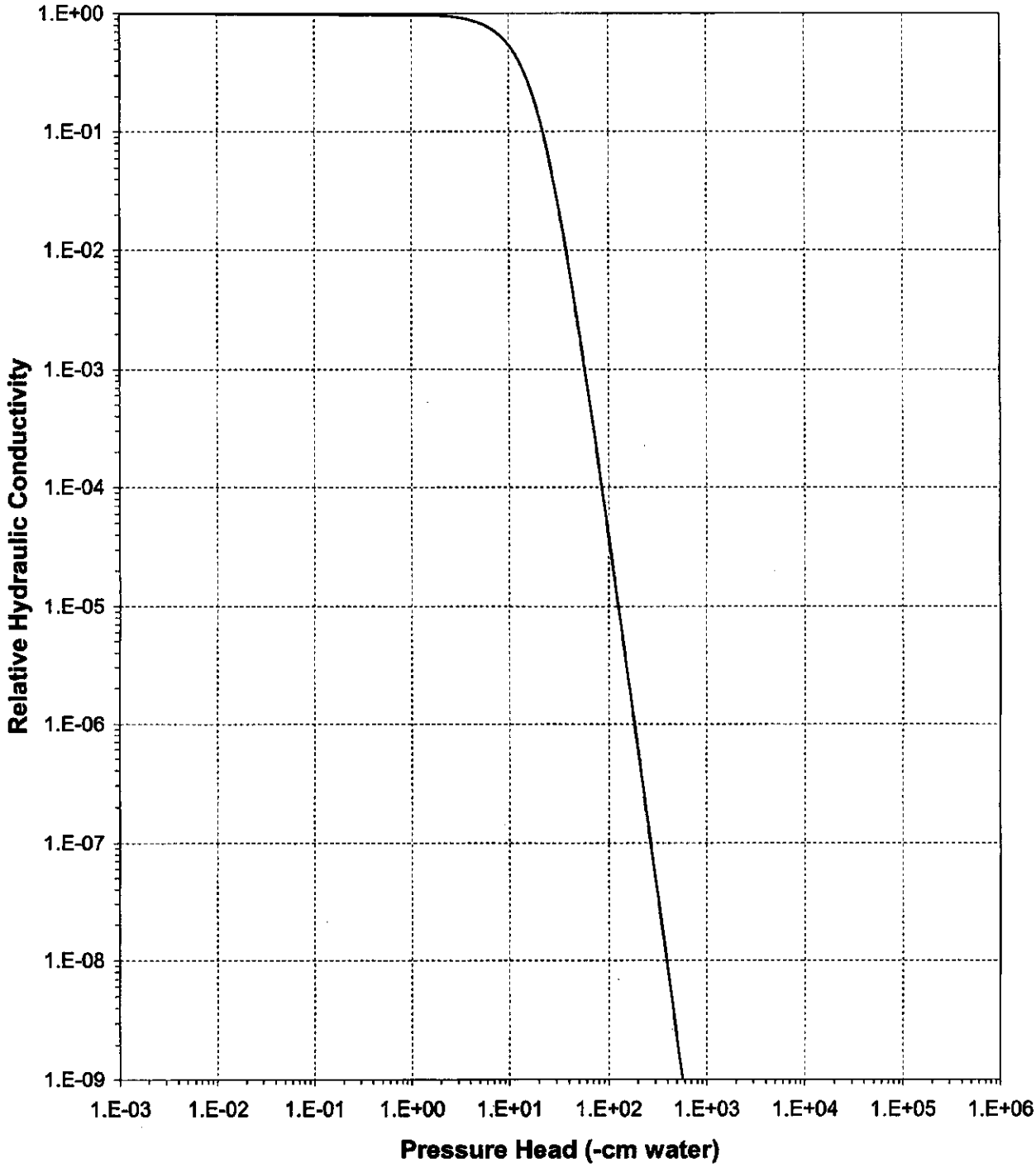
Plot of Hydraulic Conductivity vs Moisture Content

Sample Number: B1F3D4 Blend (80%) MSD



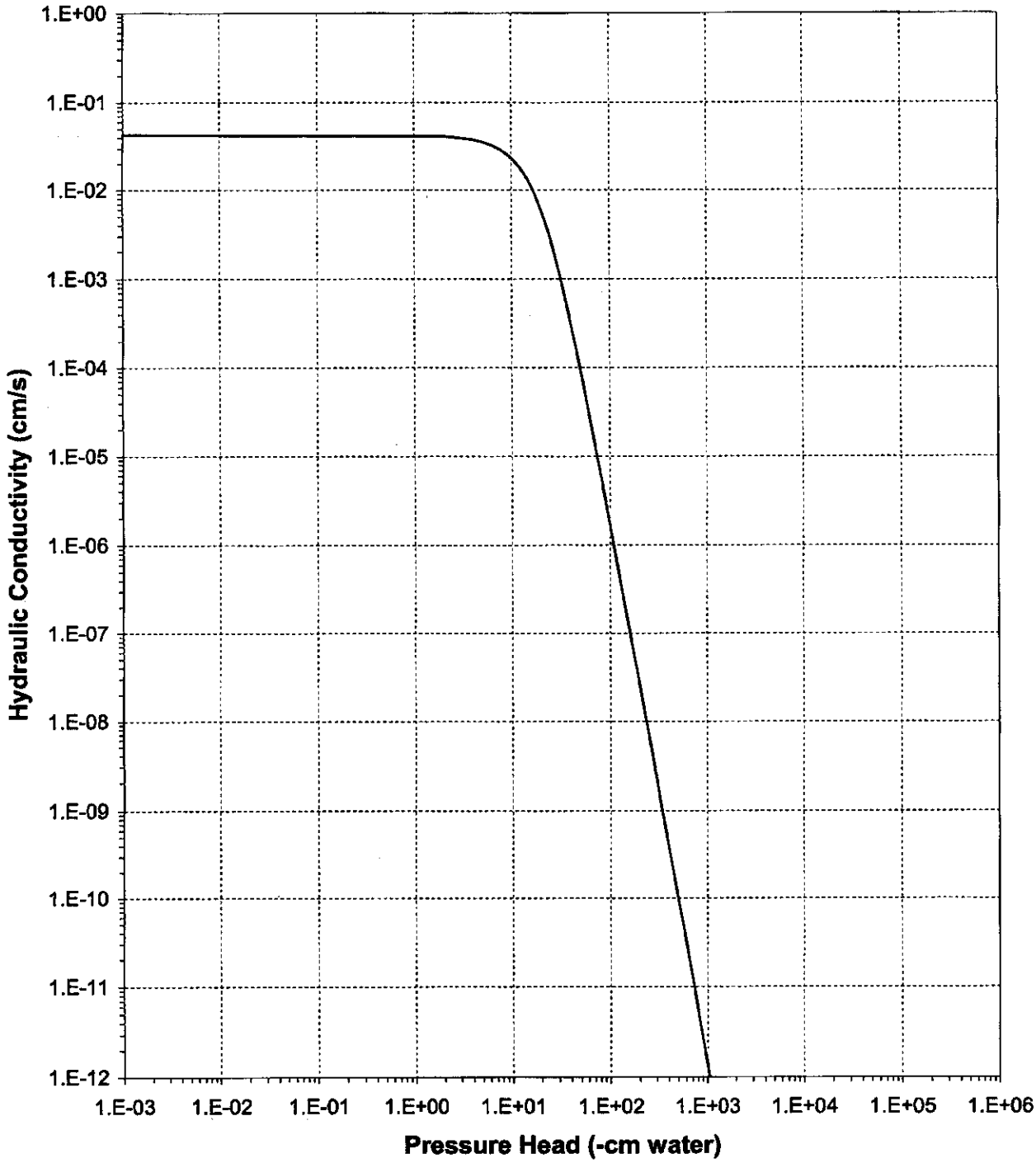
Plot of Relative Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Blend (80%) MSD



Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Blend (80%) MSD



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column/Pressure Plate/Thermocouple

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Custom Blend (90%)
Location: Sand Pile - American Rock Products
Date/Time Collected: 9/23/05 11:42

Dry wt. of sample (g): 355.68
Tare wt., screen & clamp (g): 26.42
Tare wt., ring (g): 134.64
Tare wt., epoxy (g): 0.00
Sample volume (cm^3): 225.71

Saturated weight at 0 cm tension* (g): 593.09
Volume of water† in saturated sample (cm^3): 76.35
Saturated moisture content (% vol): 33.83
Sample bulk density (g/cm^3): 1.58

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Hanging column:	03-Nov-05 / 15:30	593.09	0.00	33.83
	09-Nov-05 / 11:15	589.49	10.50	32.23
	16-Nov-05 / 14:35	549.39	38.50	14.47
	22-Nov-05 / 12:20	530.69	81.50	6.18
Pressure plate:	28-Nov-05 / 10:05	527.28	611.88	4.67

Comments:

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Water Activity Meter/Relative Humidity Box

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Custom Blend (90%)
Location: Sand Pile - American Rock Products
Date/Time Collected: 9/23/05 11:42

Dry weight of water activity meter sample* (g): 145.52
Tare weight, jar (g): 113.21
Sample bulk density (g/cm^3): 1.58

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Water Activity Meter:	11-Nov-05 / 09:05	145.99	23047.5	2.29

Dry weight of relative humidity box sample* (g): 78.43
Tare weight (g): 40.78
Sample bulk density (g/cm^3): 1.58

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Relative humidity box:	31-Oct-05 / 10:00	78.79	851293	1.50

Comments:

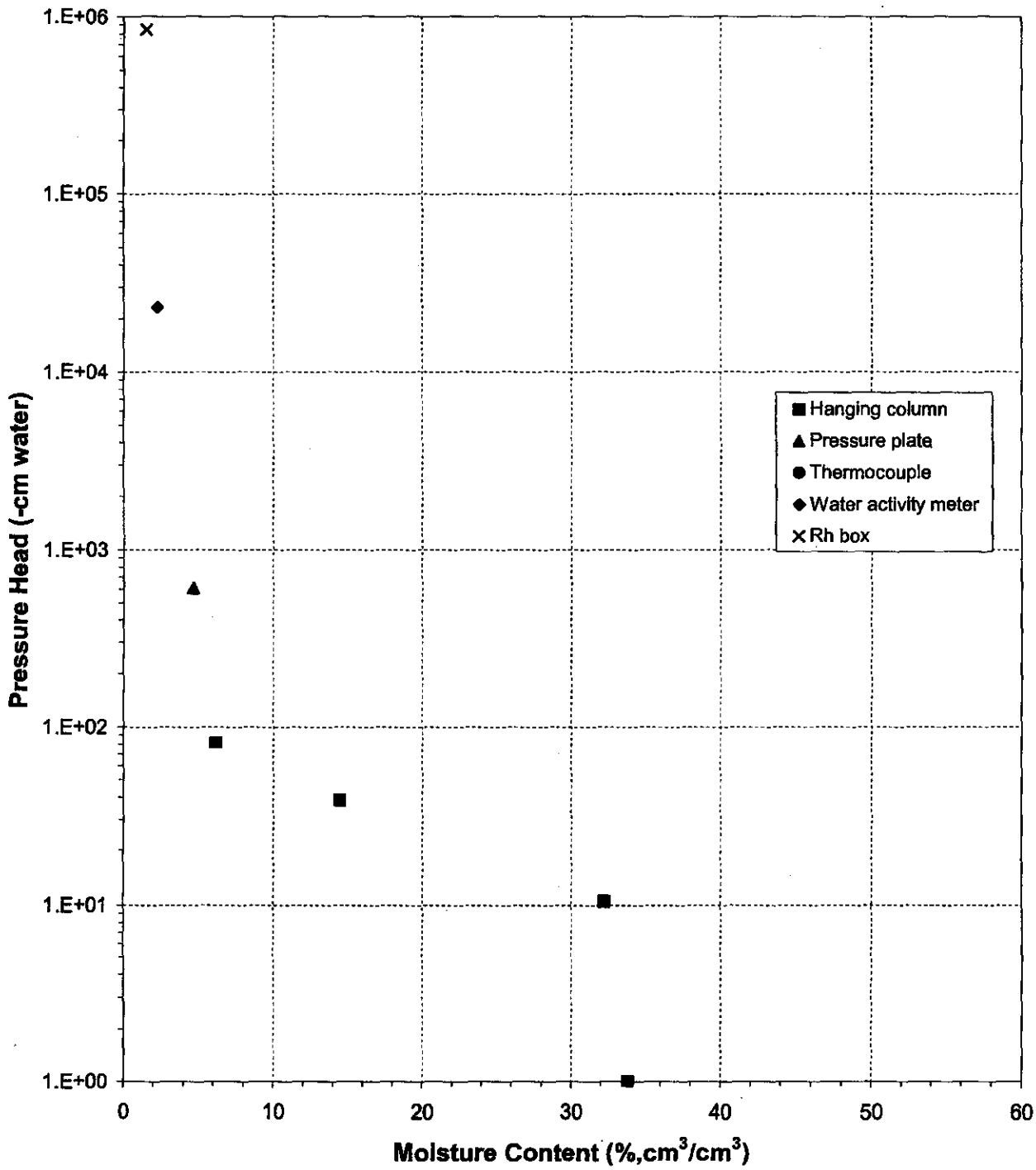
* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: Carrillo/O'Dowd/Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

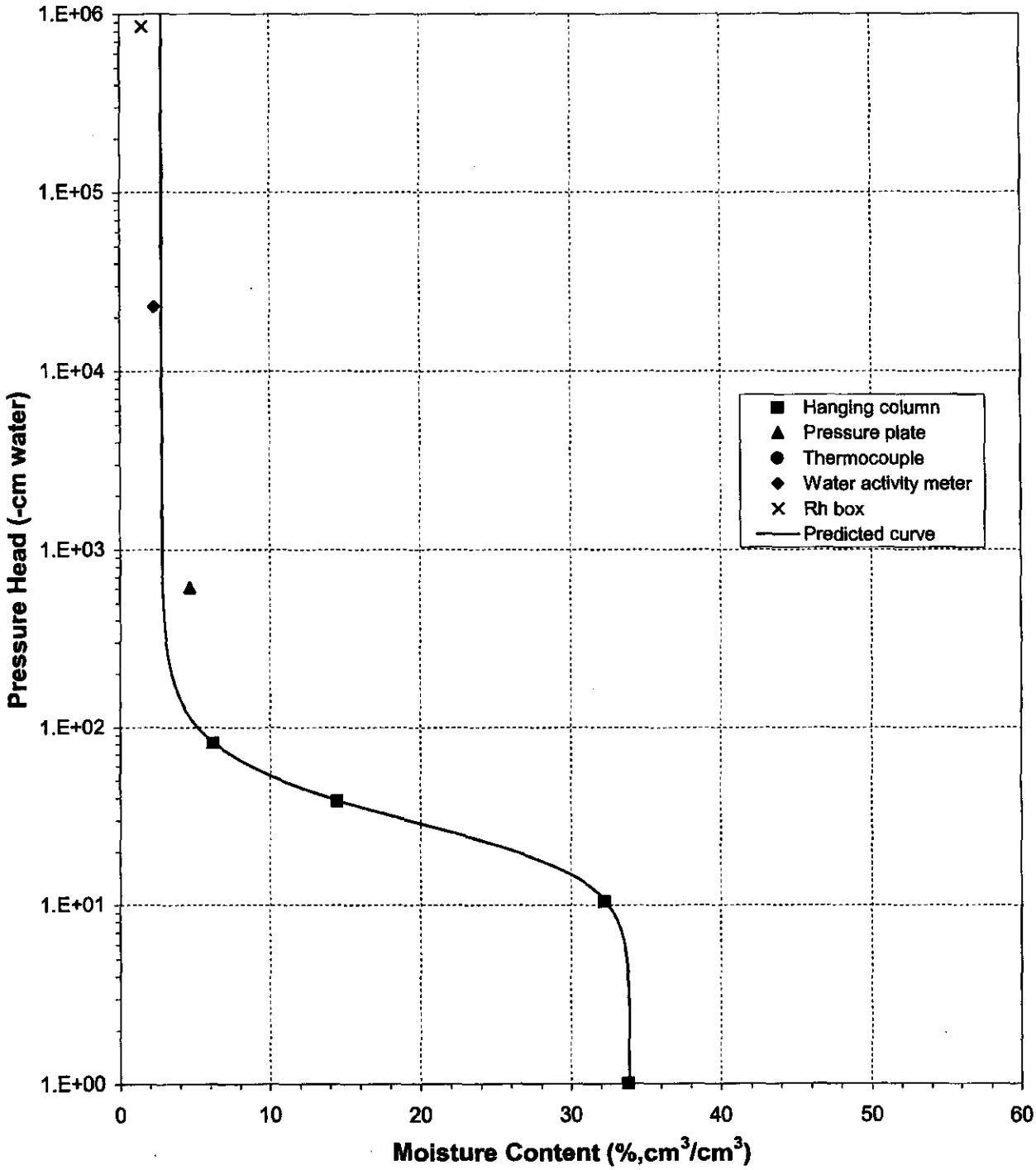
Water Retention Data Points

Sample Number: B1F3D4 Custom Blend (90%)



