

Laboratory Report for Power Resources, Inc.

Mine Unit 1 ACL, PO # 4500546125

December 19, 2016



Daniel B. Stephens & Associates, Inc.

4400 Alameda Blvd. NE, Suite C • Albuquerque, New Mexico 87113



December 19, 2016

Jim Clay
Power Resources, Inc.
Smith Ranch-Highland Operation
762 Ross Road
Douglas, Wyoming 82633
(307) 358-6541 x 457

Re: DBS&A Laboratory Report for the Power Resources, Inc., Mine Unit 1 ACL, PO # 4500546125

Dear Mr. Clay:

Enclosed is the report for the Power Resources, Inc., Mine Unit 1 ACL, PO # 4500546125 sample testing. 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.

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 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 report provided, constitutes mere test results using standardized methods, and cannot be used to disqualify DBS&A from 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 Power Resources, 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.
SOIL TESTING & RESEARCH LABORATORY

A handwritten signature in cursive script, appearing to read 'Joleen Hines'.

Joleen Hines
Laboratory Manager

Enclosure

Summaries



Summary of Tests Performed

Laboratory Sample Number	Initial Soil Properties ¹			Saturated Hydraulic Conductivity ²			Moisture Characteristics ³								Particle Size ⁴			Specific Gravity ⁵		Air Perm- eability	Atterberg Limits	Proctor Compaction
	G	VM	VD	CH	FH	FW	HC	PP	FP	DPP	RH	EP	WHC	K _{unsat}	DS	WS	H	F	C			
ST-3 (477-478)	X	X										X				X	X					
ST-4 (496-497)	X	X										X				X	X					
ST-5 (501-502)	X	X										X				X	X					
ST-5 (503-503.5)	X	X										X				X	X					
DG-2 (482-483)	X	X										X				X	X					
DG-2 (504-505)	X	X										X				X	X					
DG-3 (524-525)	X	X										X				X	X					
DG-3 (551-551.7)	X	X										X				X	X					

¹ G = Gravimetric Moisture Content, VM = Volume Measurement Method, VD = Volume Displacement Method

² CH = Constant Head Rigid Wall, FH = Falling Head Rigid Wall, FW = Falling Head Rising Tail Flexible Wall

³ HC = Hanging Column, PP = Pressure Plate, FP = Filter Paper, DPP = Dew Point Potentiometer, RH = Relative Humidity Box, EP = Effective Porosity, WHC = Water Holding Capacity, K_{unsat} = Calculated Unsaturated Hydraulic Conductivity

⁴ DS = Dry Sieve, WS = Wet Sieve, H = Hydrometer

⁵ F = Fine (<4.75mm), C = Coarse (>4.75mm)



Notes

Sample Receipt:

Thirteen samples, each as intact 3" x 8"-12" core pieces inside a ziplock bag and two vacuum sealed bags, were received on November 1, 2016. All samples were stabilized with cardboard and were packed inside one cooler, and were received in good order. Five samples were determined to exceed the acceptable limit of 0.2 mR/hr, and were not accepted for testing. The remaining samples are being prepared for testing.

Sample Preparation and Testing Notes:

An intact (undisturbed) portion of material was trimmed and weighed and the dimensions were measured using a 3-D scanner in order to obtain the initial moisture content, density, and calculated total porosity of the undisturbed material.

All samples were also subjected to the dewpoint potentiometer portion of the effective porosity testing, and to particle size analysis, using adjacent sample material.

Porosity calculations are based on the use of an assumed specific gravity value of 2.65.



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

Sample Number	Moisture Content				Dry Bulk Density (g/cm ³)	Wet Bulk Density (g/cm ³)	Calculated Porosity (%)
	As Received		Remolded				
	Gravimetric (%) (%, g/g)	Volumetric (%) (%, cm ³ /cm ³)	Gravimetric (%) (%, g/g)	Volumetric (%) (%, cm ³ /cm ³)			
ST-3 (477-478)	13.5	25.5	---	---	1.89	2.14	28.7
ST-4 (496-497)	17.0	30.0	---	---	1.77	2.07	33.2
ST-5 (501-502)	9.3	18.3	---	---	1.98	2.16	25.3
ST-5 (503-503.5)	1.3	3.3	---	---	2.54	2.57	4.1
DG-2 (482-483)	13.7	26.2	---	---	1.91	2.18	27.8
DG-2 (504-505)	15.7	29.0	---	---	1.84	2.13	30.4
DG-3 (524-525)	16.1	28.9	---	---	1.80	2.09	32.2
DG-3 (551-551.7)	12.9	23.8	---	---	1.85	2.09	30.3

NA = Not analyzed

--- = This sample was not remolded



Summary of Moisture Retention (Effective Porosity)

Sample Number	Calculated Total Porosity (%, cm ³ /cm ³)	-15 Bar Point Volumetric Water Content ¹ (%, cm ³ /cm ³)	Effective Porosity (%, cm ³ /cm ³)	Oversize Corrected		
				Calculated Total Porosity (%, cm ³ /cm ³)	-15 Bar Point Volumetric Water Content (%, cm ³ /cm ³)	Effective Porosity (%, cm ³ /cm ³)
ST-3 (477-478)	28.7	4.0	24.6	NA	NA	NA
ST-4 (496-497)	33.2	4.7	28.5	NA	NA	NA
ST-5 (501-502)	25.3	5.9	19.4	NA	NA	NA
ST-5 (503-503.5)	4.1	4.1	0.0	NA	NA	NA
DG-2 (482-483)	27.8	5.2	22.5	NA	NA	NA
DG-2 (504-505)	30.4	8.8	21.7	NA	NA	NA
DG-3 (524-525)	32.2	5.8	26.4	NA	NA	NA
DG-3 (551-551.7)	30.3	3.4	26.8	NA	NA	NA

1 = Volume adjusted, if applicable

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not applicable

NR = Not requested



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
ST-3 (477-478)	0.13	0.77	1.0	7.7	1.00	WS/H	Poorly-graded sand (SP)	Sand
ST-4 (496-497)	0.13	0.39	0.46	3.5	1.3	WS/H	Poorly-graded sand (SP)	Sand
ST-5 (501-502)	0.23	1.2	1.4	6.1	2.7	WS/H	Well-graded sand (SW)	Sand [†]
ST-5 (503-503.5)	0.099	0.98	1.2	12	2.0	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand [†]
DG-2 (482-483)	0.12	0.98	1.1	9.2	1.3	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand
DG-2 (504-505)	0.13	0.40	0.48	3.7	1.3	WS/H	Poorly-graded sand (SP)	Sand
DG-3 (524-525)	0.12	0.33	0.39	3.3	1.1	WS/H	Poorly-graded sand (SP)	Sand
DG-3 (551-551.7)	0.18	1.1	1.3	7.2	3.0	WS/H	Poorly-graded sand (SP)	Sand

d₅₀ = Median particle diameter

Est = Reported values for d₁₀, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d₁₀ 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



Percent Gravel, Sand, Silt and Clay*

Sample Number	% Gravel (>4.75mm)	% Sand (<4.75mm, >0.075mm)	% Silt (<0.075mm, >0.002mm)	% Clay (<0.002mm)
ST-3 (477-478)	0.0	95.4	4.3	0.3
ST-4 (496-497)	0.0	95.3	4.4	0.3
ST-5 (501-502)	1.1	95.8	2.8	0.2
ST-5 (503-503.5)	0.1	91.6	7.6	0.7
DG-2 (482-483)	0.0	93.5	6.1	0.3
DG-2 (504-505)	0.0	95.8	3.9	0.3
DG-3 (524-525)	0.0	95.7	4.0	0.3
DG-3 (551-551.7)	0.0	95.8	3.9	0.3

*USCS classification does not classify clay fraction based on particle size. USDA definition of clay (<0.002mm) used in this table.