Predicted Water Retention Curve and Data Points

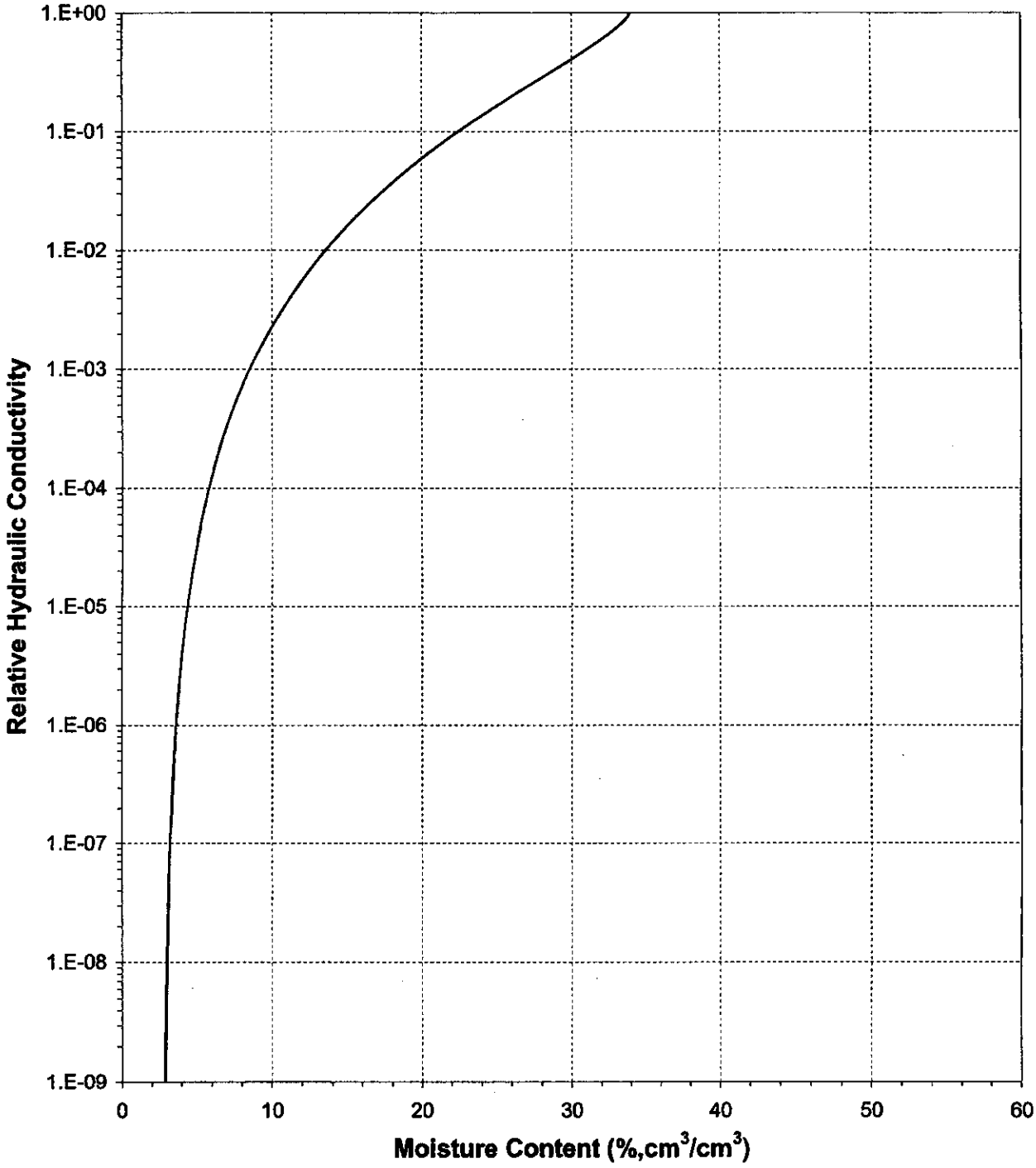
Sample Number: B1F3D4 Custom Blend (90%)



Daniel B. Stephens & Associates, Inc.

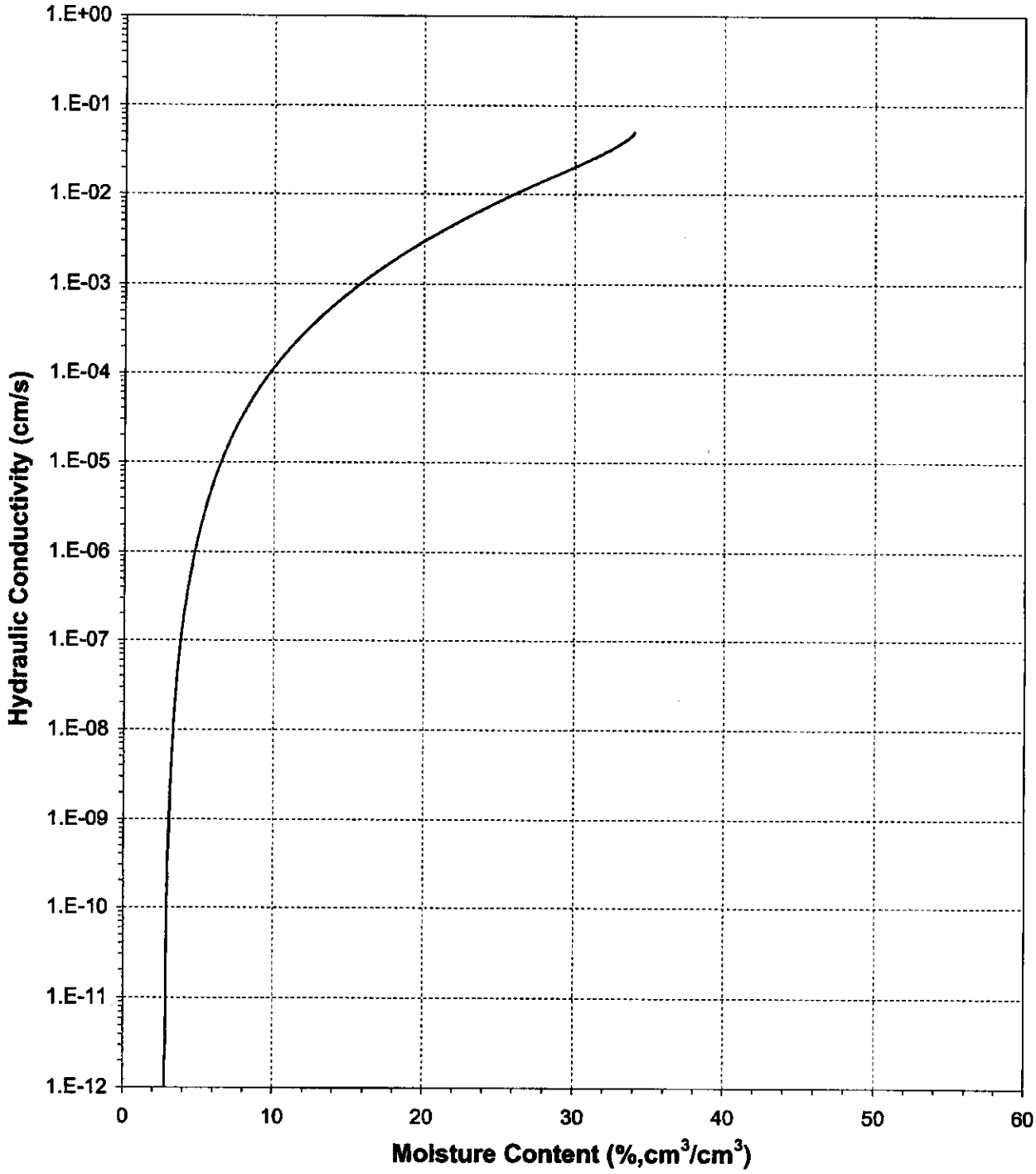
Plot of Relative Hydraulic Conductivity vs Moisture Content

Sample Number: B1F3D4 Custom Blend (90%)



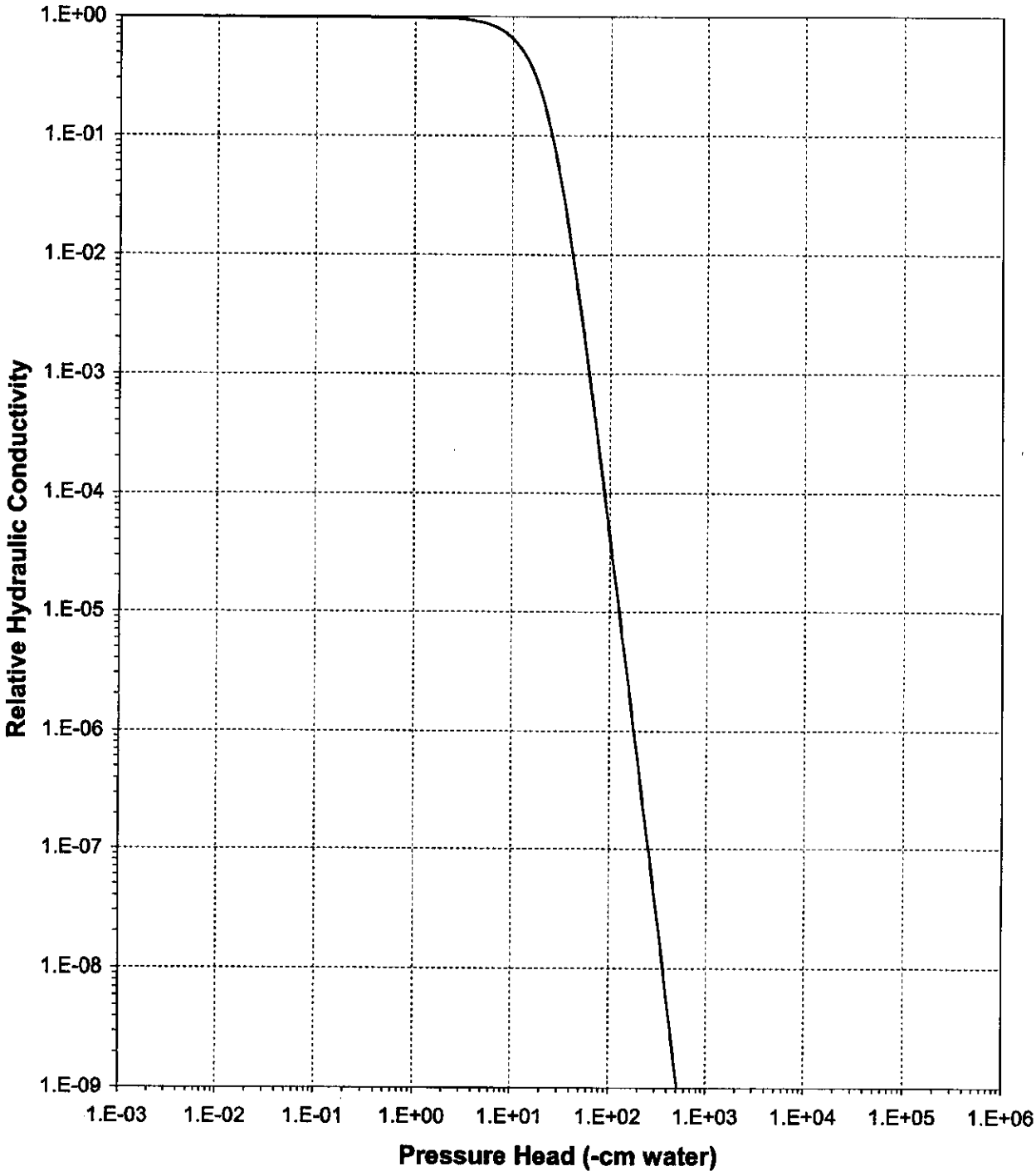
Plot of Hydraulic Conductivity vs Moisture Content

Sample Number: B1F3D4 Custom Blend (90%)



Plot of Relative Hydraulic Conductivity vs Pressure Head

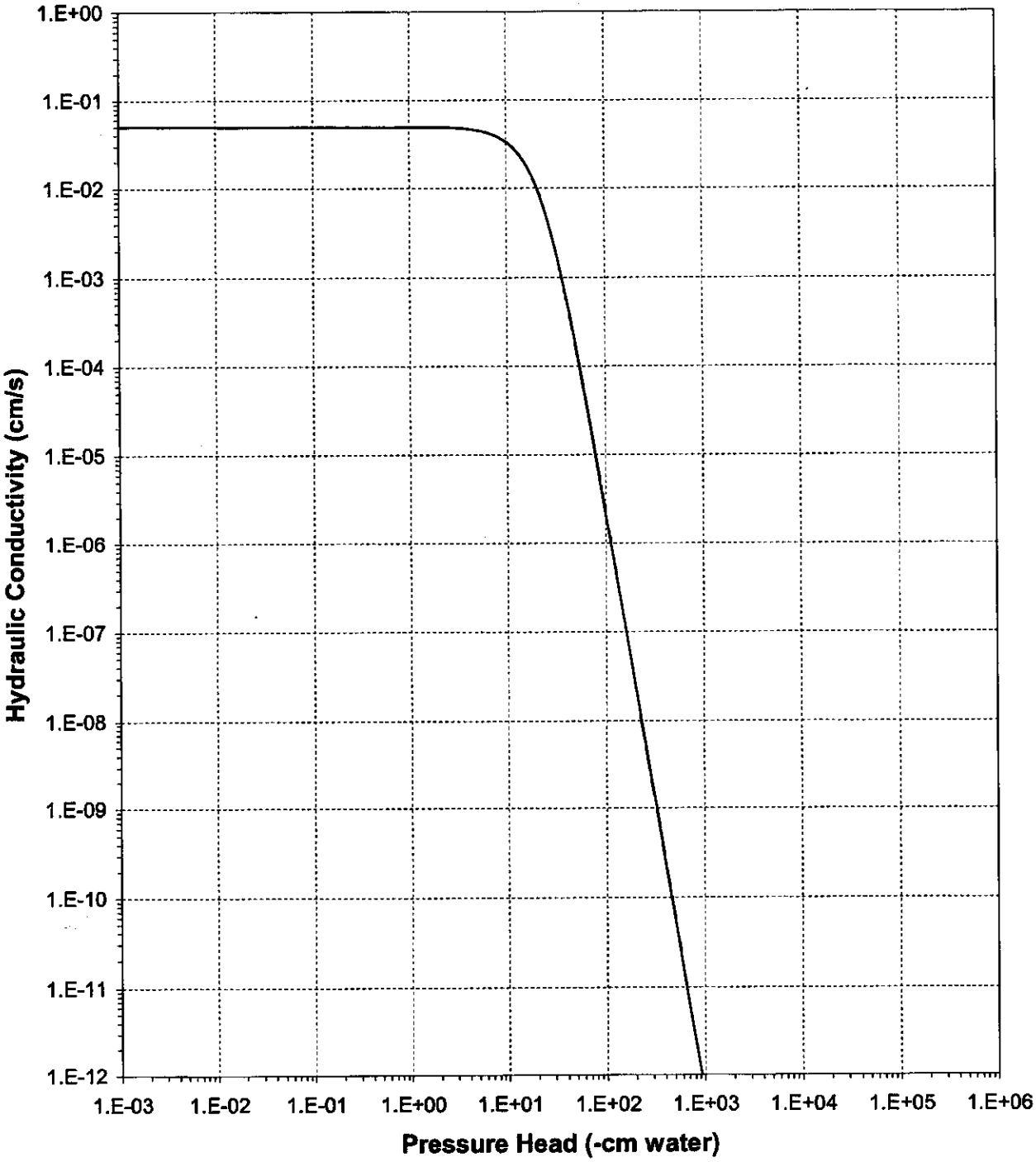
Sample Number: B1F3D4 Custom Blend (90%)



Daniel B. Stephens & Associates, Inc.

Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Custom Blend (90%)



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column/Pressure Plate/Thermocouple

(Main Drainage Curve)

Job Name:	Fluor Hanford, Inc.	*Dry wt. of sample* (g):	355.68
Job Number:	LB05.0212.00	*Tare wt., screen & clamp* (g):	26.42
Sample Number:	B1F3D4 Blend (90%) MSD	*Tare wt., ring* (g):	134.64
Ring Number:	Sand Pile - American Rock Products	*Tare wt., epoxy* (g):	0.00
Depth:	9/23/05 11:42	*Sample volume* (cm^3):	199.36

Saturated weight at 0 cm tension* (g): 593.09
Volume of water† in saturated sample (cm^3): 76.35
Saturated moisture content (% vol): 38.30
Sample bulk density (g/cm^3): 1.78

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Hanging column:	03-Nov-05 / 15:30	593.09	0.00	38.30
	09-Nov-05 / 11:15	589.49	10.50	36.49
	16-Nov-05 / 14:35	549.39	38.50	16.38
	22-Nov-05 / 12:20	530.69	81.50	7.00
Pressure plate:	28-Nov-05 / 10:05	527.28	611.88	5.29

Comments:

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Water Activity Meter/Relative Humidity Box

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Blend (90%) MSD
Ring Number: Sand Pile - American Rock Products
Depth: 9/23/05 11:42

Dry weight of water activity meter sample* (g): 145.52
Tare weight, jar (g): 113.21
Sample bulk density (g/cm^3): 1.78

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content^T (% vol)
Water Activity Meter:	11-Nov-05 / 09:05	145.99	23047.5	2.60

Dry weight of relative humidity box sample* (g): 78.43
Tare weight (g): 40.78
Sample bulk density (g/cm^3): 1.78

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content^T (% vol)
Relative humidity box:	31-Oct-05 / 10:00	78.79	851293	1.70

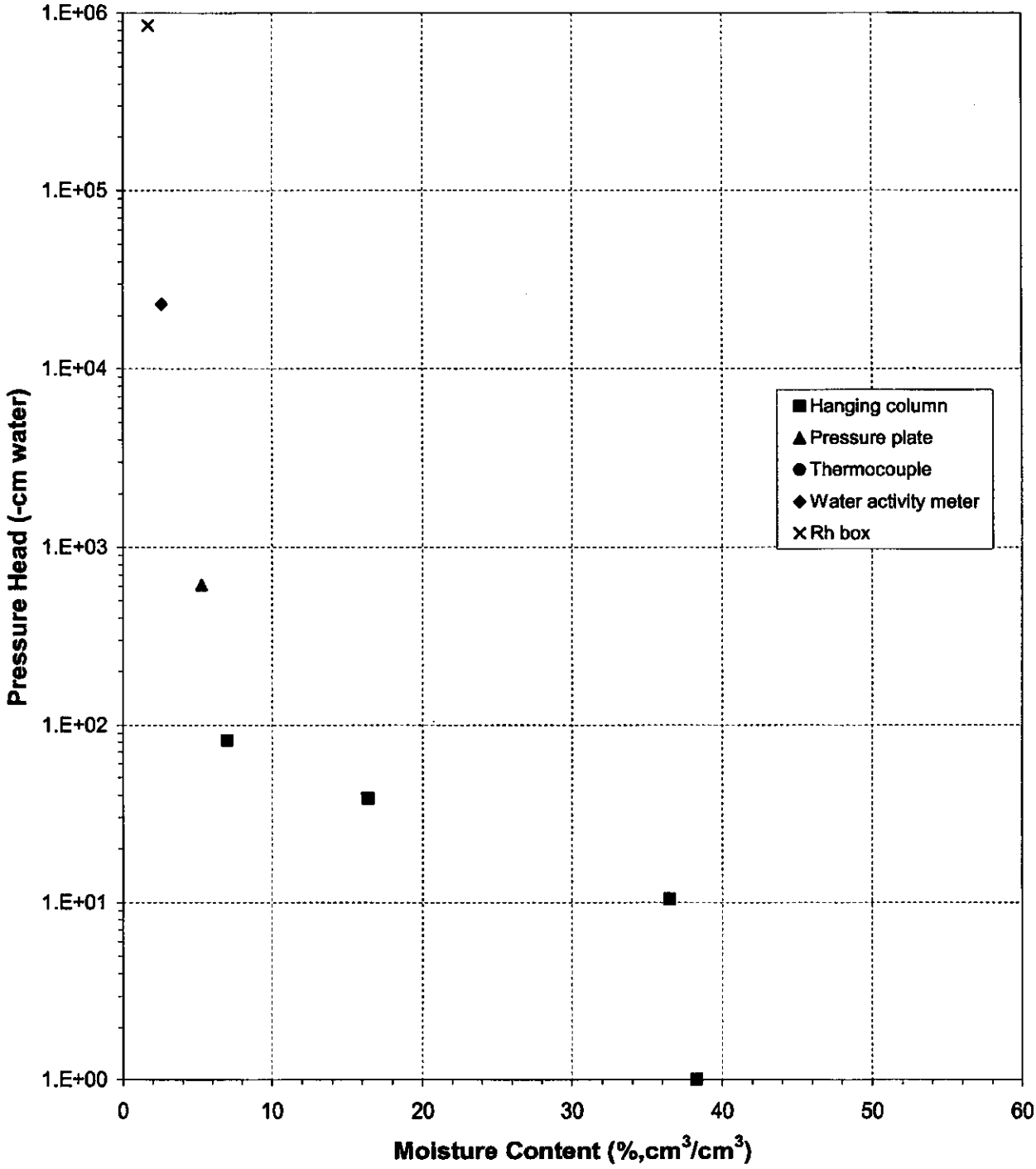
Comments:

* Weight including tares
† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: Carrillo/O'Dowd/Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

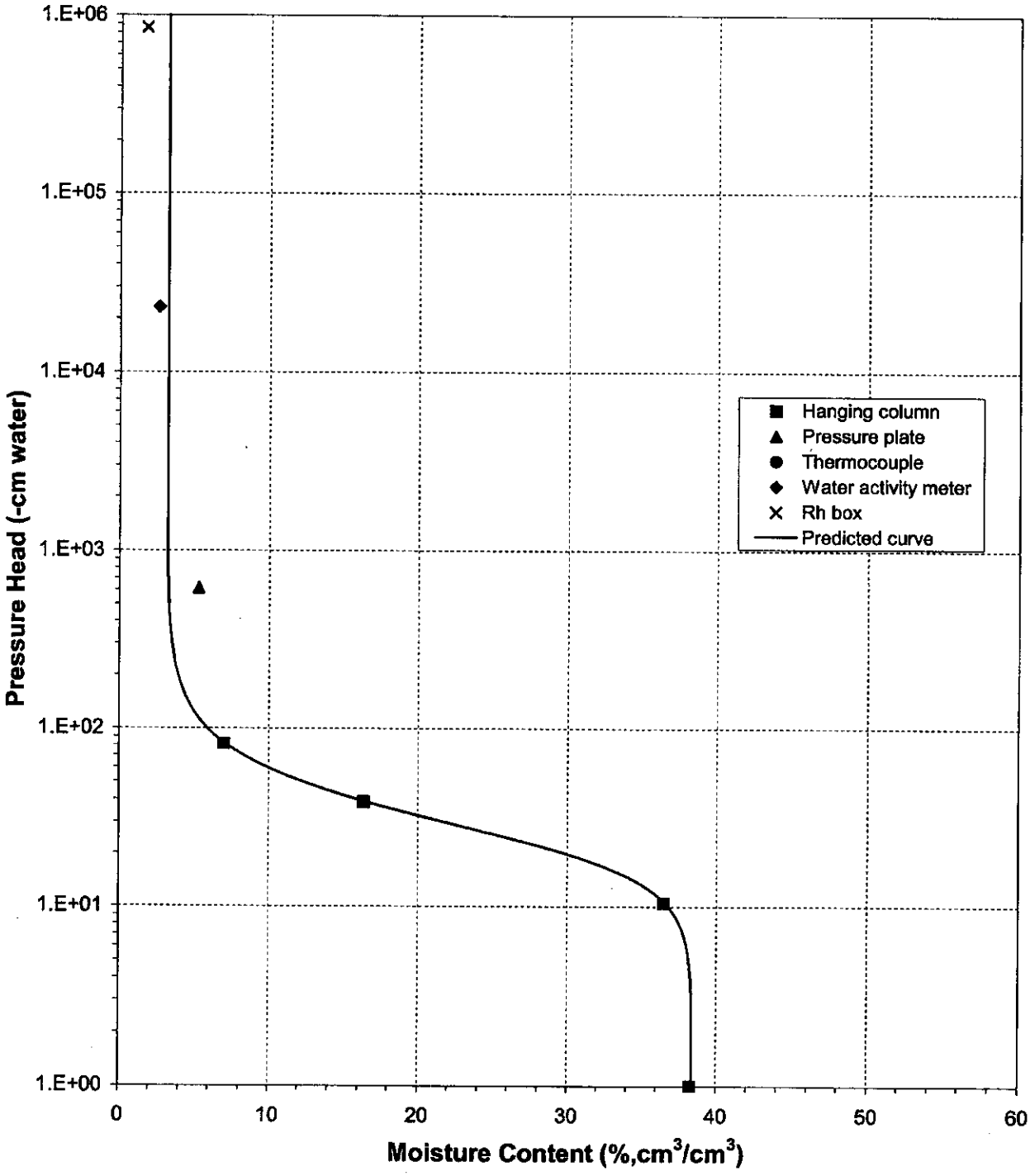
Water Retention Data Points

Sample Number: B1F3D4 Blend (90%) MSD



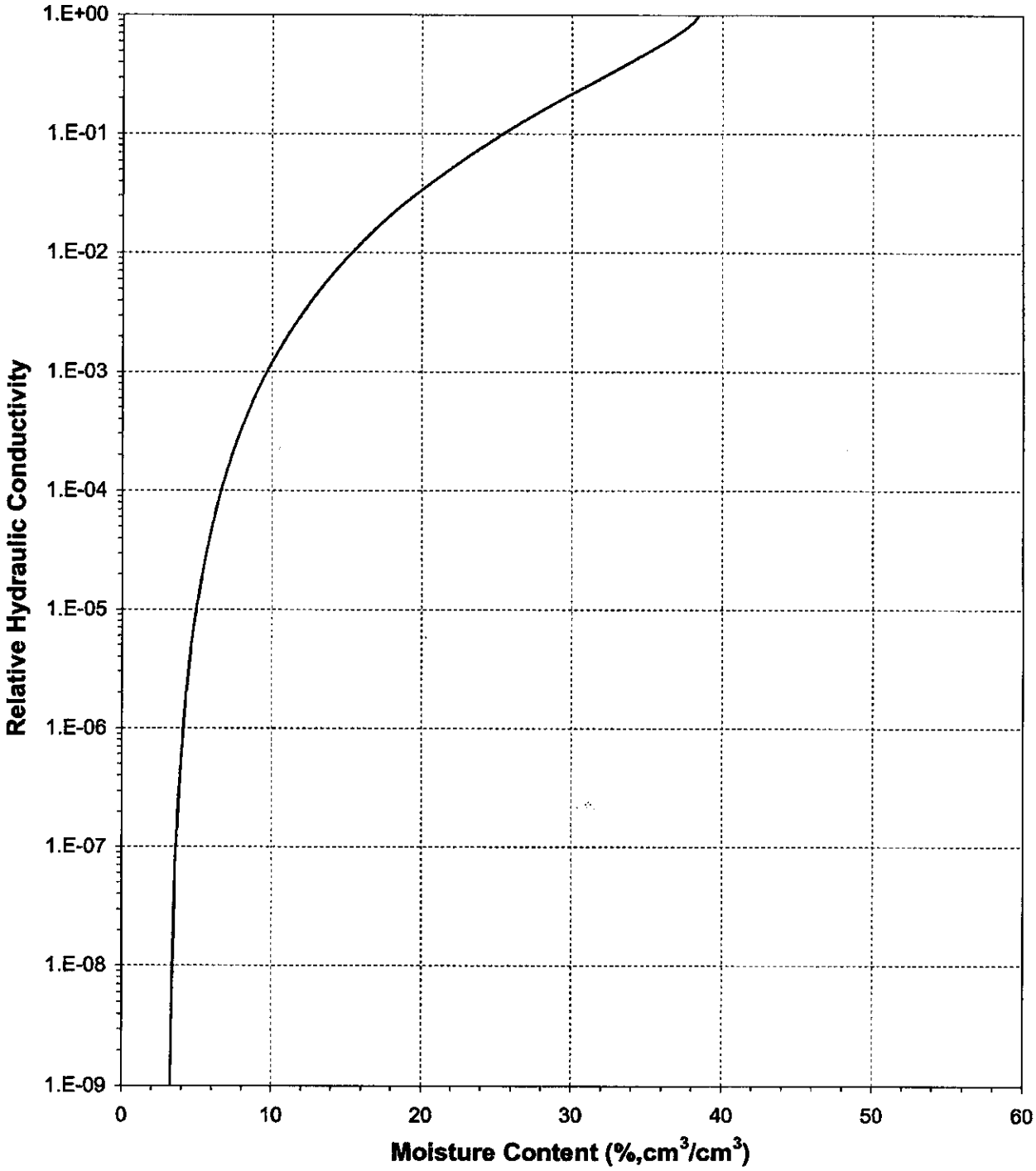
Predicted Water Retention Curve and Data Points

Sample Number: B1F3D4 Blend (90%) MSD



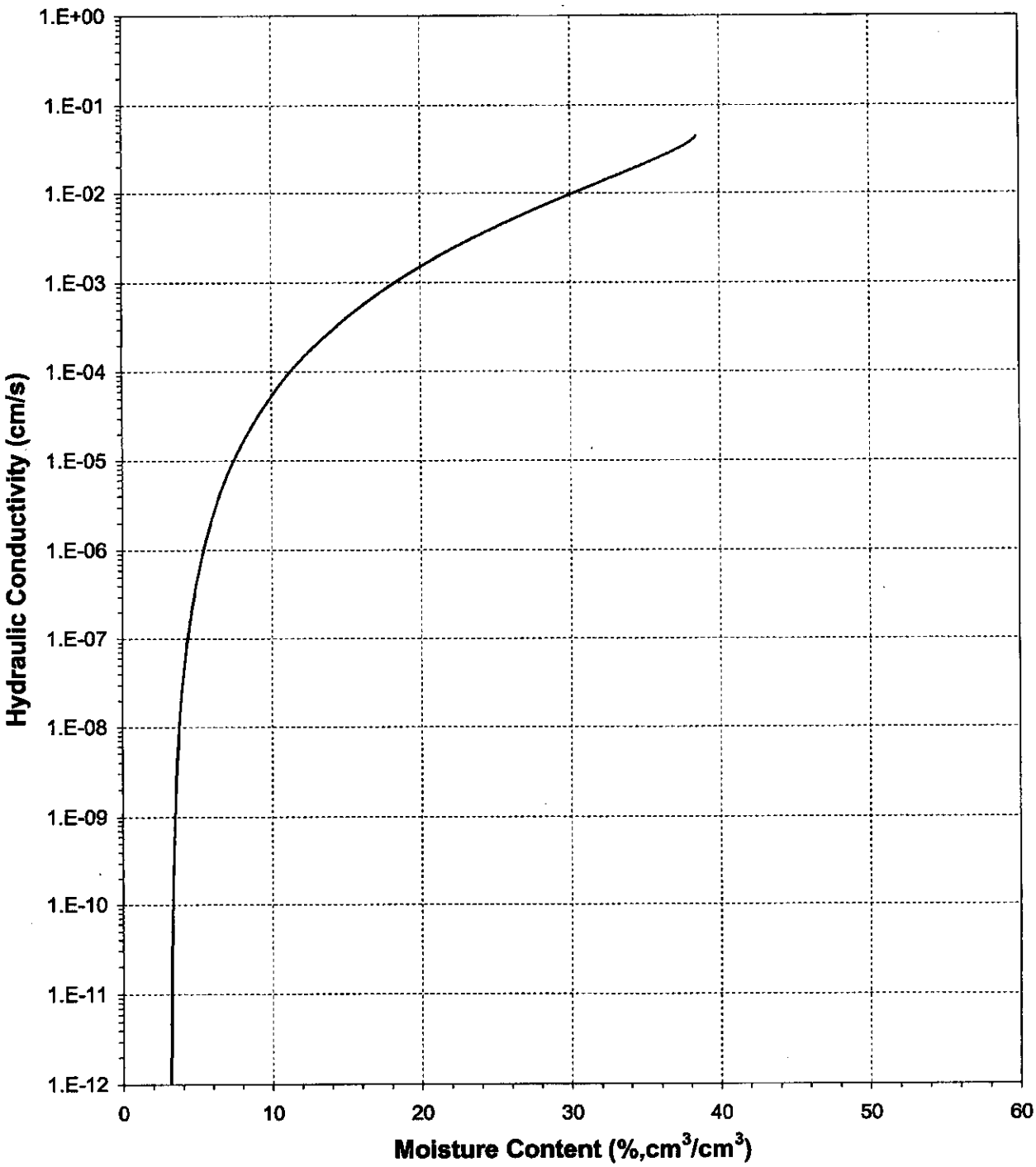
Plot of Relative Hydraulic Conductivity vs Moisture Content

Sample Number: B1F3D4 Blend (90%) MSD



Plot of Hydraulic Conductivity vs Moisture Content

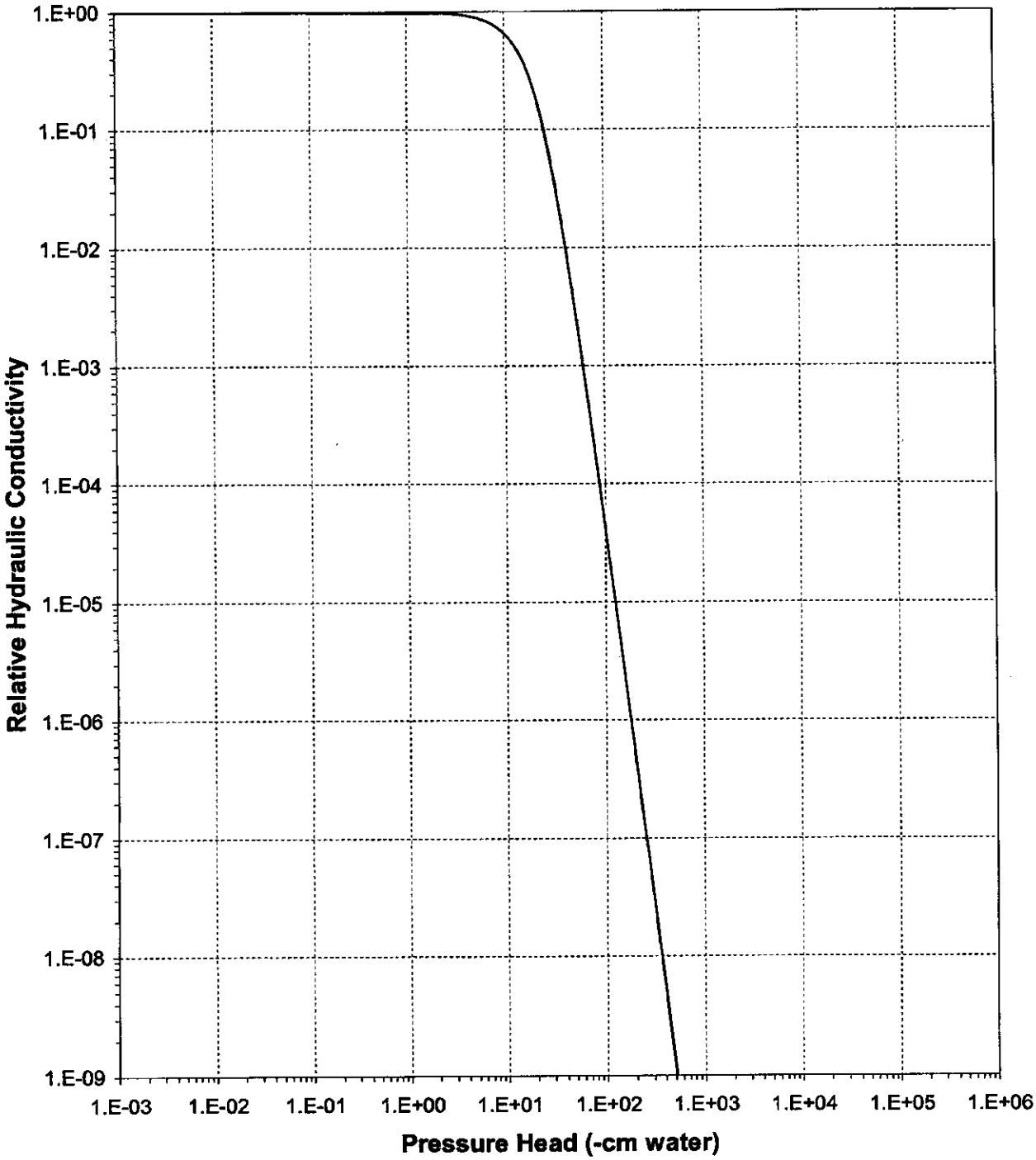
Sample Number: B1F3D4 Blend (90%) MSD



Daniel B. Stephens & Associates, Inc.