Initial Properties



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

Sample Number	Moisture Content				Dry Bulk Density (g/cm ³)	Wet Bulk Density (g/cm ³)	Calculated Porosity (%)
	As Received		Remolded				
	Gravimetric (%) (%, g/g)	Volumetric (%) (%, cm ³ /cm ³)	Gravimetric (%) (%, g/g)	Volumetric (%) (%, cm ³ /cm ³)			
ST-3 (477-478)	13.5	25.5	---	---	1.89	2.14	28.7
ST-4 (496-497)	17.0	30.0	---	---	1.77	2.07	33.2
ST-5 (501-502)	9.3	18.3	---	---	1.98	2.16	25.3
ST-5 (503-503.5)	1.3	3.3	---	---	2.54	2.57	4.1
DG-2 (482-483)	13.7	26.2	---	---	1.91	2.18	27.8
DG-2 (504-505)	15.7	29.0	---	---	1.84	2.13	30.4
DG-3 (524-525)	16.1	28.9	---	---	1.80	2.09	32.2
DG-3 (551-551.7)	12.9	23.8	---	---	1.85	2.09	30.3

NA = Not analyzed

--- = This sample was not remolded



Daniel B. Stephens & Associates, Inc.

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

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: ST-3 (477-478)
Date Sampled: 8/24/2016
Depth (ft): 477'-478'

	<u>As Received</u>	<u>Remolded</u>
<i>Test Date:</i>	11-Nov-16	---
<i>Field weight* of sample (g):</i>	973.07	
<i>Tare weight, ring (g):</i>	0.00	
<i>Tare weight, pan/plate (g):</i>	287.77	
<i>Tare weight, other (g):</i>	0.00	
<i>Dry weight of sample (g):</i>	603.93	
<i>Sample volume (cm³):</i>	319.51	
<i>Assumed particle density (g/cm³):</i>	2.65	

<i>Gravimetric Moisture Content (% g/g):</i>	13.5
<i>Volumetric Moisture Content (% vol):</i>	25.5
<i>Dry bulk density (g/cm³):</i>	1.89
<i>Wet bulk density (g/cm³):</i>	2.14
<i>Calculated Porosity (% vol):</i>	28.7
<i>Percent Saturation:</i>	88.8

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

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded



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

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: ST-4 (496-497)
Date Sampled: 8/30/2016
Depth (ft): 496'-497'

	<u>As Received</u>	<u>Remolded</u>
<i>Test Date:</i>	11-Nov-16	---
<i>Field weight* of sample (g):</i>	906.18	
<i>Tare weight, ring (g):</i>	0.00	
<i>Tare weight, pan/plate (g):</i>	270.16	
<i>Tare weight, other (g):</i>	0.00	
<i>Dry weight of sample (g):</i>	543.75	
<i>Sample volume (cm³):</i>	307.23	
<i>Assumed particle density (g/cm³):</i>	2.65	
<hr/>		
<i>Gravimetric Moisture Content (% g/g):</i>	17.0	
<i>Volumetric Moisture Content (% vol):</i>	30.0	
<i>Dry bulk density (g/cm³):</i>	1.77	
<i>Wet bulk density (g/cm³):</i>	2.07	
<i>Calculated Porosity (% vol):</i>	33.2	
<i>Percent Saturation:</i>	90.4	

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

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded



Daniel B. Stephens & Associates, Inc.

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

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: ST-5 (501-502)
Date Sampled: 8/23/2016
Depth (ft): 501'-502'

	<u>As Received</u>	<u>Remolded</u>
<i>Test Date:</i>	11-Nov-16	---
<i>Field weight* of sample (g):</i>	1007.33	
<i>Tare weight, ring (g):</i>	0.00	
<i>Tare weight, pan/plate (g):</i>	284.27	
<i>Tare weight, other (g):</i>	0.00	
<i>Dry weight of sample (g):</i>	661.79	
<i>Sample volume (cm³):</i>	334.34	
<i>Assumed particle density (g/cm³):</i>	2.65	

<i>Gravimetric Moisture Content (% g/g):</i>	9.3
<i>Volumetric Moisture Content (% vol):</i>	18.3
<i>Dry bulk density (g/cm³):</i>	1.98
<i>Wet bulk density (g/cm³):</i>	2.16
<i>Calculated Porosity (% vol):</i>	25.3
<i>Percent Saturation:</i>	72.4

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

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded



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

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: ST-5 (503-503.5)
Date Sampled: 8/23/2016
Depth (ft): 503'-503.5'

	<u>As Received</u>	<u>Remolded</u>
<i>Test Date:</i>	11-Nov-16	---
<i>Field weight* of sample (g):</i>	1083.16	
<i>Tare weight, ring (g):</i>	0.00	
<i>Tare weight, pan/plate (g):</i>	282.91	
<i>Tare weight, other (g):</i>	0.00	
<i>Dry weight of sample (g):</i>	790.10	
<i>Sample volume (cm³):</i>	311.02	
<i>Assumed particle density (g/cm³):</i>	2.65	
<hr/>		
<i>Gravimetric Moisture Content (% g/g):</i>	1.3	
<i>Volumetric Moisture Content (% vol):</i>	3.3	
<i>Dry bulk density (g/cm³):</i>	2.54	
<i>Wet bulk density (g/cm³):</i>	2.57	
<i>Calculated Porosity (% vol):</i>	4.1	
<i>Percent Saturation:</i>	78.9	

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

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded



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

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: DG-2 (482-483)
Date Sampled: 9/12/2016
Depth (ft): 482'-483'

	<u>As Received</u>	<u>Remolded</u>
Test Date:	11-Nov-16	---
Field weight* of sample (g):	1006.38	
Tare weight, ring (g):	0.00	
Tare weight, pan/plate (g):	269.11	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	648.65	
Sample volume (cm ³):	338.83	
Assumed particle density (g/cm ³):	2.65	
<hr/>		
Gravimetric Moisture Content (% g/g):	13.7	
Volumetric Moisture Content (% vol):	26.2	
Dry bulk density (g/cm ³):	1.91	
Wet bulk density (g/cm ³):	2.18	
Calculated Porosity (% vol):	27.8	
Percent Saturation:	94.2	

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

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded



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

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: DG-2 (504-505)
Date Sampled: 9/13/2016
Depth (ft): 504'-505'

	<u>As Received</u>	<u>Remolded</u>
<i>Test Date:</i>	11-Nov-16	---
<i>Field weight* of sample (g):</i>	1069.58	
<i>Tare weight, ring (g):</i>	0.00	
<i>Tare weight, pan/plate (g):</i>	270.24	
<i>Tare weight, other (g):</i>	0.00	
<i>Dry weight of sample (g):</i>	690.76	
<i>Sample volume (cm³):</i>	374.65	
<i>Assumed particle density (g/cm³):</i>	2.65	