Plot of Relative Hydraulic Conductivity vs Pressure Head

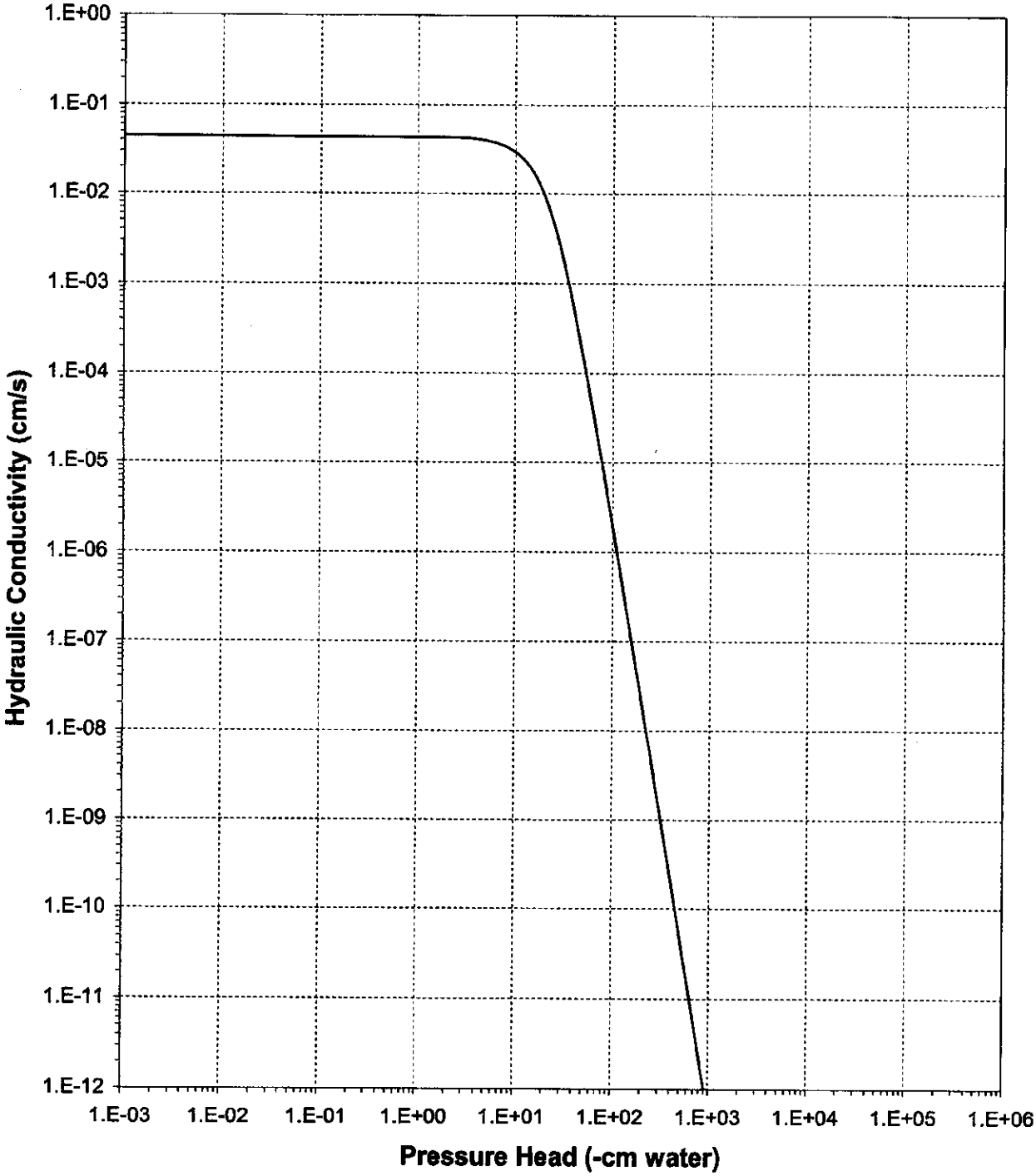
Sample Number: B1F3D4 Blend (90%) MSD



Daniel B. Stephens & Associates, Inc.

Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Blend (90%) MSD



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column/Pressure Plate/Thermocouple

(Main Drainage Curve)

Job Name:	Fluor Hanford, Inc.	*Dry wt. of sample* (g):	382.56
Job Number:	LB05.0212.00	*Tare wt., screen & clamp* (g):	25.59
Sample Number:	B1F3D4 Custom Blend (95%)	*Tare wt., ring* (g):	101.49
Location:	Sand Pile - American Rock Products	*Tare wt., epoxy* (g):	0.00
Date/Time Collected:	9/23/05 11:42	*Sample volume* (cm^3):	230.30

Saturated weight at 0 cm tension* (g): 592.03
Volume of water† in saturated sample (cm^3): 82.39
Saturated moisture content (% vol): 35.77
Sample bulk density (g/cm^3): 1.66

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Hanging column:	01-Nov-05 / 16:00	592.03	0.00	35.77
	07-Nov-05 / 14:12	584.27	10.00	32.41
	14-Nov-05 / 16:35	546.27	35.00	15.91
	21-Nov-05 / 11:10	523.92	79.00	6.20
Pressure plate:	28-Nov-05 / 09:15	520.15	509.90	4.56

Comments:

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Water Activity Meter/Relative Humidity Box

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Custom Blend (95%)
Location: Sand Pile - American Rock Products
Date/Time Collected: 9/23/05 11:42

Dry weight of water activity meter sample* (g): 143.88
Tare weight, jar (g): 113.03
Sample bulk density (g/cm^3): 1.66

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Water Activity Meter:	10-Nov-05 / 13:30	144.42	22333.6	2.91

Dry weight of relative humidity box sample* (g): 80.53
Tare weight (g): 41.90
Sample bulk density (g/cm^3): 1.66

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Relative humidity box:	31-Oct-05 / 10:00	80.93	851293	1.72

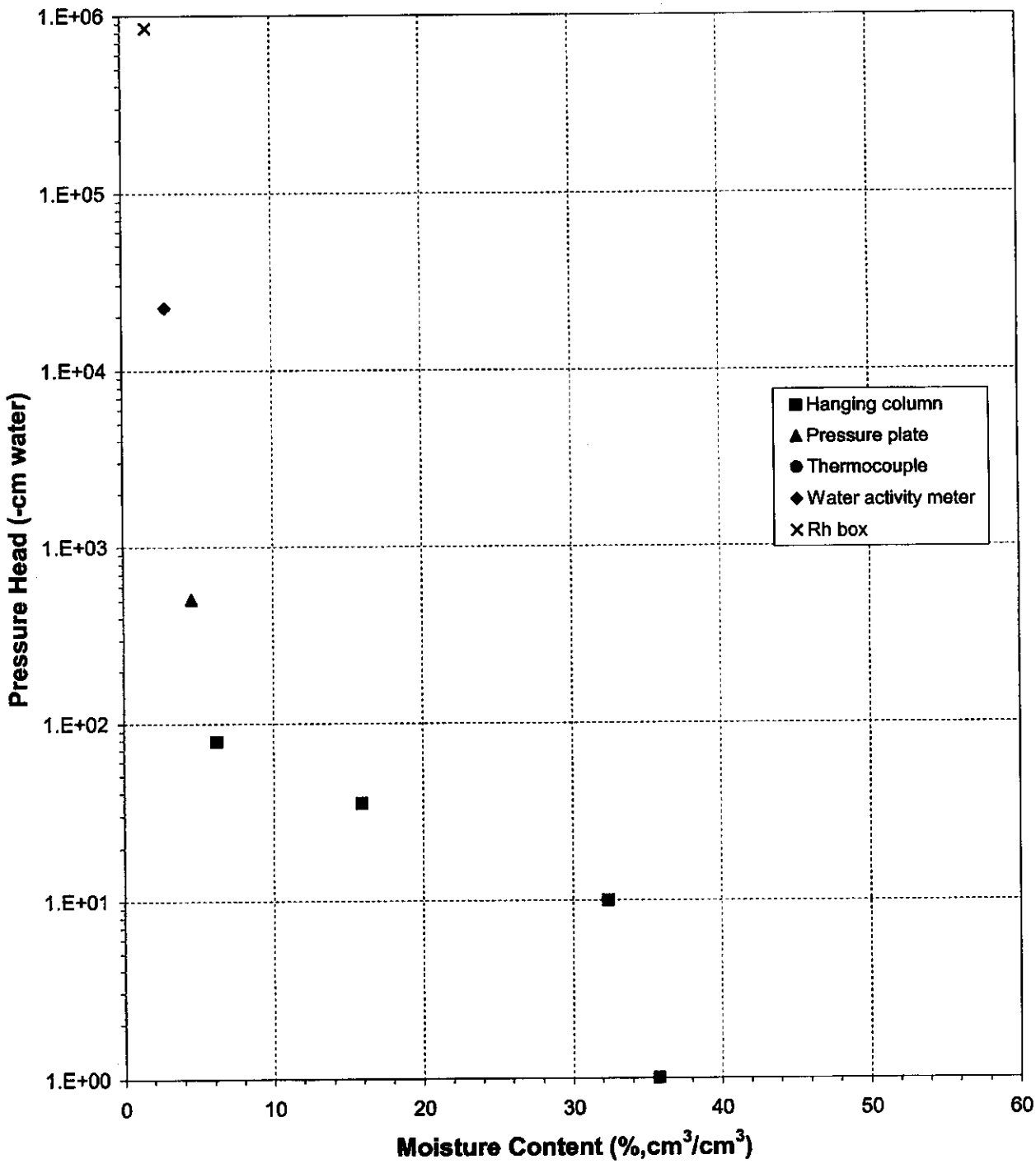
Comments:

* Weight including tares
† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: Carrillo/O'Dowd/Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Water Retention Data Points

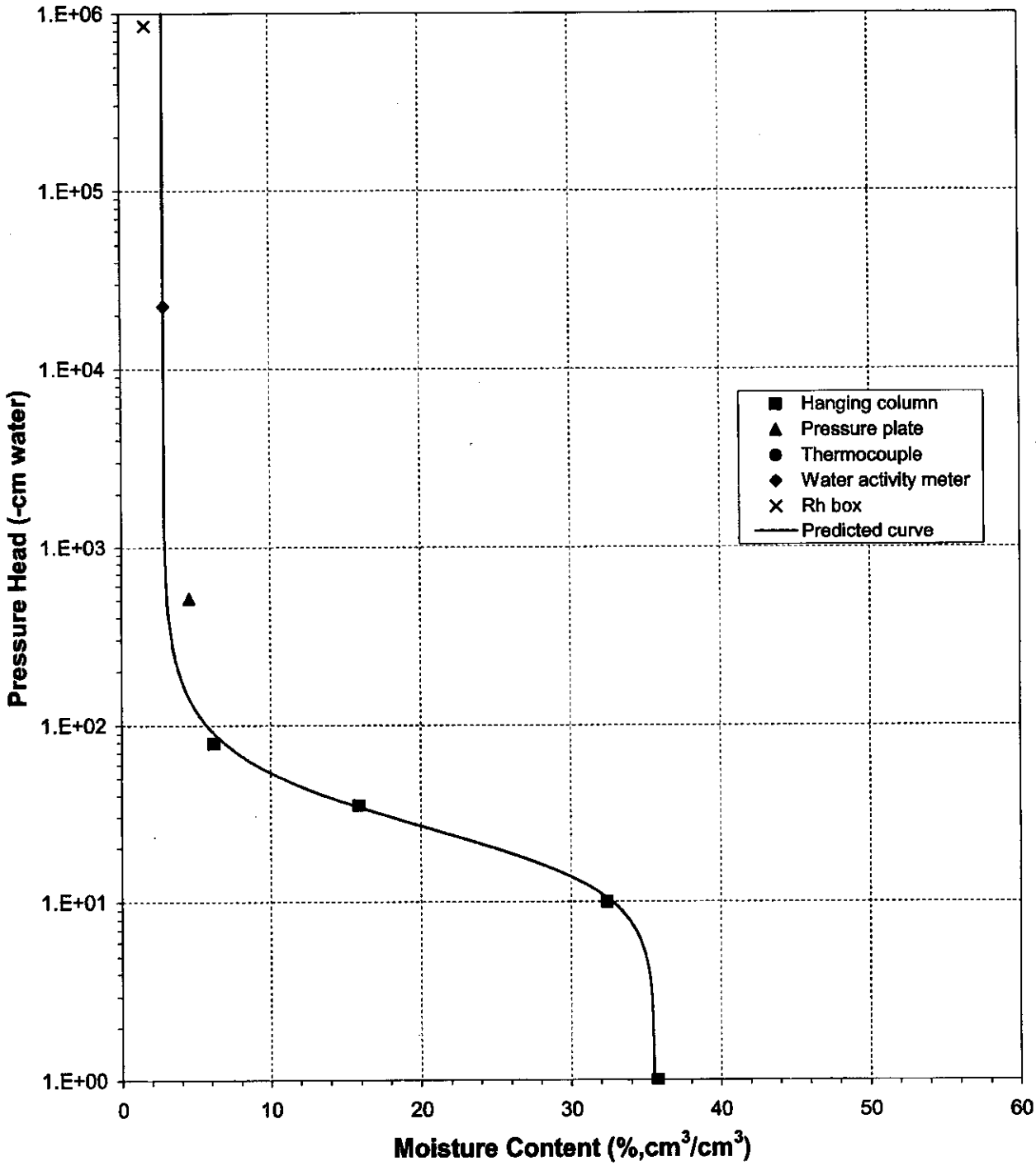
Sample Number: B1F3D4 Custom Blend (95%)



Daniel B. Stephens & Associates, Inc.

Predicted Water Retention Curve and Data Points

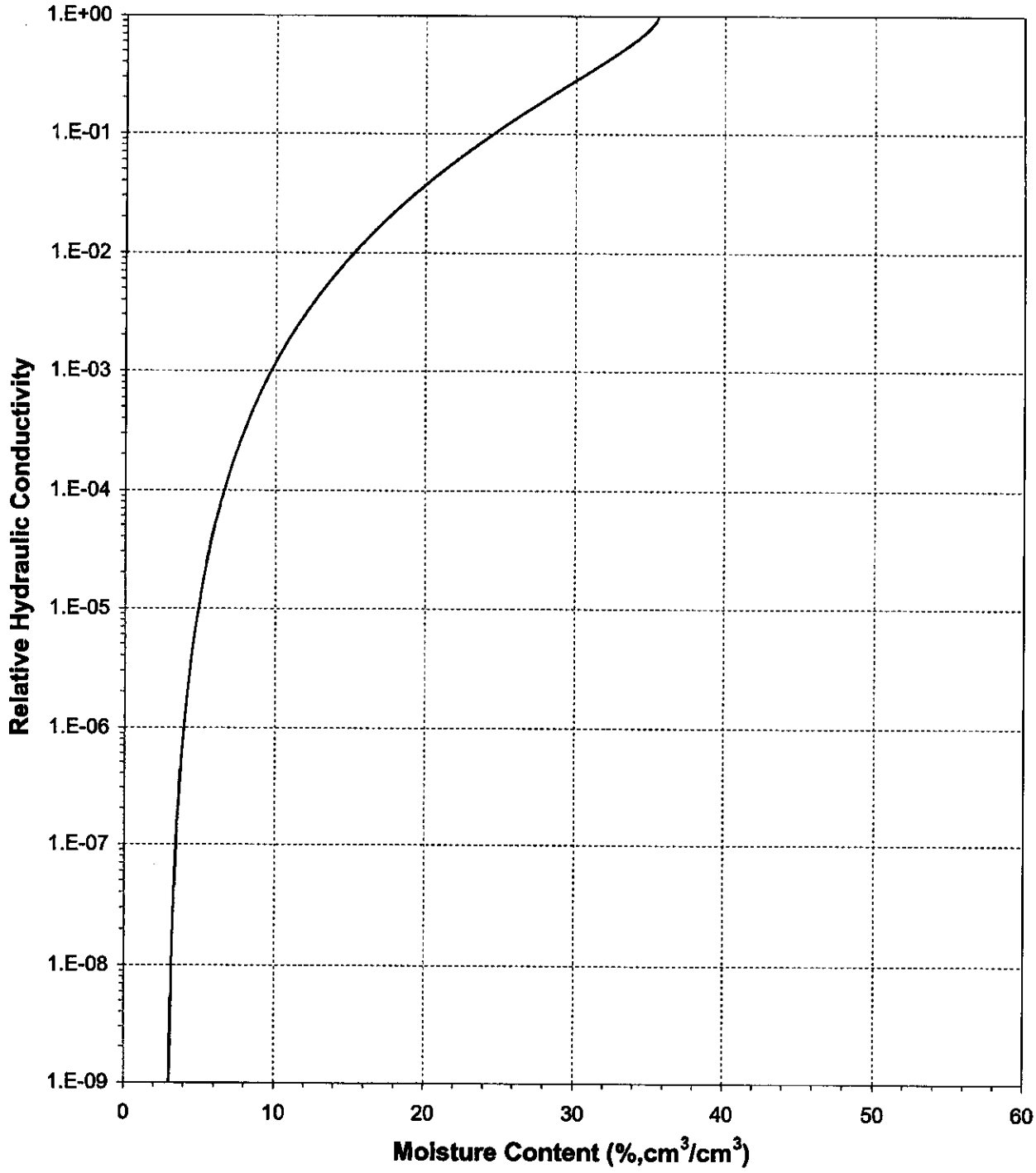
Sample Number: B1F3D4 Custom Blend (95%)



Daniel B. Stephens & Associates, Inc.