<i>Gravimetric Moisture Content (% g/g):</i>	15.7
<i>Volumetric Moisture Content (% vol):</i>	29.0
<i>Dry bulk density (g/cm³):</i>	1.84
<i>Wet bulk density (g/cm³):</i>	2.13
<i>Calculated Porosity (% vol):</i>	30.4
<i>Percent Saturation:</i>	95.3

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

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded



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

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: DG-3 (524-525)
Date Sampled: 9/20/2016
Depth (ft): 524'-525'

	<u>As Received</u>	<u>Remolded</u>
<i>Test Date:</i>	11-Nov-16	---
<i>Field weight* of sample (g):</i>	917.37	
<i>Tare weight, ring (g):</i>	0.00	
<i>Tare weight, pan/plate (g):</i>	292.65	
<i>Tare weight, other (g):</i>	0.00	
<i>Dry weight of sample (g):</i>	538.21	
<i>Sample volume (cm³):</i>	299.55	
<i>Assumed particle density (g/cm³):</i>	2.65	
<hr/>		
<i>Gravimetric Moisture Content (% g/g):</i>	16.1	
<i>Volumetric Moisture Content (% vol):</i>	28.9	
<i>Dry bulk density (g/cm³):</i>	1.80	
<i>Wet bulk density (g/cm³):</i>	2.09	
<i>Calculated Porosity (% vol):</i>	32.2	
<i>Percent Saturation:</i>	89.7	

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

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded



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

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: DG-3 (551-551.7)
Date Sampled: 9/20/2016
Depth (ft): 551'-551.7'

	<u>As Received</u>	<u>Remolded</u>
<i>Test Date:</i>	11-Nov-16	---
<i>Field weight* of sample (g):</i>	857.91	
<i>Tare weight, ring (g):</i>	0.00	
<i>Tare weight, pan/plate (g):</i>	268.52	
<i>Tare weight, other (g):</i>	0.00	
<i>Dry weight of sample (g):</i>	522.12	
<i>Sample volume (cm³):</i>	282.48	
<i>Assumed particle density (g/cm³):</i>	2.65	

<i>Gravimetric Moisture Content (% g/g):</i>	12.9
<i>Volumetric Moisture Content (% vol):</i>	23.8
<i>Dry bulk density (g/cm³):</i>	1.85
<i>Wet bulk density (g/cm³):</i>	2.09
<i>Calculated Porosity (% vol):</i>	30.3
<i>Percent Saturation:</i>	78.7

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

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Effective Porosity



Summary of Moisture Retention (Effective Porosity)

Sample Number	Calculated Total Porosity (%, cm ³ /cm ³)	-15 Bar Point Volumetric Water Content ¹ (%, cm ³ /cm ³)	Effective Porosity (%, cm ³ /cm ³)	Oversize Corrected		
				Calculated Total Porosity (%, cm ³ /cm ³)	-15 Bar Point Volumetric Water Content (%, cm ³ /cm ³)	Effective Porosity (%, cm ³ /cm ³)
ST-3 (477-478)	28.7	4.0	24.6	NA	NA	NA
ST-4 (496-497)	33.2	4.7	28.5	NA	NA	NA
ST-5 (501-502)	25.3	5.9	19.4	NA	NA	NA
ST-5 (503-503.5)	4.1	4.1	0.0	NA	NA	NA
DG-2 (482-483)	27.8	5.2	22.5	NA	NA	NA
DG-2 (504-505)	30.4	8.8	21.7	NA	NA	NA
DG-3 (524-525)	32.2	5.8	26.4	NA	NA	NA
DG-3 (551-551.7)	30.3	3.4	26.8	NA	NA	NA

1 = Volume adjusted, if applicable

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not applicable

NR = Not requested



Moisture Retention Data

Dew Point Potentiometer

(Effective Porosity)

Job Name: Power Resources, Inc.
 Job Number: NM16.0192.00
 Sample Number: ST-3 (477-478)
 Date Sampled: 8/24/2016
 Depth (ft): 477'-478'

Initial sample calculated total porosity (cm^3): 28.7
 Assumed particle density (g/cm^3): 2.65
 Initial sample bulk density (g/cm^3): 1.89
 Fraction of bulk sample used (<2.00mm fraction) (%): 91.86

Dry weight* of dew point potentiometer sample (g): 172.49
 Tare weight, jar (g): 116.42

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content [†] (% vol)
Dew point potentiometer:	2-Dec-16	8:55	173.80	14787	4.06
	1-Dec-16	10:45	173.71	19988	3.78

Volume Adjusted Data¹

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change ² (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Dew point potentiometer:	14787	---	---	---	---
	19988	---	---	---	---

Moisture content at -15 bars ($\% \text{ cm}^3/\text{cm}^3$): 4.0

Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): 24.6
Oversize Corrected Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): NA

Comments:

¹ Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent the volume change measurements obtained after the pressure plate point. "----" indicates no volume changes occurred.

² Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '----' denotes no volume change occurred.

* Weight including tares

[†] Adjusted for >2.00mm (#10 sieve) material not used in DPP testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is $1.0 \text{ g}/\text{cm}^3$.

[‡] Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

NA Not Applicable

Laboratory analysis by: D. O'Dowd
 Data entered by: S. Devine
 Checked by: J. Hines
 Attachment C-3



Moisture Retention Data

Dew Point Potentiometer

(Effective Porosity)

Job Name: Power Resources, Inc.

Job Number: NM16.0192.00

Sample Number: ST-4 (496-497)

Date Sampled: 8/30/2016

Depth (ft): 496'-497'

Initial sample calculated total porosity (cm^3): 33.2

Assumed particle density (g/cm^3): 2.65

Initial sample bulk density (g/cm^3): 1.77

Fraction of bulk sample used (<2.00mm fraction) (%): 100.00

Dry weight* of dew point potentiometer sample (g): 166.71

Tare weight, jar (g): 114.09

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content [†] (% vol)	
Dew point potentiometer:	1-Dec-16	10:55	168.13	13767	4.78	##
	2-Dec-16	8:57	168.09	17337	4.64	##

Volume Adjusted Data¹

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change ² (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Dew point potentiometer:	13767	---	---	---	---
	17337	---	---	---	---

Moisture content at -15 bars ($\% \text{ cm}^3/\text{cm}^3$): 4.7

Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): 28.5

Oversize Corrected Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): NA

Comments:

¹ Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent the volume change measurements obtained after the pressure plate point. "----" indicates no volume changes occurred.

² Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '----' denotes no volume change occurred.

* Weight including tares

† Adjusted for >2.00mm (#10 sieve) material not used in DPP testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is 1.0 g/cm^3 .

Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

NA Not Applicable

Laboratory analysis by: D. O'Dowd

Data entered by: S. Devine

Checked by: J. Hines
Attachment C-3



Moisture Retention Data

Dew Point Potentiometer

(Effective Porosity)

Job Name: Power Resources, Inc.

Job Number: NM16.0192.00

Sample Number: ST-5 (501-502)

Date Sampled: 8/23/2016

Depth (ft): 501'-502'

Initial sample calculated total porosity (cm^3): 25.3

Assumed particle density (g/cm^3): 2.65

Initial sample bulk density (g/cm^3): 1.98

Fraction of bulk sample used (<2.00mm fraction) (%): 83.21

Dry weight* of dew point potentiometer sample (g): 180.02

Tare weight, jar (g): 117.64

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content [†] (% vol)	
Dew point potentiometer:	2-Dec-16	9:12	182.27	15093	5.94	##
	1-Dec-16	11:06	182.22	16623	5.81	##

Volume Adjusted Data¹

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change ² (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Dew point potentiometer:	15093	---	---	---	---
	16623	---	---	---	---

Moisture content at -15 bars ($\% \text{ cm}^3/\text{cm}^3$): 5.9

Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): 19.4

Oversize Corrected Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): NA

Comments:

¹ Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent the volume change measurements obtained after the pressure plate point. "----" indicates no volume changes occurred.

² Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '----' denotes no volume change occurred.

* Weight including tares

† Adjusted for >2.00mm (#10 sieve) material not used in DPP testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is $1.0 \text{ g}/\text{cm}^3$.

Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

NA Not Applicable

Laboratory analysis by: D. O'Dowd

Data entered by: S. Devine

Checked by: J. Hines
Attachment C-3



Moisture Retention Data

Dew Point Potentiometer

(Effective Porosity)

Job Name: Power Resources, Inc.
 Job Number: NM16.0192.00
 Sample Number: ST-5 (503-503.5)
 Date Sampled: 8/23/2016
 Depth (ft): 503'-503.5'

Initial sample calculated total porosity (cm^3): 4.1
 Assumed particle density (g/cm^3): 2.65
 Initial sample bulk density (g/cm^3): 2.54
 Fraction of bulk sample used (<2.00mm fraction) (%): 86.69

Dry weight* of dew point potentiometer sample (g): 178.11
 Tare weight, jar (g): 112.65

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content [†] (% vol)	
Dew point potentiometer:	2-Dec-16	9:17	179.37	13869	4.24	##
	1-Dec-16	11:10	179.32	16419	4.07	##

Volume Adjusted Data¹

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change ² (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Dew point potentiometer:	13869	---	---	---	---
	16419	---	---	---	---

Moisture content at -15 bars ($\% \text{ cm}^3/\text{cm}^3$): 4.1

Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): 0.0

Oversize Corrected Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): NA

Comments:

¹ Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent the volume change measurements obtained after the pressure plate point. "----" indicates no volume changes occurred.

² Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '----' denotes no volume change occurred.

* Weight including tares

[†] Adjusted for >2.00mm (#10 sieve) material not used in DPP testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is 1.0 g/cm^3 .

Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

NA Not Applicable

Laboratory analysis by: D. O'Dowd

Data entered by: S. Devine

Checked by: J. Hines
 Attachment C-3



Moisture Retention Data

Dew Point Potentiometer

(Effective Porosity)

Job Name: Power Resources, Inc.

Job Number: NM16.0192.00

Sample Number: DG-2 (482-483)

Date Sampled: 9/12/2016

Depth (ft): 482'-483'

Initial sample calculated total porosity (cm^3): 27.8

Assumed particle density (g/cm^3): 2.65

Initial sample bulk density (g/cm^3): 1.91

Fraction of bulk sample used (<2.00mm fraction) (%): 96.77

Dry weight* of dew point potentiometer sample (g): 173.64

Tare weight, jar (g): 115.71

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content [†] (% vol)	
Dew point potentiometer:	2-Dec-16	8:23	175.32	12748	5.37	##
	1-Dec-16	10:13	175.22	18152	5.05	##

Volume Adjusted Data¹

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change ² (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Dew point potentiometer:	12748	---	---	---	---
	18152	---	---	---	---

Moisture content at -15 bars ($\% \text{ cm}^3/\text{cm}^3$): 5.2

Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): 22.5

Oversize Corrected Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): NA

Comments:

¹ Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent the volume change measurements obtained after the pressure plate point. "----" indicates no volume changes occurred.

² Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '----' denotes no volume change occurred.

* Weight including tares

[†] Adjusted for >2.00mm (#10 sieve) material not used in DPP testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is 1.0 g/cm^3 .

Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

NA Not Applicable

Laboratory analysis by: D. O'Dowd

Data entered by: S. Devine

Checked by: J. Hines
Attachment C-3



Moisture Retention Data

Dew Point Potentiometer

(Effective Porosity)

Job Name: Power Resources, Inc.
 Job Number: NM16.0192.00
 Sample Number: DG-2 (504-505)
 Date Sampled: 9/13/2016
 Depth (ft): 504'-505'

Initial sample calculated total porosity (cm^3): 30.4
 Assumed particle density (g/cm^3): 2.65
 Initial sample bulk density (g/cm^3): 1.84
 Fraction of bulk sample used (<2.00mm fraction) (%): 100.00

Dry weight* of dew point potentiometer sample (g): 161.39
 Tare weight, jar (g): 116.71

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content [†] (% vol)	
Dew point potentiometer:	2-Dec-16	8:34	163.52	14991	8.79	##
	1-Dec-16	10:30	163.41	20294	8.34	##

Volume Adjusted Data¹

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change ² (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Dew point potentiometer:	14991	---	---	---	---
	20294	---	---	---	---

Moisture content at -15 bars ($\% \text{ cm}^3/\text{cm}^3$): 8.8

Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): 21.7

Oversize Corrected Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): NA

Comments:

¹ Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent the volume change measurements obtained after the pressure plate point. "----" indicates no volume changes occurred.

² Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '----' denotes no volume change occurred.

* Weight including tares

† Adjusted for >2.00mm (#10 sieve) material not used in DPP testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is $1.0 \text{ g}/\text{cm}^3$.

Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

NA Not Applicable

Laboratory analysis by: D. O'Dowd

Data entered by: S. Devine

Checked by: J. Hines
 Attachment C-3



Moisture Retention Data

Dew Point Potentiometer

(Effective Porosity)

Job Name: Power Resources, Inc.
 Job Number: NM16.0192.00
 Sample Number: DG-3 (524-525)
 Date Sampled: 9/20/2016
 Depth (ft): 524'-525'

Initial sample calculated total porosity (cm^3): 32.2
 Assumed particle density (g/cm^3): 2.65
 Initial sample bulk density (g/cm^3): 1.80
 Fraction of bulk sample used (<2.00mm fraction) (%): 99.95

Dry weight* of dew point potentiometer sample (g): 167.97
 Tare weight, jar (g): 112.74

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content [†] (% vol)	
Dew point potentiometer:	2-Dec-16	8:40	169.77	14991	5.85	##
	1-Dec-16	10:42	169.66	18356	5.50	##

Volume Adjusted Data¹

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change ² (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Dew point potentiometer:	14991	---	---	---	---
	18356	---	---	---	---

Moisture content at -15 bars ($\% \text{ cm}^3/\text{cm}^3$): 5.8

Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): 26.4
Oversize Corrected Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): NA

Comments:

¹ Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent the volume change measurements obtained after the pressure plate point. "----" indicates no volume changes occurred.

² Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '----' denotes no volume change occurred.

* Weight including tares

[†] Adjusted for >2.00mm (#10 sieve) material not used in DPP testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is 1.0 g/cm^3 .

Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

NA Not Applicable

Laboratory analysis by: D. O'Dowd
 Data entered by: S. Devine
 Checked by: J. Hines
 Attachment C-3



Moisture Retention Data

Dew Point Potentiometer

(Effective Porosity)

Job Name: Power Resources, Inc.

Job Number: NM16.0192.00

Sample Number: DG-3 (551-551.7)

Date Sampled: 9/20/2016

Depth (ft): 551'-551.7'

Initial sample calculated total porosity (cm^3): 30.3

Assumed particle density (g/cm^3): 2.65

Initial sample bulk density (g/cm^3): 1.85

Fraction of bulk sample used (<2.00mm fraction) (%): 95.46

Dry weight* of dew point potentiometer sample (g): 174.03

Tare weight, jar (g): 115.64

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content [†] (% vol)	
Dew point potentiometer:	1-Dec-16	11:17	175.17	15093	3.44	##
	2-Dec-16	8:47	175.14	17439	3.35	##

Volume Adjusted Data¹

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change ² (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Dew point potentiometer:	15093	---	---	---	---
	17439	---	---	---	---

Moisture content at -15 bars ($\% \text{ cm}^3/\text{cm}^3$): 3.4

Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): 26.8

Oversize Corrected Effective Porosity ($\% \text{ cm}^3/\text{cm}^3$): NA

Comments:

¹ Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent the volume change measurements obtained after the pressure plate point. "----" indicates no volume changes occurred.

² Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '----' denotes no volume change occurred.

* Weight including tares

[†] Adjusted for >2.00mm (#10 sieve) material not used in DPP testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is $1.0 \text{ g}/\text{cm}^3$.

Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

NA Not Applicable

Laboratory analysis by: D. O'Dowd

Data entered by: S. Devine

Checked by: J. Hines
Attachment C-3

Particle Size Analysis



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
ST-3 (477-478)	0.13	0.77	1.0	7.7	1.00	WS/H	Poorly-graded sand (SP)	Sand
ST-4 (496-497)	0.13	0.39	0.46	3.5	1.3	WS/H	Poorly-graded sand (SP)	Sand
ST-5 (501-502)	0.23	1.2	1.4	6.1	2.7	WS/H	Well-graded sand (SW)	Sand [†]
ST-5 (503-503.5)	0.099	0.98	1.2	12	2.0	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand [†]
DG-2 (482-483)	0.12	0.98	1.1	9.2	1.3	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand
DG-2 (504-505)	0.13	0.40	0.48	3.7	1.3	WS/H	Poorly-graded sand (SP)	Sand
DG-3 (524-525)	0.12	0.33	0.39	3.3	1.1	WS/H	Poorly-graded sand (SP)	Sand
DG-3 (551-551.7)	0.18	1.1	1.3	7.2	3.0	WS/H	Poorly-graded sand (SP)	Sand

d₅₀ = Median particle diameter

Est = Reported values for d₁₀, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d₁₀ 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



Percent Gravel, Sand, Silt and Clay*

Sample Number	% Gravel (>4.75mm)	% Sand (<4.75mm, >0.075mm)	% Silt (<0.075mm, >0.002mm)	% Clay (<0.002mm)
ST-3 (477-478)	0.0	95.4	4.3	0.3
ST-4 (496-497)	0.0	95.3	4.4	0.3
ST-5 (501-502)	1.1	95.8	2.8	0.2
ST-5 (503-503.5)	0.1	91.6	7.6	0.7
DG-2 (482-483)	0.0	93.5	6.1	0.3
DG-2 (504-505)	0.0	95.8	3.9	0.3
DG-3 (524-525)	0.0	95.7	4.0	0.3
DG-3 (551-551.7)	0.0	95.8	3.9	0.3

*USCS classification does not classify clay fraction based on particle size. USDA definition of clay (<0.002mm) used in this table.



Particle Size Analysis Wet Sieve Data (#10 Split)

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: ST-3 (477-478)
Date Sampled: 8/24/2016
Depth (ft): 477'-478'
Test Date: 6-Dec-16

Initial Dry Weight of Sample (g): 605.53
Weight Passing #10 (g): 556.26
Weight Retained #10 (g): 49.27
Weight of Hydrometer Sample (g): 100.26
Calculated Weight of Sieve Sample (g): 109.14

Shape: Angular
Hardness: Weathered and friable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10	3"	75	0.00	0.00	605.53	100.00
	2"	50	0.00	0.00	605.53	100.00
	1.5"	38.1	0.00	0.00	605.53	100.00
	1"	25	0.00	0.00	605.53	100.00
	3/4"	19.0	0.00	0.00	605.53	100.00
	3/8"	9.5	0.00	0.00	605.53	100.00
	4	4.75	0.12	0.12	605.41	99.98
	10	2.00	49.15	49.27	556.26	91.86
-10	(Based on calculated sieve wt.)					
	20	0.85	42.76	51.64	57.50	52.68
	40	0.425	20.34	71.98	37.16	34.05
	60	0.250	15.30	87.28	21.86	20.03
	140	0.106	14.71	101.99	7.15	6.55
	200	0.075	2.15	104.14	5.00	4.58
	dry pan		0.90	105.04	4.10	
	wet pan			4.10	0.00	

d₁₀ (mm): 0.13 d₅₀ (mm): 0.77
d₁₆ (mm): 0.19 d₆₀ (mm): 1.00
d₃₀ (mm): 0.36 d₈₄ (mm): 1.7

Median Particle Diameter--d₅₀ (mm): 0.77
Uniformity Coefficient, Cu--[d₆₀/d₁₀] (mm): 7.7
Coefficient of Curvature, Cc--[(d₃₀)²/(d₁₀*d₆₀)] (mm): 1.00
Mean Particle Diameter--[d₁₆+d₅₀+d₈₄]/3] (mm): 0.89

ASTM Soil Classification: Poorly-graded sand (SP)
USDA Soil Classification: Sand

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



Daniel B. Stephens & Associates, Inc.

Particle Size Analysis Hydrometer Data

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: ST-3 (477-478)
Date Sampled: 8/24/2016
Depth (ft): 477'-478'
Test Date: 1-Dec-16
Start Time: 8:54