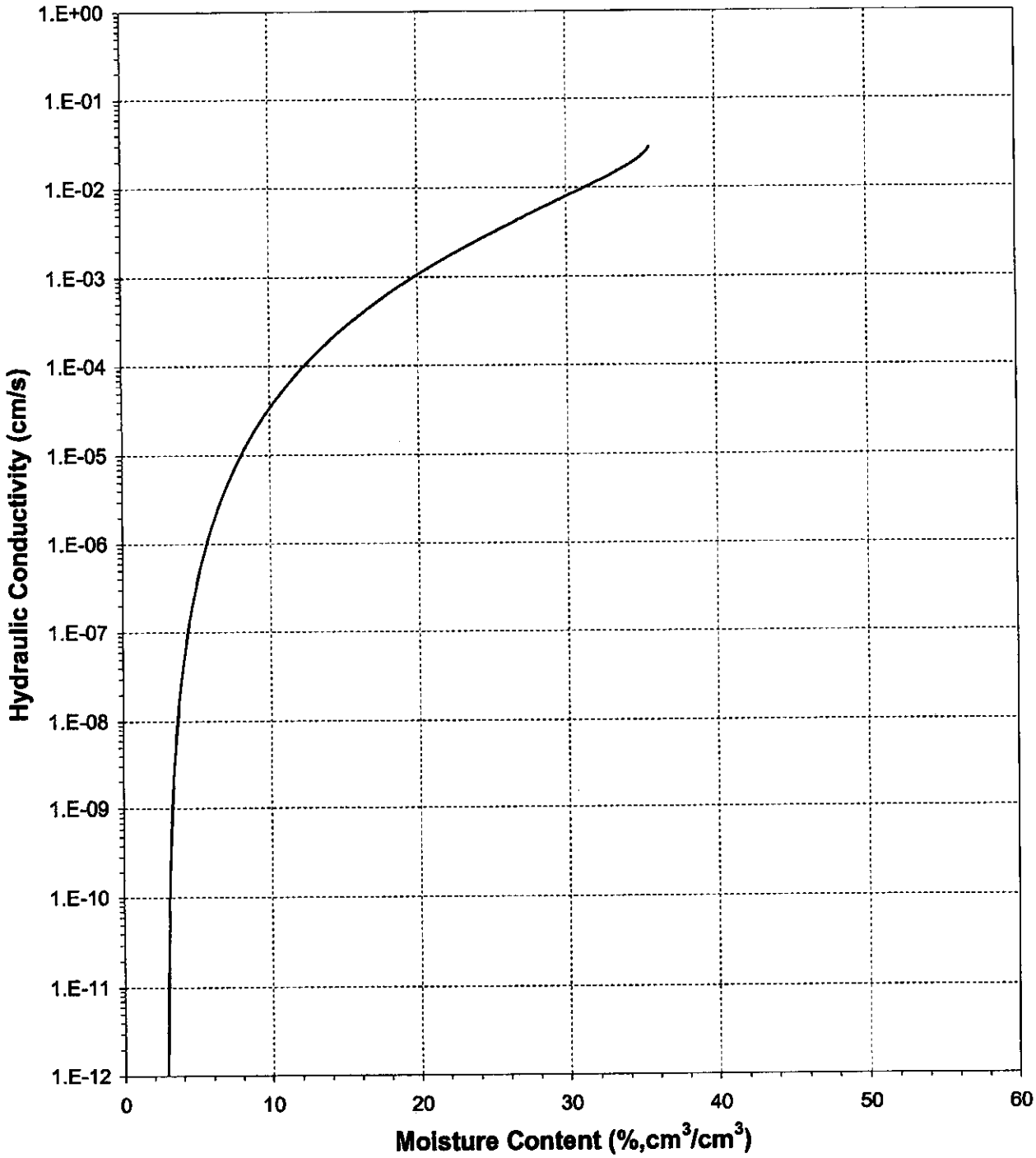
Plot of Relative Hydraulic Conductivity vs Moisture Content

Sample Number: B1F3D4 Custom Blend (95%)



Plot of Hydraulic Conductivity vs Moisture Content

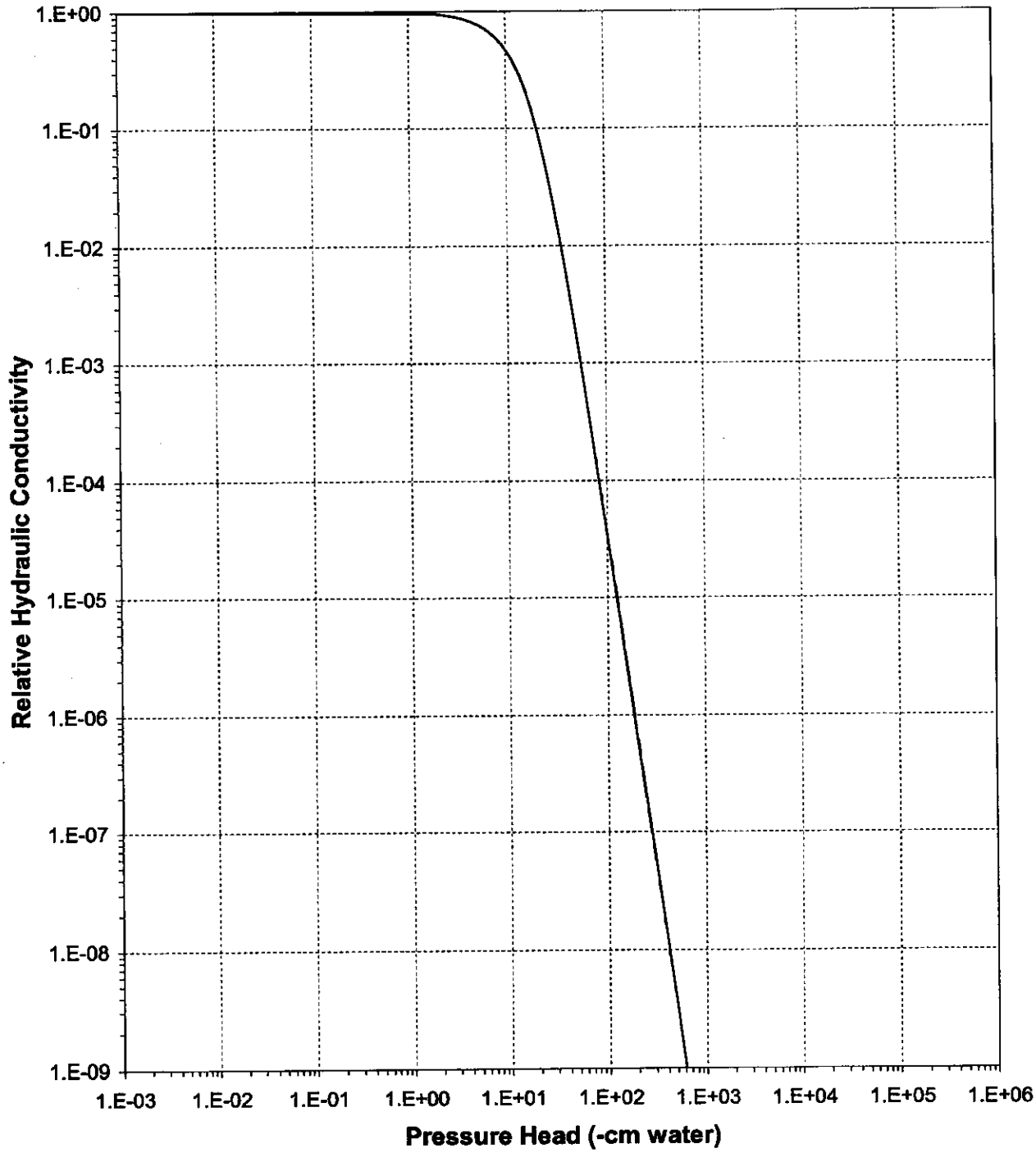
Sample Number: B1F3D4 Custom Blend (95%)



Daniel B. Stephens & Associates, Inc.

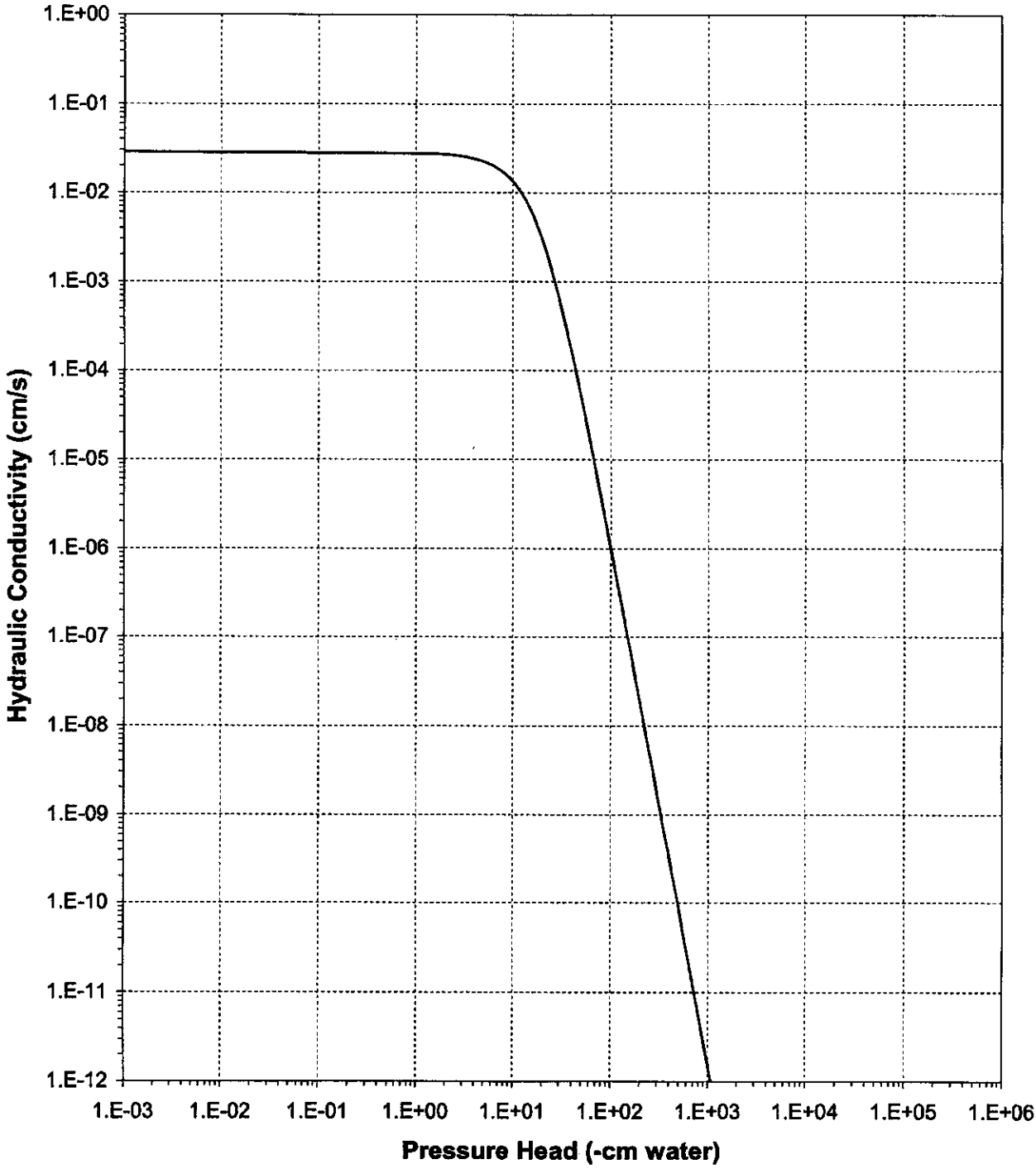
Plot of Relative Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Custom Blend (95%)



Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Custom Blend (95%)



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column/Pressure Plate/Thermocouple

(Main Drainage Curve)

Job Name:	Fluor Hanford, Inc.	*Dry wt. of sample* (g):	382.56
Job Number:	LB05.0212.00	*Tare wt., screen & clamp* (g):	25.59
Sample Number:	B1F3D4 Blend (95%) MSD	*Tare wt., ring* (g):	101.49
Ring Number:	Sand Pile - American Rock Products	*Tare wt., epoxy* (g):	0.00
Depth:	9/23/05 11:42	*Sample volume* (cm^3):	218.77

Saturated weight at 0 cm tension* (g): 592.03
Volume of water† in saturated sample (cm^3): 82.39
Saturated moisture content (% vol): 37.66
Sample bulk density (g/cm^3): 1.75

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content† (% vol)
Hanging column:	01-Nov-05 / 16:00	592.03	0.00	37.66
	07-Nov-05 / 14:12	584.27	10.00	34.11
	14-Nov-05 / 16:35	546.27	35.00	16.74
	21-Nov-05 / 11:10	523.92	79.00	6.53
Pressure plate:	28-Nov-05 / 09:15	520.15	509.90	4.80

Comments:

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: M. Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Water Activity Meter/Relative Humidity Box

(Main Drainage Curve)

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Blend (95%) MSD
Ring Number: Sand Pile - American Rock Products
Depth: 9/23/05 11:42

Dry weight of water activity meter sample* (g): 143.88
Tare weight, jar (g): 113.03
Sample bulk density (g/cm^3): 1.75

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content^T (% vol)
Water Activity Meter:	10-Nov-05 / 13:30	144.42	22333.6	3.06

Dry weight of relative humidity box sample* (g): 80.53
Tare weight (g): 41.90
Sample bulk density (g/cm^3): 1.75

	Date/Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content^T (% vol)
Relative humidity box:	31-Oct-05 / 10:00	80.93	851293	1.81

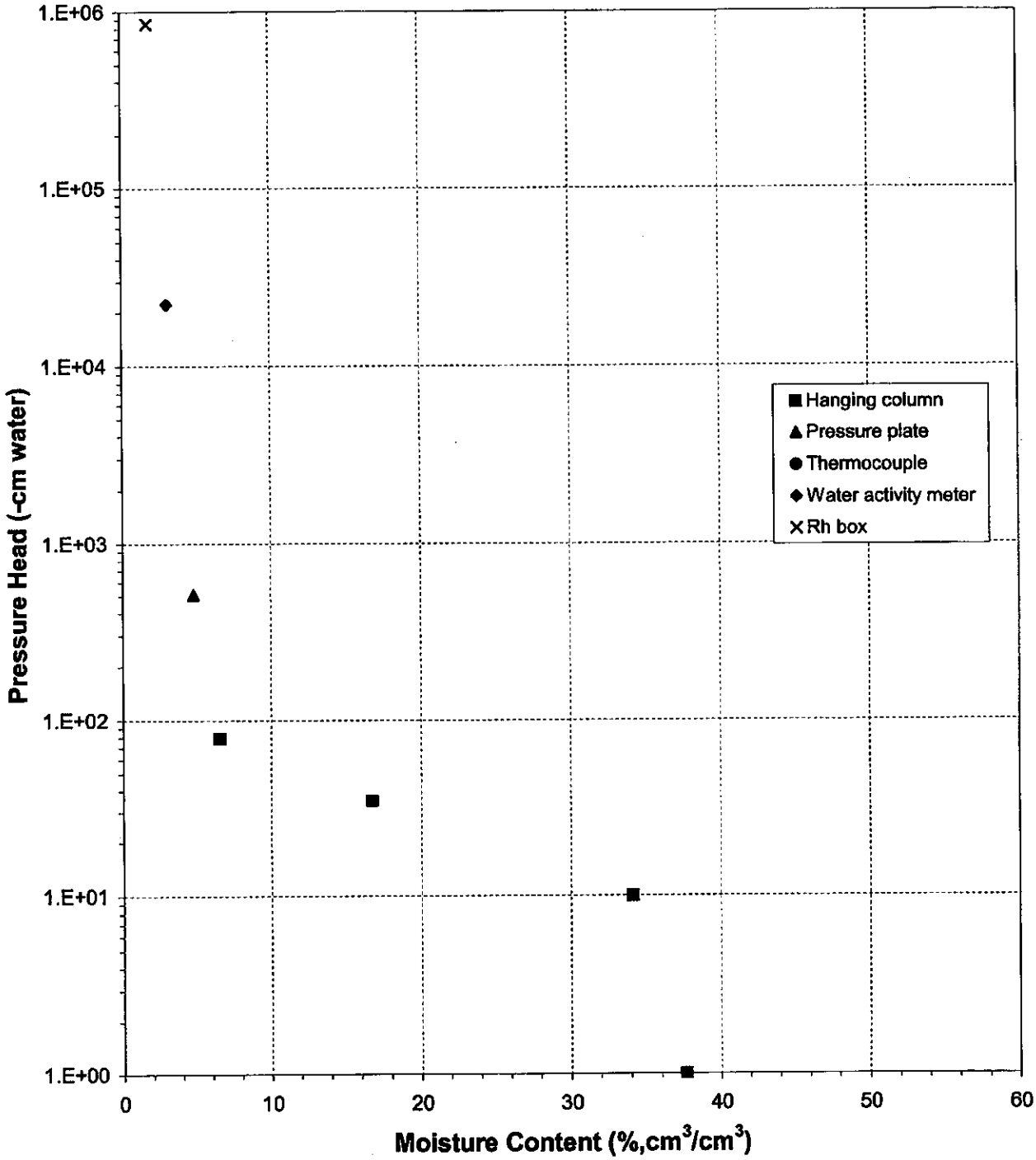
Comments:

* Weight including tares
† Assumed density of water is 1.0 g/cm^3

Laboratory analysis by: Carrillo/O'Dowd/Carrillo
Data entered by: T. Bowekaty
Checked by: J. Hines

Water Retention Data Points

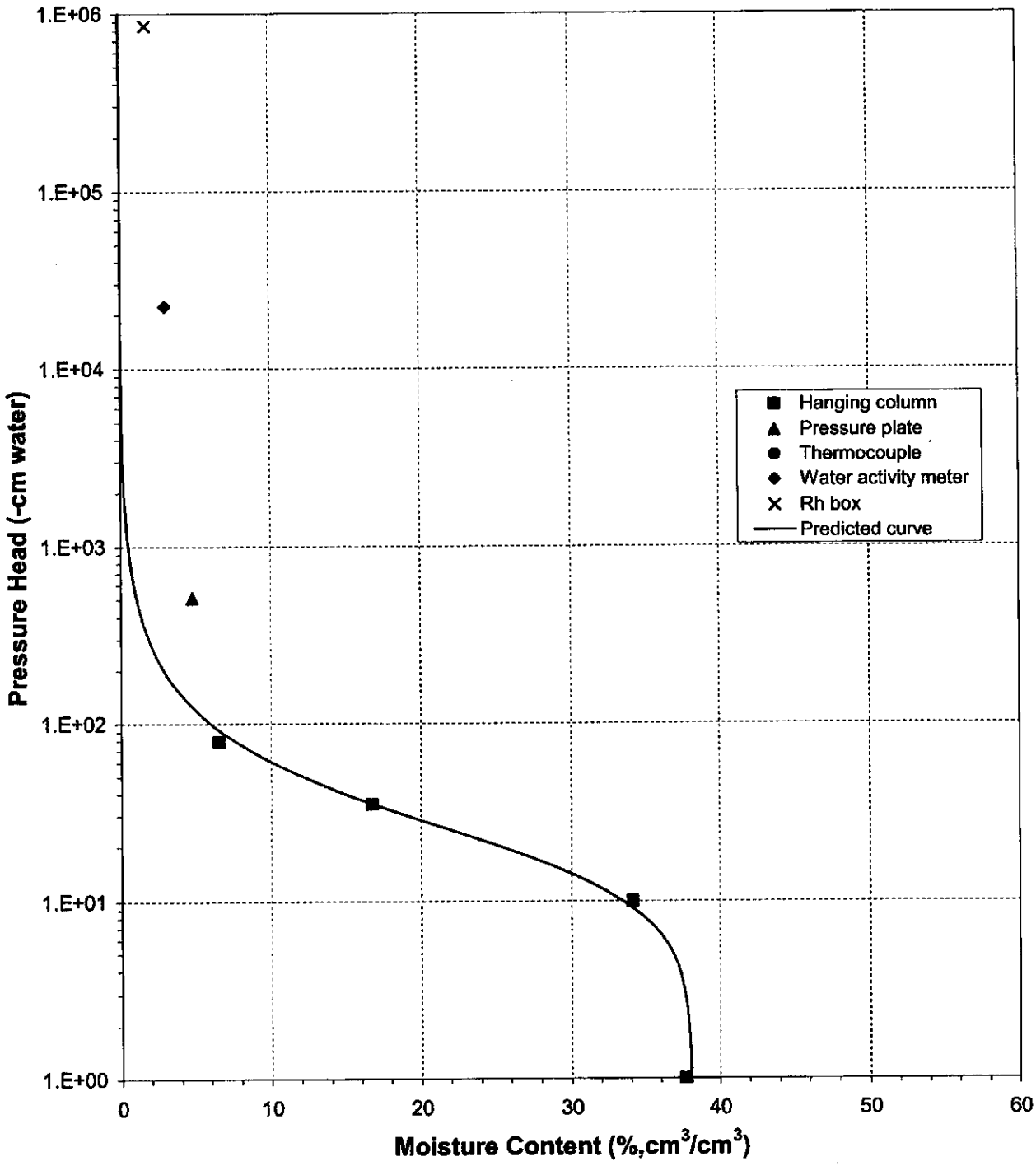
Sample Number: B1F3D4 Blend (95%) MSD



Daniel B. Stephens & Associates, Inc.