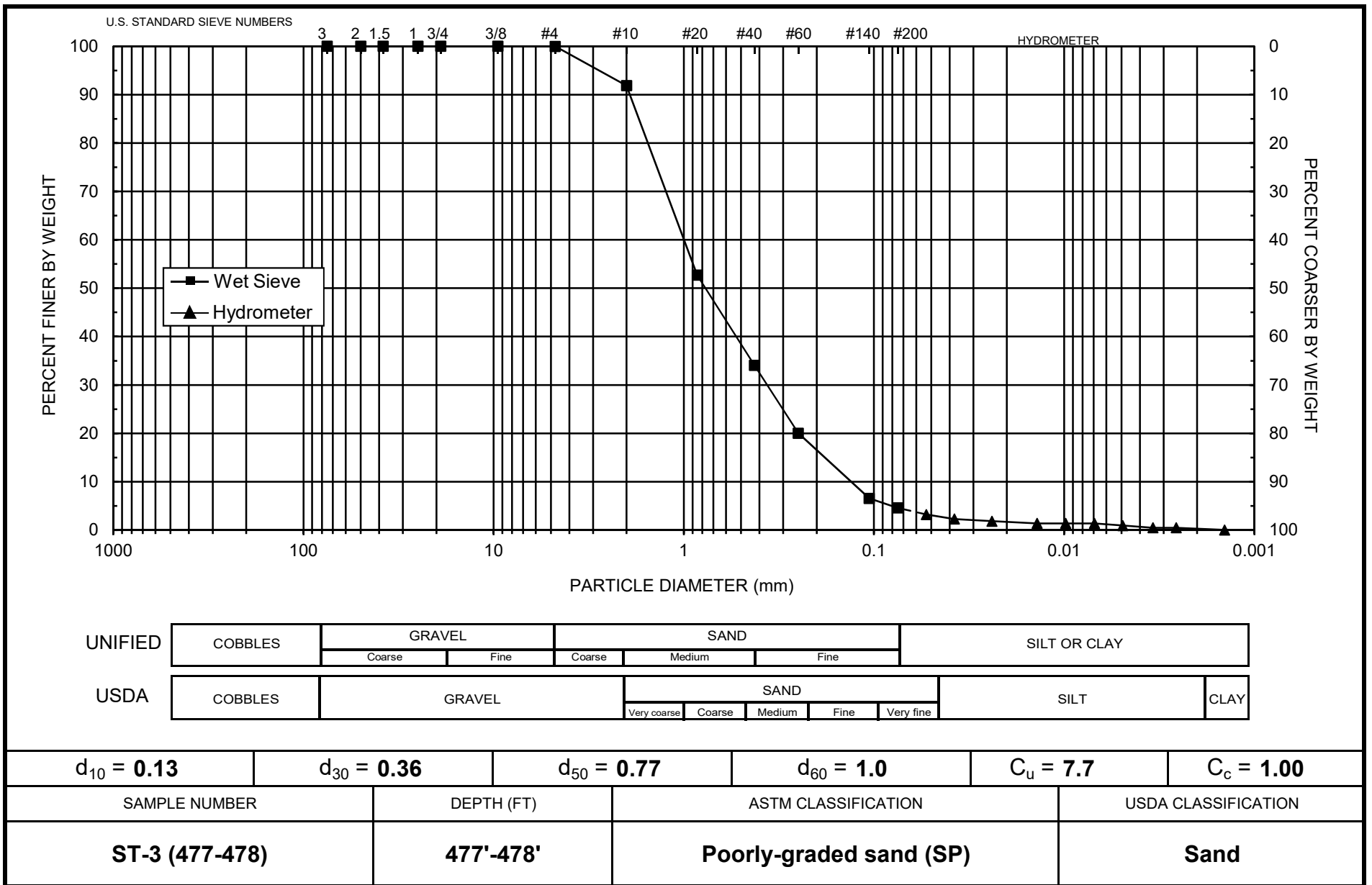
Type of Water Used: DISTILLED
Reaction with H_2O_2 : NA
Dispersant*: $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g): 100.26
Total Sample Wt. (g): 605.53
Wt. Passing #10 (g): 556.26

Date	Time (min)	Temp (°C)	R (g/L)	R _L (g/L)	R _{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
1-Dec-16	1	19.0	9.0	5.5	3.5	14.8	0.05315	3.5	3.2
	2	19.0	8.0	5.5	2.5	15.0	0.03779	2.5	2.3
	5	19.0	7.5	5.5	2.0	15.1	0.02397	2.0	1.8
	15	19.0	7.0	5.5	1.5	15.2	0.01387	1.5	1.4
	30	19.0	7.0	5.5	1.5	15.2	0.00981	1.5	1.4
	60	19.1	7.0	5.5	1.5	15.2	0.00693	1.5	1.4
	120	19.1	6.5	5.5	1.0	15.2	0.00491	1.0	0.9
	250	19.1	6.0	5.5	0.5	15.3	0.00341	0.5	0.5
	439	19.1	6.0	5.5	0.5	15.3	0.00258	0.5	0.5
2-Dec-16	1420	19.3	5.5	5.5	0.0	15.4	0.00143	0.0	0.0

Comments:

* Dispersion device: mechanically operated stirring device

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



Daniel B. Stephens & Associates, Inc.



Particle Size Analysis Wet Sieve Data (#10 Split)

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: ST-4 (496-497)
Date Sampled: 8/30/2016
Depth (ft): 496'-497'
Test Date: 6-Dec-16

Initial Dry Weight of Sample (g): 544.89
Weight Passing #10 (g): 544.89
Weight Retained #10 (g): 0.00
Weight of Hydrometer Sample (g): 93.52
Calculated Weight of Sieve Sample (g): 93.52

Shape: Rounded
Hardness: Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10	3"	75	0.00	0.00	544.89	100.00
	2"	50	0.00	0.00	544.89	100.00
	1.5"	38.1	0.00	0.00	544.89	100.00
	1"	25	0.00	0.00	544.89	100.00
	3/4"	19.0	0.00	0.00	544.89	100.00
	3/8"	9.5	0.00	0.00	544.89	100.00
	4	4.75	0.00	0.00	544.89	100.00
	10	2.00	0.00	0.00	544.89	100.00
-10	(Based on calculated sieve wt.)					
	20	0.85	2.76	2.76	90.76	97.05
	40	0.425	39.00	41.76	51.76	55.35
	60	0.250	31.15	72.91	20.61	22.04
	140	0.106	14.47	87.38	6.14	6.57
	200	0.075	1.71	89.09	4.43	4.74
	dry pan		0.62	89.71	3.81	
	wet pan			3.81	0.00	

d₁₀ (mm): 0.13 d₅₀ (mm): 0.39
d₁₆ (mm): 0.18 d₆₀ (mm): 0.46
d₃₀ (mm): 0.28 d₈₄ (mm): 0.68

Median Particle Diameter--d₅₀ (mm): 0.39
Uniformity Coefficient, Cu--[d₆₀/d₁₀] (mm): 3.5
Coefficient of Curvature, Cc--[(d₃₀)²/(d₁₀*d₆₀)] (mm): 1.3
Mean Particle Diameter--[(d₁₆+d₅₀+d₈₄)/3] (mm): 0.42

ASTM Soil Classification: Poorly-graded sand (SP)
USDA Soil Classification: Sand

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



Daniel B. Stephens & Associates, Inc.

Particle Size Analysis Hydrometer Data

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: ST-4 (496-497)
Date Sampled: 8/30/2016
Depth (ft): 496'-497'
Test Date: 1-Dec-16
Start Time: 9:00

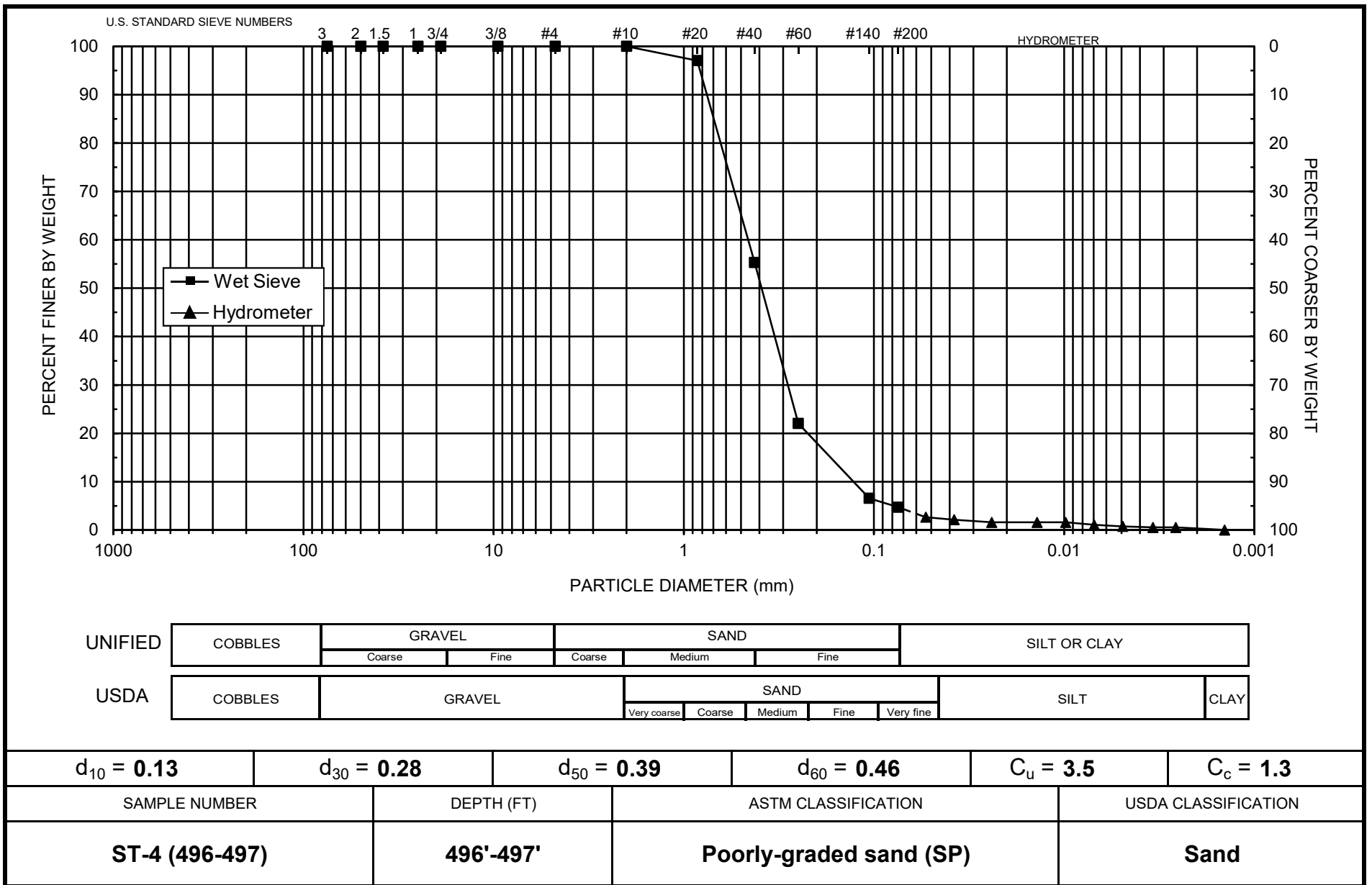
Type of Water Used: DISTILLED
Reaction with H_2O_2 : NA
Dispersant*: $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g): 93.52
Total Sample Wt. (g): 544.89
Wt. Passing #10 (g): 544.89

Date	Time (min)	Temp (°C)	R (g/L)	R _L (g/L)	R _{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
1-Dec-16	1	19.0	8.0	5.5	2.5	15.0	0.05344	2.7	2.7
	2	19.0	7.5	5.5	2.0	15.1	0.03789	2.1	2.1
	5	19.0	7.0	5.5	1.5	15.2	0.02403	1.6	1.6
	15	19.0	7.0	5.5	1.5	15.2	0.01387	1.6	1.6
	30	19.0	7.0	5.5	1.5	15.2	0.00981	1.6	1.6
	60	19.1	6.5	5.5	1.0	15.2	0.00695	1.1	1.1
	120	19.1	6.2	5.5	0.7	15.3	0.00492	0.8	0.8
	250	19.1	6.0	5.5	0.5	15.3	0.00341	0.5	0.5
	435	19.1	6.0	5.5	0.5	15.3	0.00259	0.5	0.5
2-Dec-16	1415	19.3	5.5	5.5	0.0	15.4	0.00143	0.0	0.0

Comments:

* Dispersion device: mechanically operated stirring device

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



Daniel B. Stephens & Associates, Inc.



Particle Size Analysis Wet Sieve Data (#10 Split)

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: ST-5 (501-502)
Date Sampled: 8/23/2016
Depth (ft): 501'-502'
Test Date: 6-Dec-16

Initial Dry Weight of Sample (g): 663.57
Weight Passing #10 (g): 552.15
Weight Retained #10 (g): 111.42
Weight of Hydrometer Sample (g): 100.44
Calculated Weight of Sieve Sample (g): 120.71

Shape: Angular
Hardness: Weathered and friable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10	3"	75	0.00	0.00	663.57	100.00
	2"	50	0.00	0.00	663.57	100.00
	1.5"	38.1	0.00	0.00	663.57	100.00
	1"	25	0.00	0.00	663.57	100.00
	3/4"	19.0	0.00	0.00	663.57	100.00
	3/8"	9.5	0.00	0.00	663.57	100.00
	4	4.75	7.47	7.47	656.10	98.87
	10	2.00	103.95	111.42	552.15	83.21
-10	(Based on calculated sieve wt.)					
	20	0.85	72.89	93.16	27.55	22.82
	40	0.425	11.05	104.21	16.50	13.67
	60	0.250	3.70	107.91	12.80	10.60
	140	0.106	8.00	115.91	4.80	3.98
	200	0.075	1.08	116.99	3.72	3.08
	dry pan		0.46	117.45	3.26	
	wet pan			3.26	0.00	

d₁₀ (mm): 0.23 d₅₀ (mm): 1.2
d₁₆ (mm): 0.51 d₆₀ (mm): 1.4
d₃₀ (mm): 0.94 d₈₄ (mm): 2.1

Median Particle Diameter--d₅₀ (mm): 1.2
Uniformity Coefficient, Cu--[d₆₀/d₁₀] (mm): 6.1
Coefficient of Curvature, Cc--[(d₃₀)²/(d₁₀*d₆₀)] (mm): 2.7
Mean Particle Diameter--[(d₁₆+d₅₀+d₈₄)/3] (mm): 1.3

ASTM Soil Classification: Well-graded sand (SW)
USDA Soil Classification: Sand [†]

[†] Greater than 10% of sample is coarse material

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



Daniel B. Stephens & Associates, Inc.