Predicted Water Retention Curve and Data Points

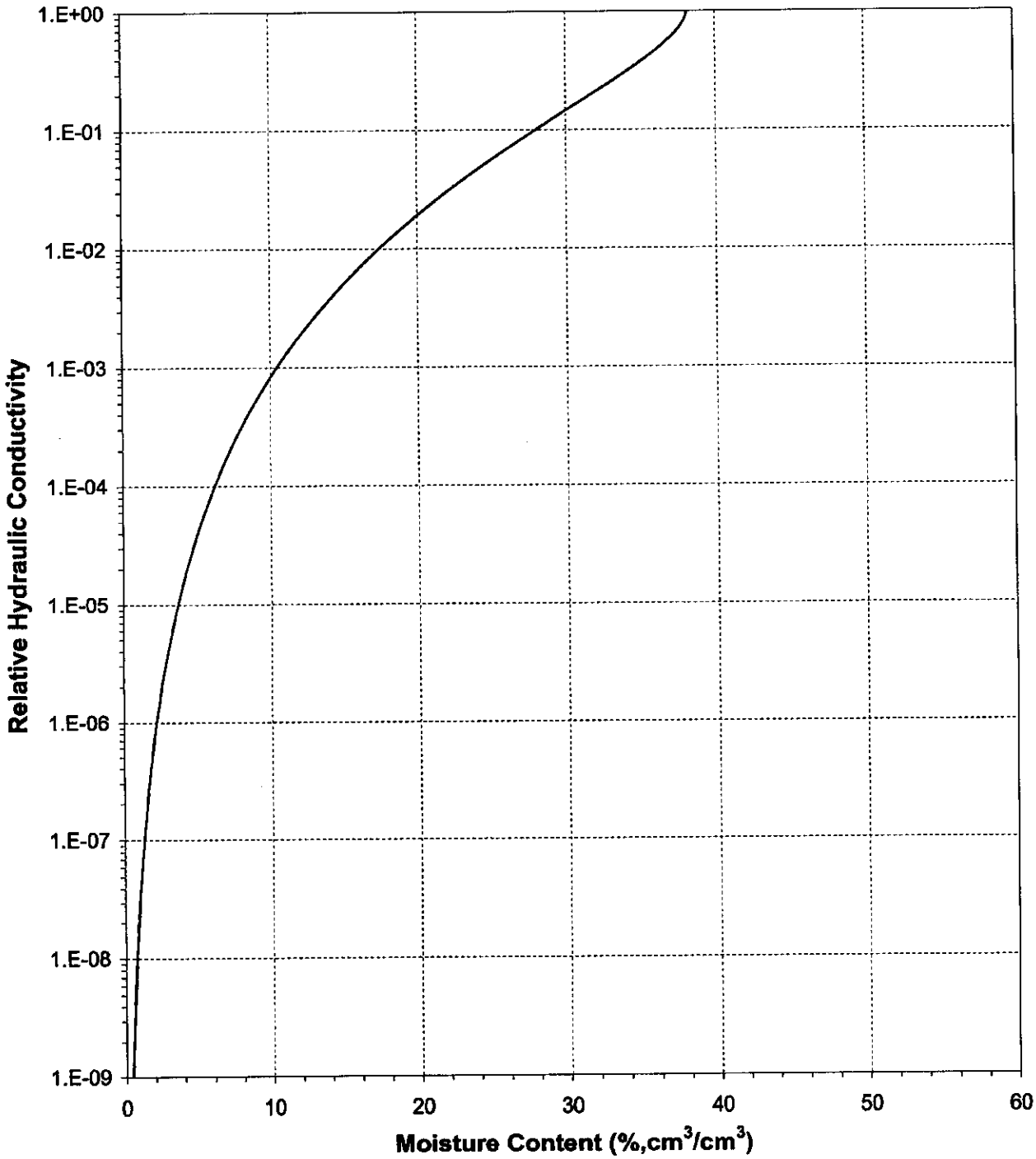
Sample Number: B1F3D4 Blend (95%) MSD



Daniel B. Stephens & Associates, Inc.

Plot of Relative Hydraulic Conductivity vs Moisture Content

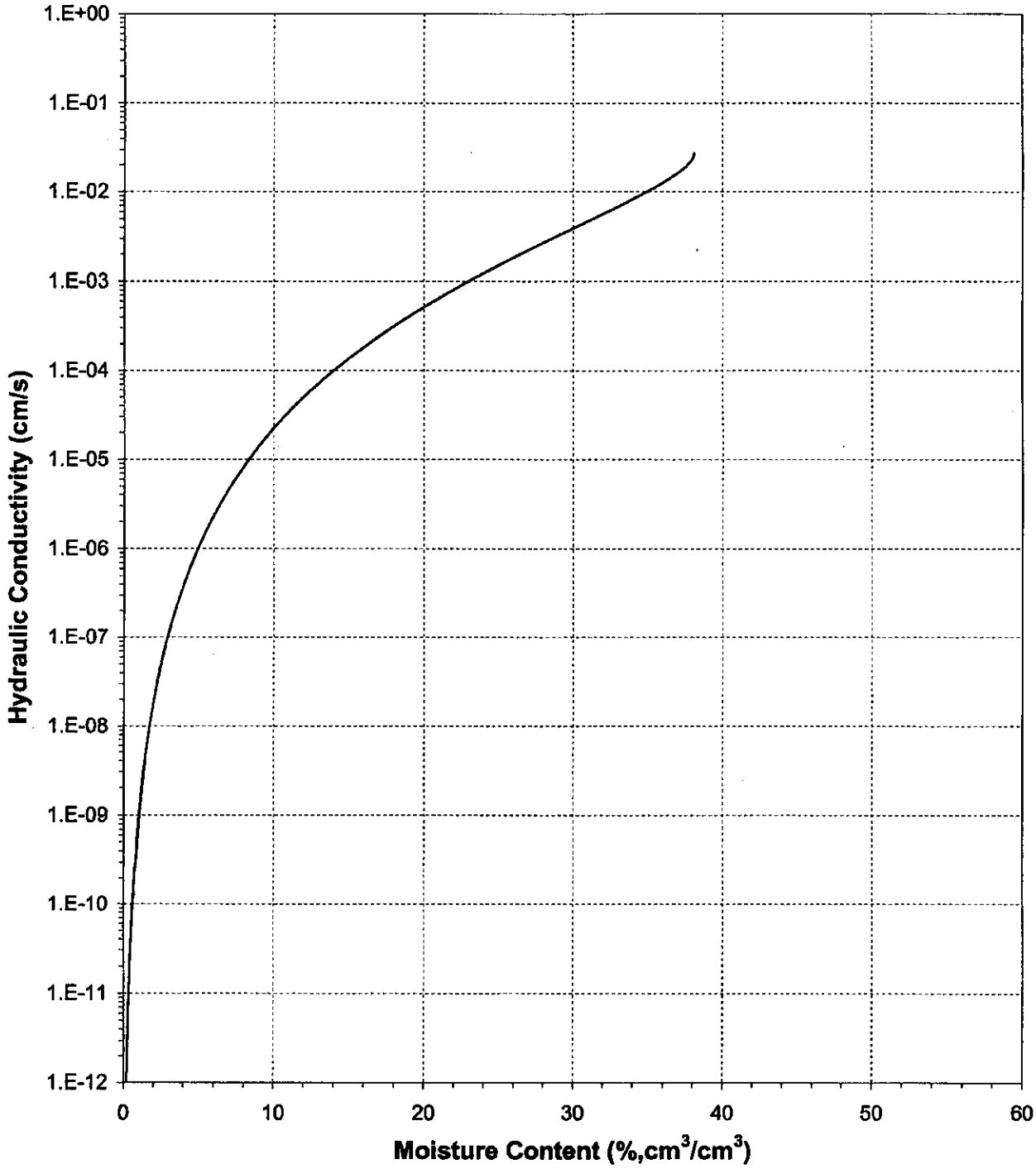
Sample Number: B1F3D4 Blend (95%) MSD



Daniel B. Stephens & Associates, Inc.

Plot of Hydraulic Conductivity vs Moisture Content

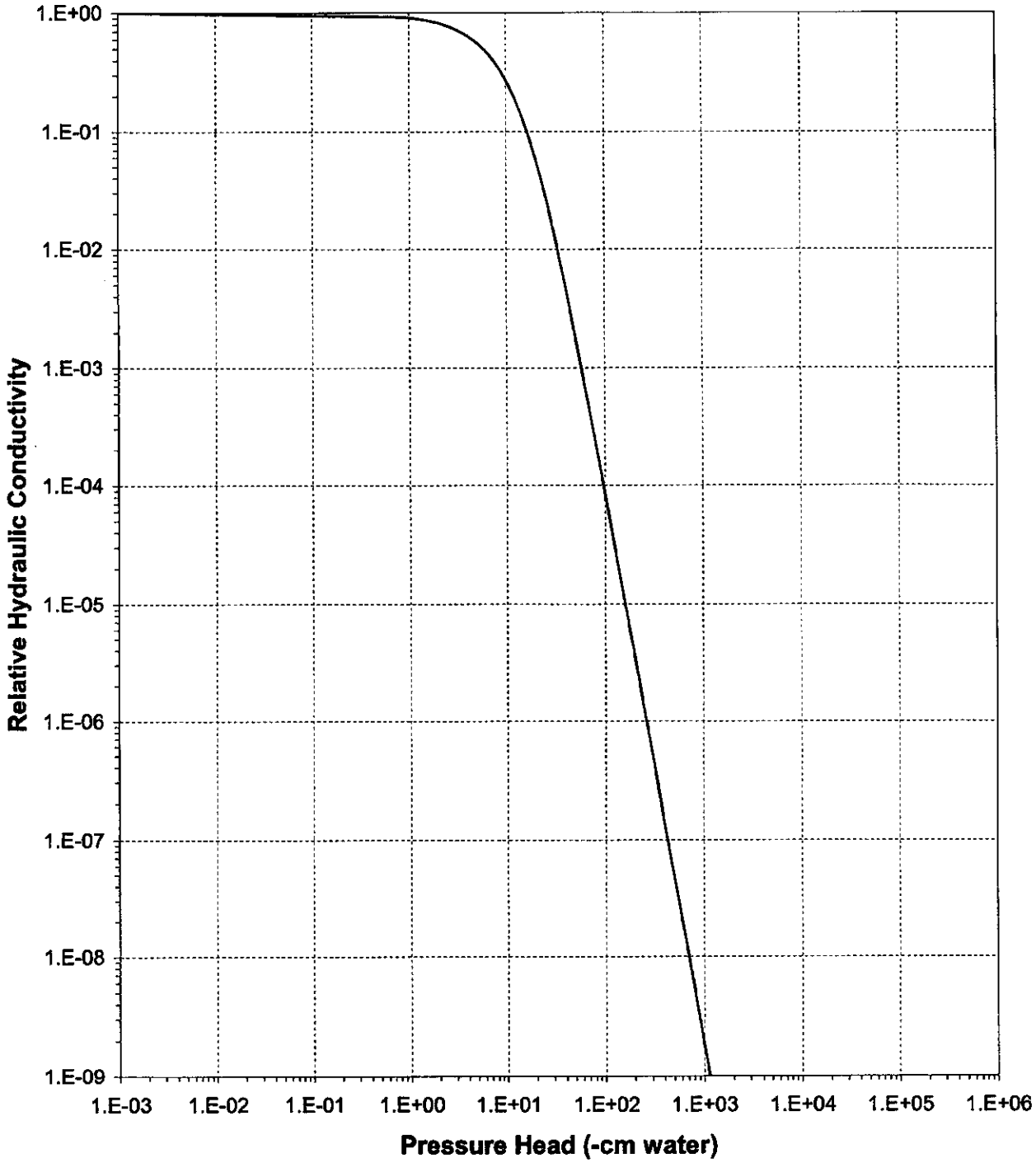
Sample Number: B1F3D4 Blend (95%) MSD



Daniel B. Stephens & Associates, Inc.

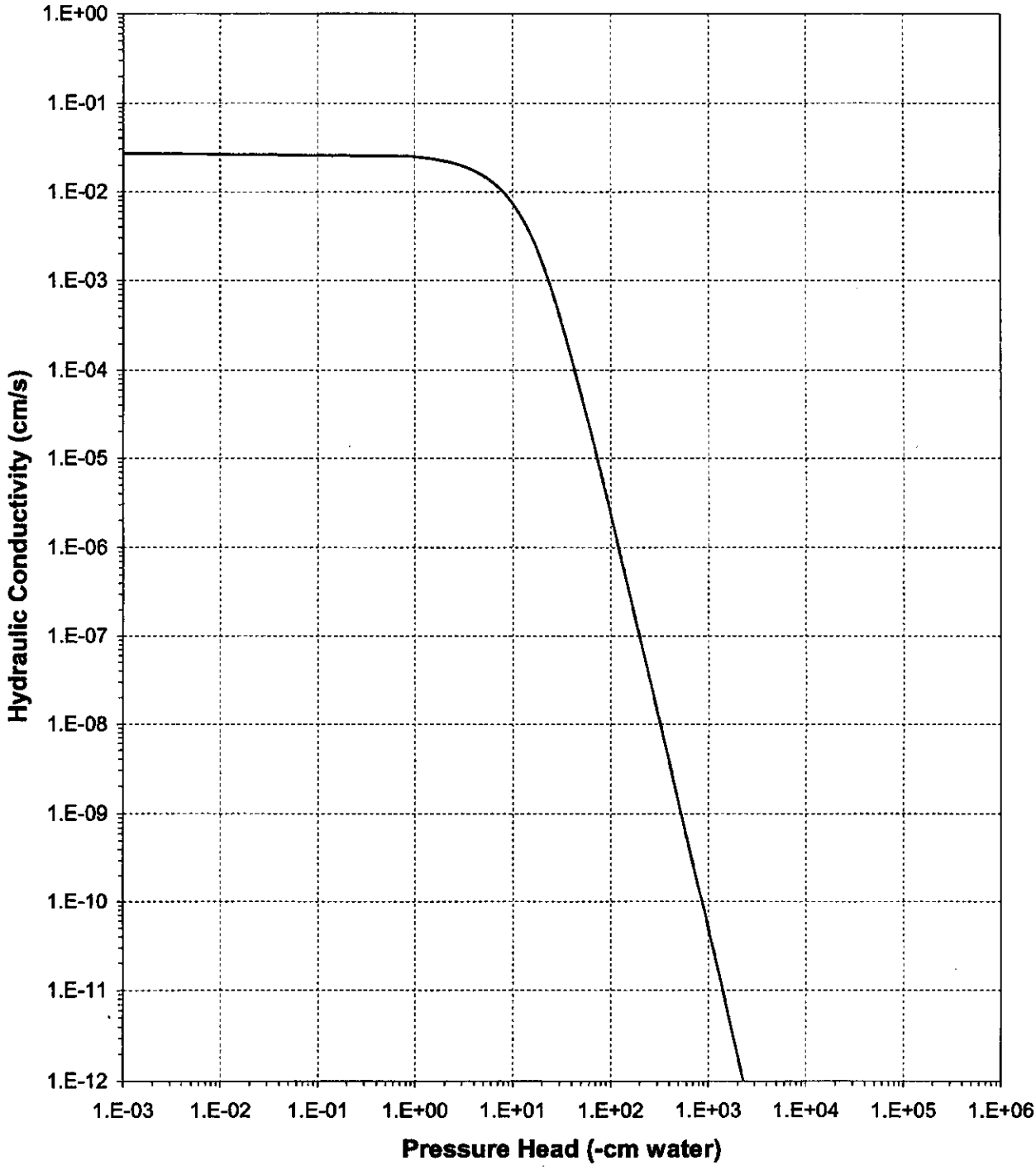
Plot of Relative Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Blend (95%) MSD



Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: B1F3D4 Blend (95%) MSD



Particle Size Analysis

Daniel B. Stephens & Associates, Inc.

Summary of Particle Size Characteristics

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification
B1F3D4 Composite	0.30	1.1	1.7	5.7	0.68	DS	Poorly-graded sand	Sand †
B1F3D4 Custom Blend	0.18	0.56	0.70	3.9	0.97	DS	Poorly-graded sand	Sand

Sample B1F3D4 Composite was sieved on a standard ASTM D422 sieve stack. Sample B1F3D4 Custom Blend was was specifically created and sieved based on the criteria below (provided by the client).

Custom Blend Criteria

Sieve	Percent Passing, by weight
9.5 mm (3/8-in)	100
4.75 mm (No. 4)	100
2.36 mm (No.8)	100
1.18 mm (No. 16)	85
0.60 mm (No. 30)	60
0.30 mm (No. 50)	30
0.15 mm (No. 100)	10
0.075 mm (No. 200)*	3*

*Maximum 3% + 200

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Dry Sieve Data

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Composite
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 7-Oct-05

Shape: Angular
Hardness: Soft

Total Sample Weight (g): 1767.99

Sieve Number	Diameter (mm)	Wt. Retained (g)	Cum Wt. Retained (g)	Wt. Passing (g)	% Passing
3"	75	0.00	0.00	1767.99	100.00
2"	50	0.00	0.00	1767.99	100.00
1.5"	38.1	0.00	0.00	1767.99	100.00
1"	25	0.00	0.00	1767.99	100.00
3/4"	19.0	0.00	0.00	1767.99	100.00
3/8"	9.5	0.00	0.00	1767.99	100.00
4	4.75	116.96	116.96	1651.03	93.38
10	2.00	504.84	621.80	1146.19	64.83
20	0.85	404.67	1026.47	741.52	41.94
40	0.425	408.66	1435.13	332.86	18.83
60	0.250	226.93	1662.06	105.93	5.99
140	0.106	97.15	1759.21	8.78	0.50
200	0.075	6.24	1765.45	2.54	0.14
pan		4.43	1769.88	- 1.89	

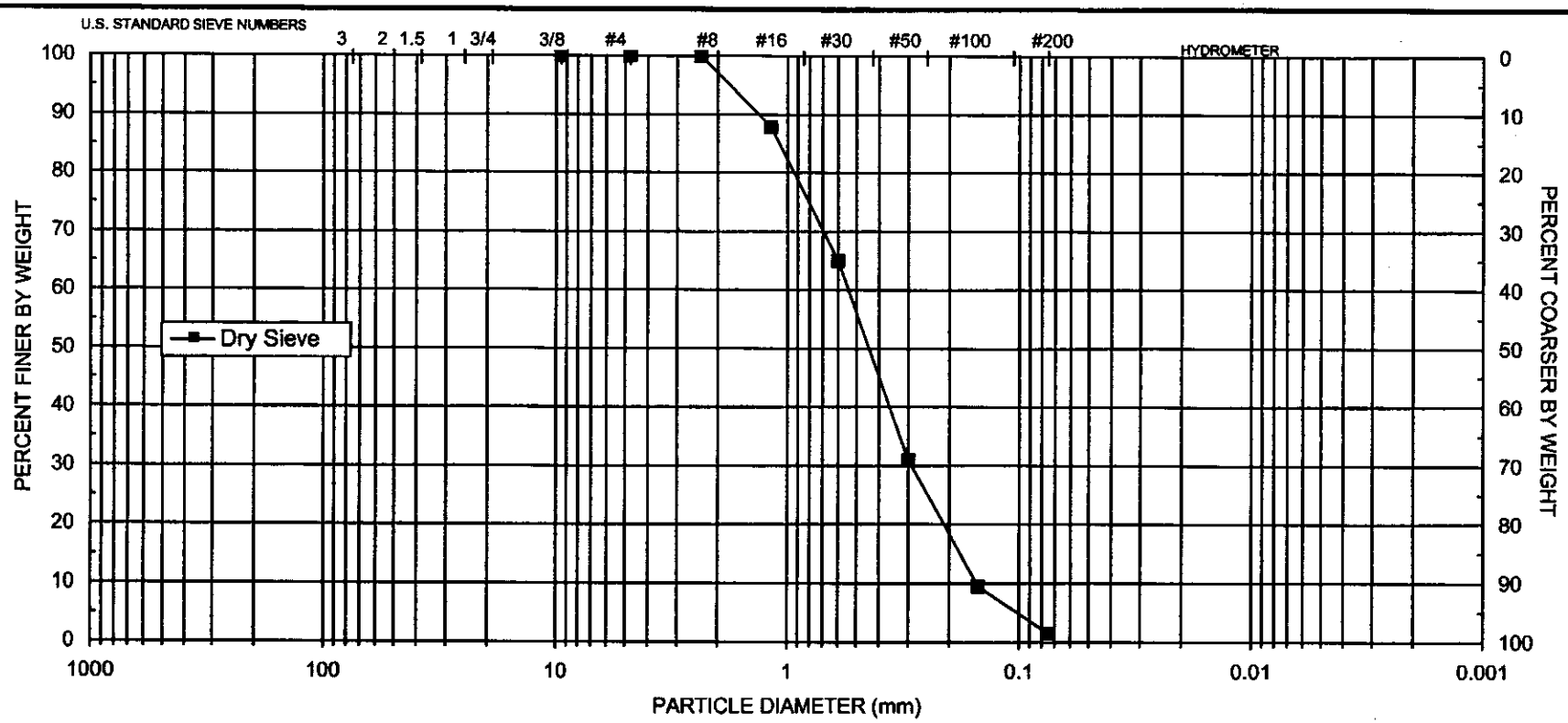
d_{10} (mm): 0.30 d_{50} (mm): 1.1
d_{16} (mm): 0.38 d_{60} (mm): 1.7
d_{30} (mm): 0.59 d_{84} (mm): 3.6

Median Particle Diameter--d_{50} (mm): 1.1
Uniformity Coefficient, Cu--$[d_{60}/d_{10}]$ (mm): 5.7
Coefficient of Curvature, Cc--$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.68
Mean Particle Diameter--$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 1.7

ASTM Soil Classification: Poorly-graded sand
USDA Soil Classification: Sand †

† Greater than 10% of sample is coarse material

Laboratory analysis by: T. Bowekaty
Data entered by: T. Bowekaty
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL: Coarse, Fine	SAND: Coarse, Medium, Fine	SILT OR CLAY	
USDA	COBBLES	GRAVEL	SAND: Very coarse, Coarse, Medium, Fine, Very fine	SILT	CLAY

d_{10} = **0.18**	d_{30} = **0.35**	d_{50} = **0.56**	d_{60} = **0.70**	C_u = **3.9**	C_c = **0.97**

SAMPLE NUMBER	DATE/TIME COLLECTED	ASTM CLASSIFICATION	USDA CLASSIFICATION
B1F3D4 Custom Blend	**9/23/05 11:42**	**Poorly-graded sand**	**Sand**

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Dry Sieve Data

Job Name: Fluor Hanford, Inc.
Job Number: LB05.0212.00
Sample Number: B1F3D4 Custom Blend
Location: Sand Pile - ARP
Date/Time Collected: 9/23/05 11:42

Test Date: 20-Oct-05

Shape: Angular
Hardness: Soft

Total Sample Weight (g): 701.39

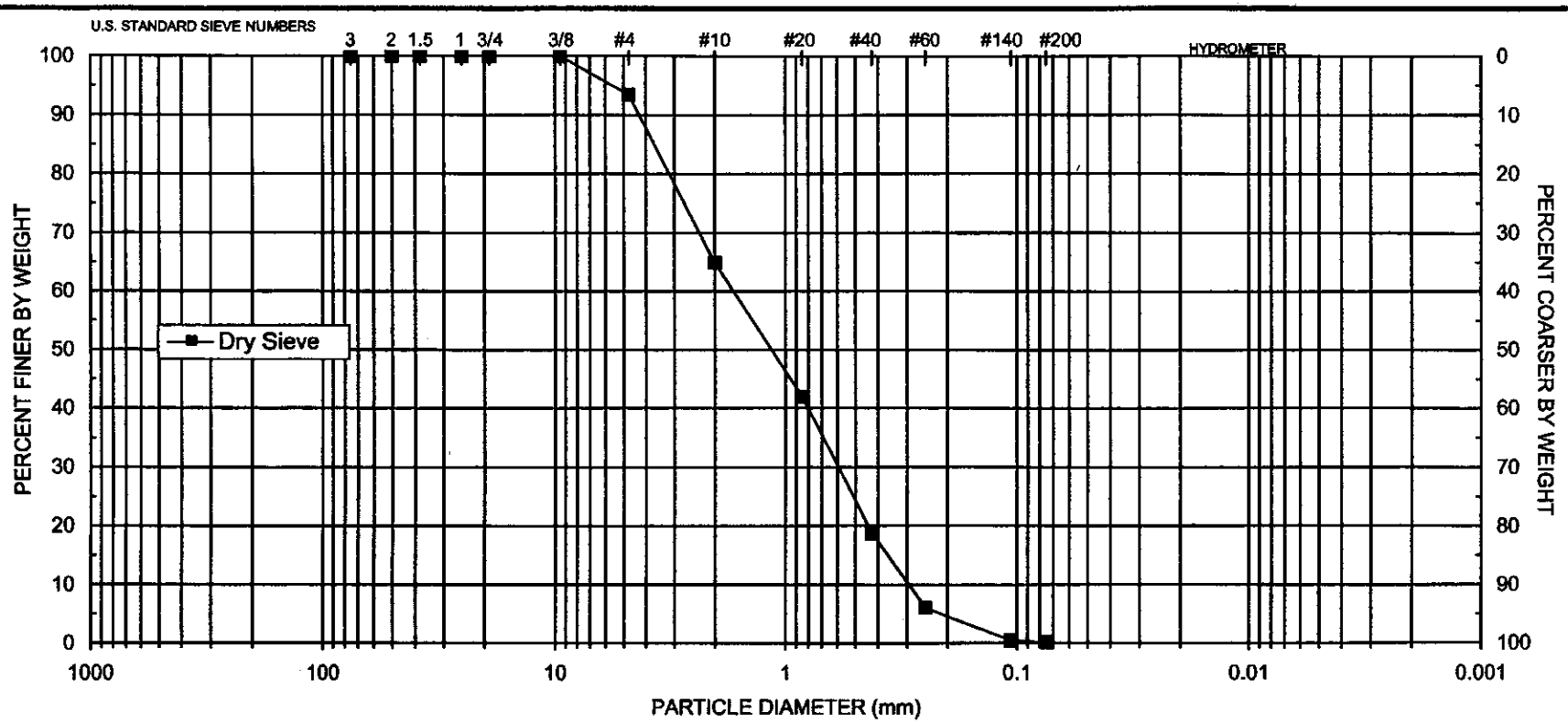
Sieve Number	Diameter (mm)	Wt. Retained (g)	Cum Wt. Retained (g)	Wt. Passing (g)	% Passing
3/8"	9.5	0.00	0.00	701.39	100.00
4	4.75	0.00	0.00	701.39	100.00
8	2.36	0.22	0.22	701.17	99.97
16	1.18	85.02	85.24	616.15	87.85
30	0.600	160.32	245.56	455.83	64.99
50	0.300	239.34	484.90	216.49	30.87
100	0.150	149.80	634.70	66.69	9.51
200	0.075	55.96	690.66	10.73	1.53
pan		10.76	701.42	- 0.03	

d_{10} (mm): 0.18 d_{50} (mm): 0.56
d_{16} (mm): 0.25 d_{60} (mm): 0.70
d_{30} (mm): 0.35 d_{84} (mm): 1.4

Median Particle Diameter--d_{50} (mm): 0.56
Uniformity Coefficient, Cu--$[d_{60}/d_{10}]$ (mm): 3.9
Coefficient of Curvature, Cc--$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.97
Mean Particle Diameter--$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.74

ASTM Soil Classification: Poorly-graded sand
USDA Soil Classification: Sand

Laboratory analysis by: T. Bowekaty
Data entered by: D. O'Dowd
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL: Coarse, Fine	SAND: Coarse, Medium, Fine	SILT OR CLAY	
USDA	COBBLES	GRAVEL	SAND: Very coarse, Coarse, Medium, Fine, Very fine	SILT	CLAY

d_{10} = 0.30	d_{30} = 0.59	d_{50} = 1.1	d_{60} = 1.7	C_u = 5.7	C_c = 0.68

SAMPLE NUMBER	DATE/TIME COLLECTED	ASTM CLASSIFICATION	USDA CLASSIFICATION
B1F3D4 Composite	**9/23/05 11:42**	**Poorly-graded sand**	**Sand †**

† Greater than 10% of sample is coarse material

Daniel B. Stephens & Associates, Inc.

Proctor Compaction

Summary of Proctor Compaction Tests

Sample Number	Optimum Moisture Content (% g/g)	Maximum Dry Bulk Density (g/cm^3)
B1F3D4 Composite	12.7	1.82
B1F3D4 Composite(Gravel Corrected)	12.3	1.85
B1F3D4 Custom Blend	15.4	1.73

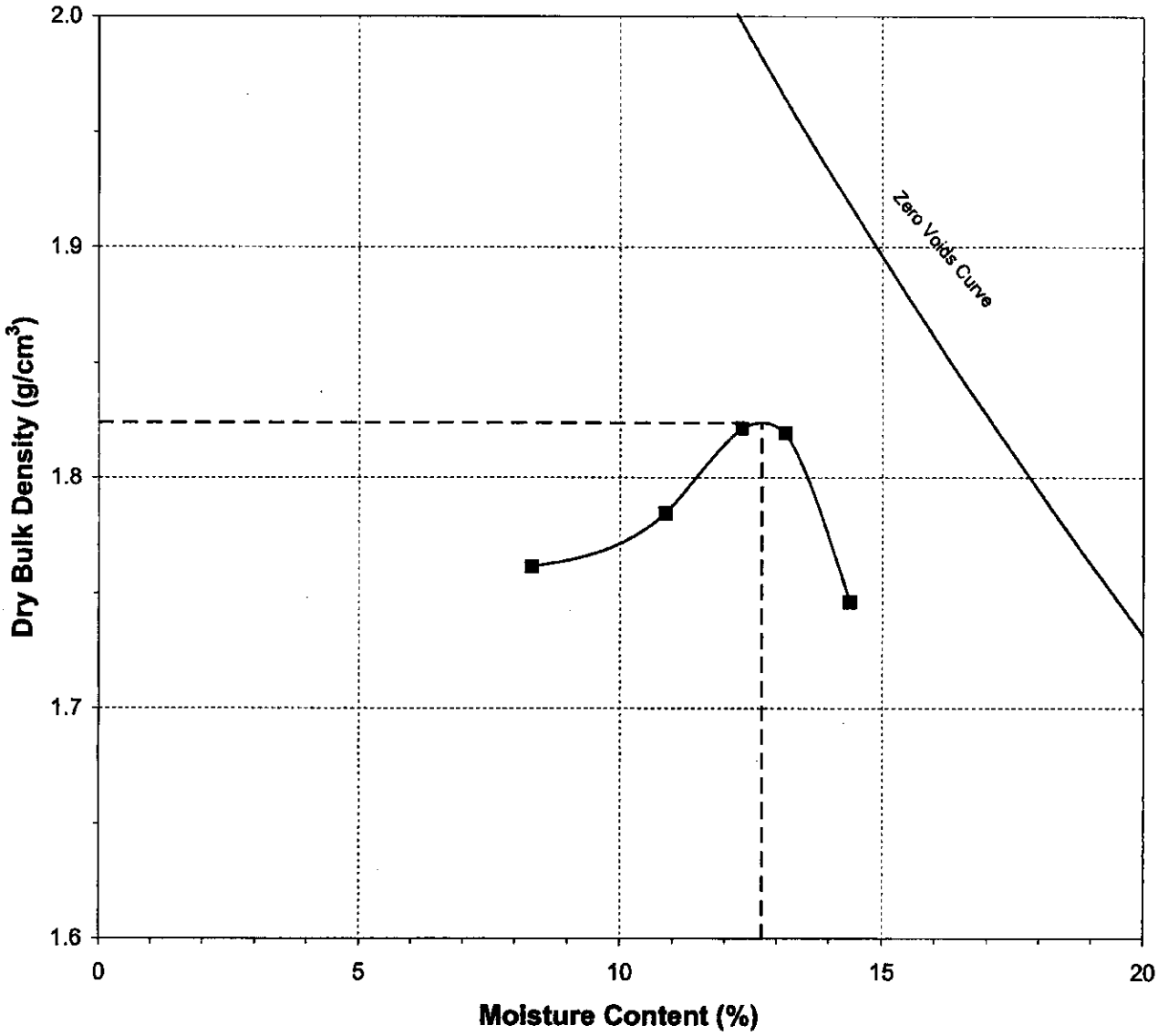
Daniel B. Stephens & Associates, Inc.

Proctor Compaction Data Points with Fitted Curve

Sample Number: B1F3D4 Composite

Optimum Moisture Content (%): 12.7
Maximum Dry Bulk Density (g/cm^3): 1.82
Assumed particle density (g/cm^3): 2.65

Test Date: 5-Oct-05



Compaction method: Standard A
Laboratory analysis by: T. Sciacca
Data entered by: D. O'Dowd
Checked by: J. Hines

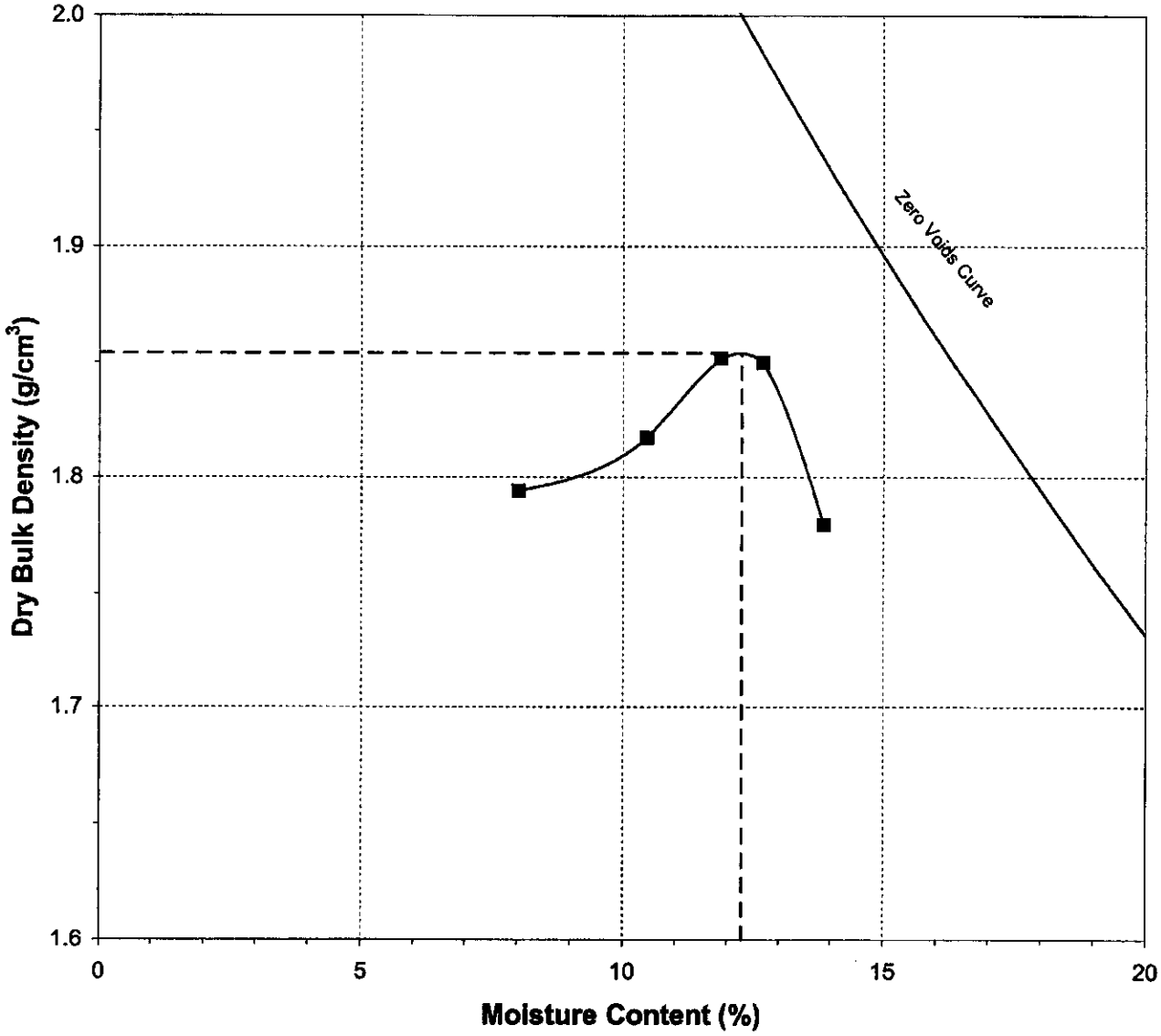
Daniel B. Stephens & Associates, Inc.

Proctor Compaction Data Points with Fitted Curve

Sample Number: B1F3D4 Composite(Gravel Corrected)

Optimum Moisture Content (%): 12.3
Maximum Dry Bulk Density (g/cm^3): 1.85
Assumed particle density (g/cm^3): 2.65

Test Date: 5-Oct-05



Compaction method: Standard A

Laboratory analysis by: T. Sciacca
Data entered by: D. O'Dowd
Checked by: J. Hines

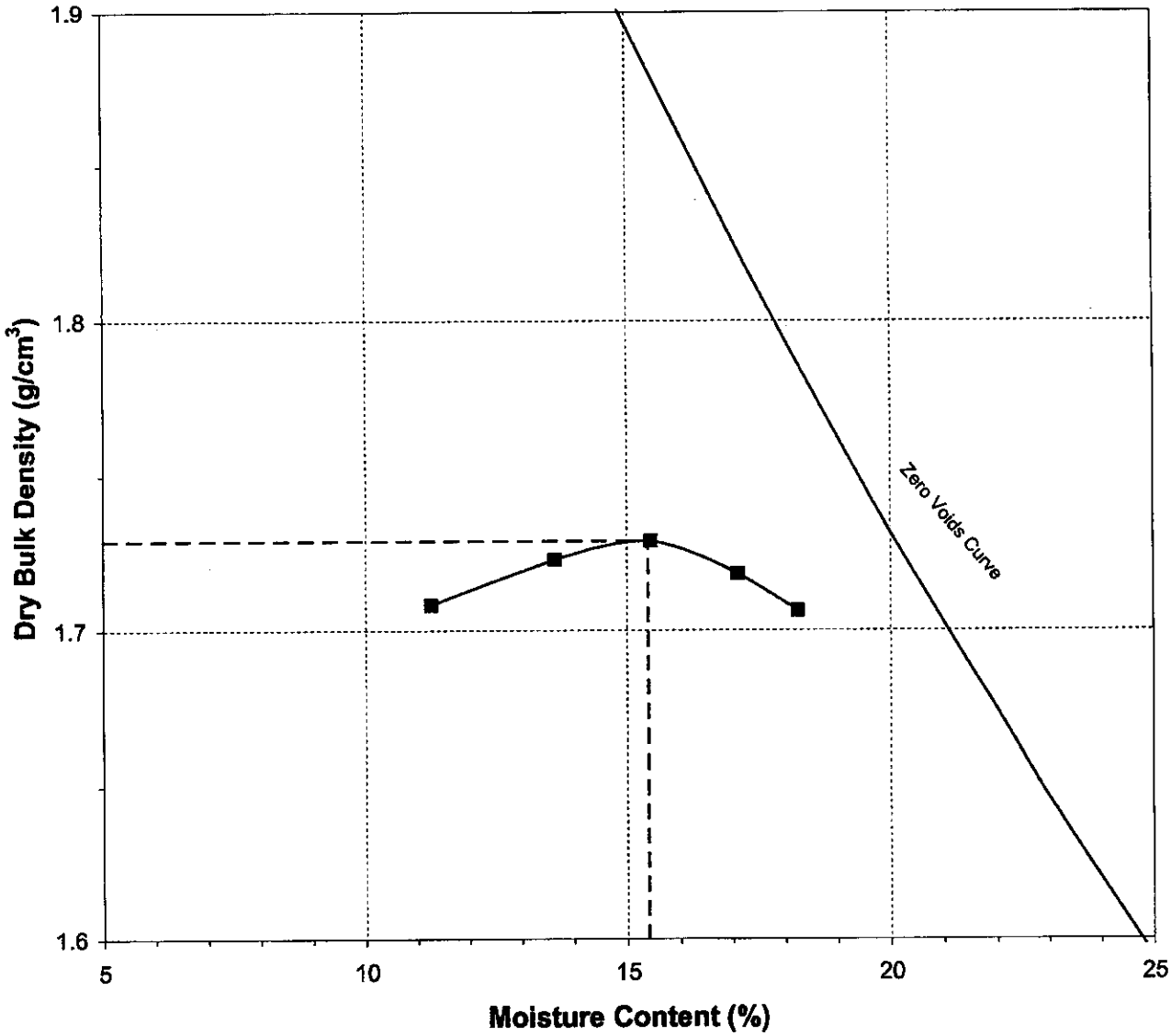
Daniel B. Stephens & Associates, Inc.

Proctor Compaction Data Points with Fitted Curve

Sample Number: B1F3D4 Custom Blend

Optimum Moisture Content (%): 15.4
Maximum Dry Bulk Density (g/cm^3): 1.73
Assumed particle density (g/cm^3): 2.65

Test Date: 20-Oct-05



Compaction method: Standard A
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Laboratory Tests and Methods

Tests and Methods

Dry Bulk Density:	ASTM D4531; ASTM D6836
Moisture Content:	ASTM D2216; ASTM D6836
Calculated Porosity:	Klute, A. 1986. Porosity. Chp.18-2.1, pp. 444-445, in A. Klute (ed.), Methods of Soil Analysis, American Society of Agronomy, Madison, WI
Saturated K: Constant Head:	ASTM D 2434 (modified apparatus)
Hanging Column Method:	ASTM D6836; Klute, A. 1986. Porosity. Chp.26, in A. Klute (ed.), Methods of Soil Analysis, American Society of Agronomy, Madison, WI
Pressure Plate Method:	ASTM D6836; ASTM D2325
Water Potential Method:	ASTM D6836; Rawlins, S.L. and G.S. Campbell, 1986. Water Potential: Thermocouple Psychrometry. Chp. 24, pp. 597-619, in A. Klute (ed.), Methods of Soil Analysis, Part 1. American Society of Agronomy, Madison, WI.
Relative Humidity Box:	Karathanasis & Hajek. 1982. Quantitative Evaluation of Water Adsorption on Soil Clays.SSA Journal 46:1321-1325
Calc. Kunsat:	ASTM D6836; Soil Sci. Soc. Am. J. 1980 44:892-898
Particle Size Analysis:	ASTM D422
Proctor Compaction Test:	ASTM D698
Course Fraction (Gravel) Correction (calc):	ASTM D4718; Bouwer, H. and Rice, R.C. 1984. Hydraulic Properties of Stony Vadose Zones. Groundwater Vol. 22, No. 6

Daniel B. Stephens & Associates, Inc.
5840 Osuna Rd., NE
Albuquerque, NM 87109
(505) 889-7752
FAX: (505) 889-0258

Date	10/4/05	**Total Pages Including Cover Sheet**	9
To	Steve Trent, FH	**From**	Joleen Hines, DBS&A
Fax No.	(866) 252-5816	**Project No.**	

[Phone: (509) 373-5869]

Remarks:

Joleen Hines
505-889-7752
jhines@dbstephens.com

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Daniel B. Stephens & Associates, Inc.

SAMPLE RECEIPT FORM

CLIENT: Fluor Hanford, Inc.
PROJECT #: Contract No: 27892

DATE RECEIVED: 9//2705

DBS&A
PROJECT #: _____

1) Are the custody seals on the cooler intact?	N/A
2) Are the custody seals on the sample containers intact?	Yes
3) Are there Chain of Custody(COC), or other directive shipping papers?	Yes
4) Is the COC complete?	Yes
5) Is the COC in agreement with the samples received?	Yes
6) Did all the samples arrive intact?	Yes

7) Comments

Three samples arrived, each in full 5-gallon buckets, in good condition. A fourth sample arrived in a small (250 g. container), loose. The samples are being prepared today, and testing will begin soon.

If you have any questions or concerns please contact Joleen Hines at (505) 889-7752.

NOTE: Samples will be held for a period of 30 days after the completion of testing. After 30 days samples will be disposed of locally unless DBS&A receives other instructions.

Signature: _____

6840 OSUNA RD NE, ALBUQUERQUE, NM 87109
(505) 889-7752 FAX (505) 889-0258

Disclaimer:
Interpretations of test results, interim reports of laboratory work, and research and development of special equipment or test procedures will be charged at our regular schedule of professional services fees, which is available upon request. The testing utilized to generate laboratory reports follows methods that are standard for the industry. The results do not constitute a professional or expert opinion by DBS&A, nor can the results affect any professional or expert opinions rendered with respect thereto by DBS&A. All testing undertaken by DBS&A, and any and all reports provided from said testing, constitute mere test results using standardized methods, and cannot be used to disqualify DBS&A from rendering any professional or expert opinion. Because of the nature of the results of our testing, and the limited scope of the Lab's undertaking, you hereby waive any claim of conflict of interest by DBS&A in the event professional or expert opinion is requested of qualified professionals or experts within DBS&A, for or against any party. Other than the express warranty that the testing utilized under this Contract uses standard methods, DBS&A disclaims any and all other warranties of any kind whatsoever.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F05-037-001 | PAGE 1 OF 1

COLLECTOR: MAHOOD, RO	COMPANY CONTACT: TRENT, SJ	TELEPHONE NO.: 509-373-5869	PROJECT COORDINATOR: TRENT, SJ
PRICE CODE: 8N	DATA TURNAROUND: 45 Days / 45 Days	AIR QUALITY: ☐	
SAMPLING LOCATION: Sand Pile American Ready Rock Products	PROJECT DESIGNATION: Physical Properties of a Commercially Produced ASTM C-33 Fine Aggregate	SAF NO.: F05-037	
ICE CHEST NO.: N/A (Ryan 9/22/05)	FIELD LOGBOOK NO.:	COA: 119142ES10	METHOD OF SHIPMENT: FEDERAL EXPRESS
SHIPPED TO: D. B. Stephens	OFFSITE PROPERTY NO.: 200 PTR 16270		BILL OF LADING/AIR BILL NO.: 200 PTR 16270

MATRIX*: A=Air, DL=Drum Liquids, DS=Drum Solids, L=Liquid, O=Oil, S=Soil, SE=Sediment, T=Tissue, V=Vegetation, W=Water, WI=Wipe, X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS: Samples did not originate in radiological controlled area. No total activity associated with sample/samples.

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	None	None
TYPE OF CONTAINER	Bucket	Moisture Resistant Cont
NO. OF CONTAINER(S)	3	1
VOLUME	5gal	250g
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Moisture Content - D2216;

✓ SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B1F3D4	SOIL	9-23-05	11:42	3 ✓	1 ✓

CHAIN OF POSSESSION — SIGN/ PRINT NAMES

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
R.O. Mahood	9-23-05 12:35	MO-026 Refrigerator No. 01	9-23-05 12:35
MO-026	9/26/05 1145		9/26/05 1145
	9/26/05 1145		
Fed Ex			9/27/05

SPECIAL INSTRUCTIONS: (1)Capillary-Moisture Relationship - D2325; Compaction - D698; Particle Size (Wet Sieve) - D422; Permeability - D2434; Saturated Hydraulic Conductivity; Specific Gravity;

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

A-600-518(03/03)

Oct. 4. 2005 4:33PM No. 0111 P. 3

PARTS AND TOOLS RETURN (PTR) FORM
PROJECT HANFORD, 2355 STEVENS DR., RICHLAND, WA 99354

REFERENCE BUSINESS PROCESS GUIDE - MATERIAL RETURNS

SECTION A - Material Information

Company FH Date 09/26/2005

One of the following is **REQUIRED**:

PO/Release No. N/A

Contract/Rel. No. 27892

P-Card Log No. N/A

Other N/A

Contract Specialist Name N/A

Phone Number N/A

Material Coordinator/P-Card Holder Name N/A

Phone Number N/A

PTR No. 16270

Total Pieces 4

Line Item No.	Quantity	U/M	Q Level	Description (Catalog ID No., S/N, Gov. Tag No.)/Include Reason for Return	Unit Price	Value
1	3	EA		SAND IN 5 GALLON POLY BUCKET SAF F05-037 70 LB (1 of 3) -7923-9402-2338 72 LB (2 of 3) -7923-9402-2349 70 LB (3 of 3) -7923-9402-2350	N/A	N/A

SECTION B - Financial Transaction Information

Passport **Purchase Order** Financial Transaction - Check One

- ☐ **Credit** - Return for Credit - PP Receipt Required
- ☐ **Replace** - Return for Replacement - PP Receipt Required
- ☐ **Inventory** - Return to PHMC Inventory
- ☐ **Return** - QA-Non-NCR Material (Credit)

*Requires identification of controlling Purchase Order, Contract, or PHMC Property Custodian accountable for the Govt. property in accordance with Regulations.

Contract/P-Card/Other - No Financial Transaction Created from PTR

- ☐ Credit - Contract/P-Card
- ☐ Repair
- ☐ Ship Supplier Owned Materials, Containers, Samples, etc.
- ☒ *Ship Govt. Owned Materials, Containers, Samples, etc.
- ☐ OTHER
- ☐ Core Charge - Return for Credit of Deposit
- ☐ Replace
- ☐ Ship Waste/Material for Disposal
- ☐ Over Shipment

SECTION C - Hazardous Material Information

Hazardous Material ☐ Yes* ☒ No

Radioactive Material ☐ Yes* ☒ No

Rad. Control Survey ☐ Yes ☒ No

*T&P Inspections (req'd) ☐ Yes ☒ No

Include appropriate shipping document. Radioactive Material is also Hazardous.

Certified Free of Contamination ☒ Yes ☐ No

Certifier's Name/Date

Custodian: M. A. BAECHLER

Telephone: 509-531-0638

Current Location of Material: MO-026 / 300

Date Available to Ship: 09/26/2005

SECTION D - Vendor/Ship To Information

Ship To: D. B. STEPHENS
6020 ACADEMY ROAD
SUITE 100
ALBUQUERQUE, NM 87109

Contact: JOLEEN HINES

Contact Phone:

RA No.: N/A

F.O.B.

Contractor FLUOR HANFORD, INC.
2355 STEVENS DRIVE
RICHLAND, WA 99354

ATTN: MIKE BAECHLER,300,MO-026

Item	% Cost	Cost Center	CACN	COA
1	100	M8200	119142	ES20

SECTION E - Shipping Information - To be completed by Shipping Department

Routing Fed-X Overnight

B/L No. See Above

B/L Wt. 7977.70

Frt. Collect

Acct. No.

SECTION F - OSD&D/Shipping Notice Information - To be completed by Shipping/Procurement

By [illegible]

Date Shipped 9-26-05

OSD&D No.

Shipping Notice No.

Receipt No.

A-6001-535 (03/05)

PARTS AND TOOLS RETURN (PTR) FORM (Continued)

PTR No. 16270

Line Item No.	Quantity	U/M	Q Level	Description (Catalog ID No., S/N, Gov. Tag No.)/Include Reason for Return	Unit Price	Value
2	1	EA		SAND PACKAGED IN POLY COOLER WITH PACKING PEANUTS COOLER # GRP-05-012 SAF # F05-037 4 LB 7912-1654-8280	N/A	N/A

A-6001-535R (03/05)

From: Origin ID: (509)376-7768
SHIPPING DEPT
FLUOR HANFORD
2355 STEVENS DR BLDG 1162

RICHLAND, WA 99352

Ship Date: 26SEP05
Actual Wgt: 4 LB
System#: 5651865/INET2200
Account#: S ********

REF: M8200 119142 ES20

Delivery Address Bar Code

SHIP TO: (509)531-0638 BILL SENDER

JOLEEN HINES
D.B.STEPHENS
6020 ACADEMY ROAD
SUITE 100 PTR16270
ALBUQUERQUE, NM 87109

PRIORITY OVERNIGHT **TUE**

Deliver By: 27SEP05

TRK# 7912 1654 8280 FORM 0201

ABQ A1

87109 -NM-US

XX ONMA

Shipping Label: Your shipment is complete

1. Use the 'Print' feature from your browser to send this page to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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