Particle Size Analysis Hydrometer Data

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: ST-5 (501-502)
Date Sampled: 8/23/2016
Depth (ft): 501'-502'
Test Date: 1-Dec-16
Start Time: 9:06

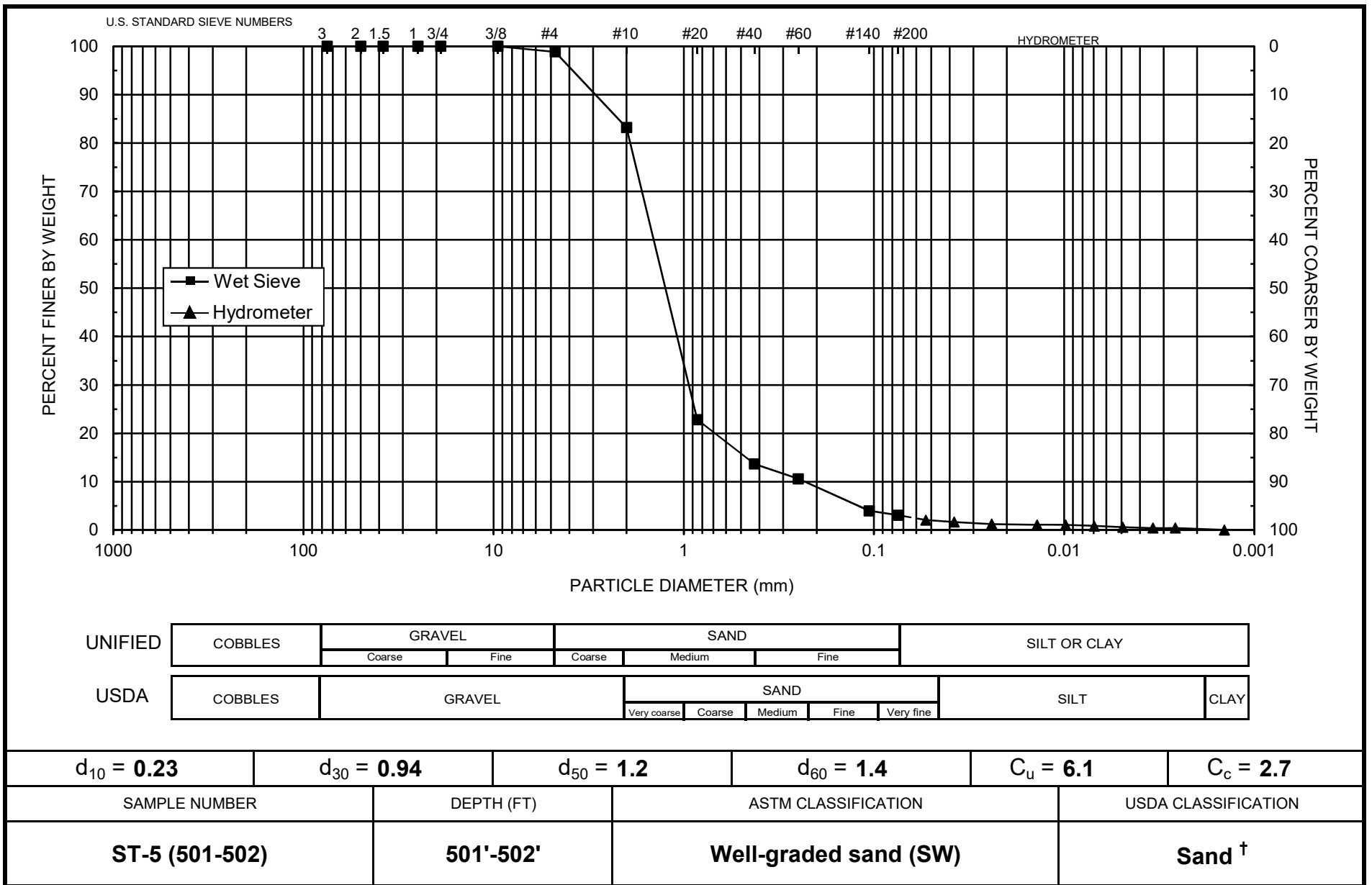
Type of Water Used: DISTILLED
Reaction with H_2O_2 : NA
Dispersant*: $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g): 100.44
Total Sample Wt. (g): 663.57
Wt. Passing #10 (g): 552.15

Date	Time (min)	Temp (°C)	R (g/L)	R _L (g/L)	R _{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
1-Dec-16	1	19.0	8.0	5.5	2.5	15.0	0.05344	2.5	2.1
	2	19.0	7.5	5.5	2.0	15.1	0.03789	2.0	1.7
	5	19.0	7.0	5.5	1.5	15.2	0.02403	1.5	1.2
	15	19.0	6.8	5.5	1.3	15.2	0.01389	1.3	1.1
	30	19.0	6.8	5.5	1.3	15.2	0.00982	1.3	1.1
	60	19.1	6.5	5.5	1.0	15.2	0.00695	1.0	0.8
	120	19.1	6.2	5.5	0.7	15.3	0.00492	0.7	0.6
	250	19.1	6.0	5.5	0.5	15.3	0.00341	0.5	0.4
	430	19.1	6.0	5.5	0.5	15.3	0.00260	0.5	0.4
2-Dec-16	1411	19.3	5.5	5.5	0.0	15.4	0.00144	0.0	0.0

Comments:

* Dispersion device: mechanically operated stirring device

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



[†] Greater than 10% of sample is coarse material



Daniel B. Stephens & Associates, Inc.



Particle Size Analysis Wet Sieve Data (#10 Split)

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: ST-5 (503-503.5)
Date Sampled: 8/23/2016
Depth (ft): 503'-503.5'
Test Date: 6-Dec-16

Initial Dry Weight of Sample (g): 790.82
Weight Passing #10 (g): 685.58
Weight Retained #10 (g): 105.24
Weight of Hydrometer Sample (g): 100.20
Calculated Weight of Sieve Sample (g): 115.58

Shape: Angular
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10	3"	75	0.00	0.00	790.82	100.00
	2"	50	0.00	0.00	790.82	100.00
	1.5"	38.1	0.00	0.00	790.82	100.00
	1"	25	0.00	0.00	790.82	100.00
	3/4"	19.0	0.00	0.00	790.82	100.00
	3/8"	9.5	0.00	0.00	790.82	100.00
	4	4.75	0.74	0.74	790.08	99.91
	10	2.00	104.50	105.24	685.58	86.69
-10	(Based on calculated sieve wt.)					
	20	0.85	51.02	66.40	49.18	42.55
	40	0.425	18.48	84.88	30.70	26.56
	60	0.250	9.00	93.88	21.70	18.77
	140	0.106	9.64	103.52	12.06	10.43
	200	0.075	2.46	105.98	9.60	8.31
	dry pan		0.76	106.74	8.84	
	wet pan			8.84	0.00	

d₁₀ (mm): 0.099 d₅₀ (mm): 0.98
d₁₆ (mm): 0.19 d₆₀ (mm): 1.2
d₃₀ (mm): 0.49 d₈₄ (mm): 1.9

Median Particle Diameter--d₅₀ (mm): 0.98
Uniformity Coefficient, Cu--[d₆₀/d₁₀] (mm): 12
Coefficient of Curvature, Cc--[d₃₀²/(d₁₀*d₆₀)] (mm): 2.0
Mean Particle Diameter--[d₁₆+d₅₀+d₈₄]/3] (mm): 1.0

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: Sand [†]

[†] Greater than 10% of sample is coarse material

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



Daniel B. Stephens & Associates, Inc.

Particle Size Analysis Hydrometer Data

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: ST-5 (503-503.5)
Date Sampled: 8/23/2016
Depth (ft): 503'-503.5'
Test Date: 1-Dec-16
Start Time: 9:12

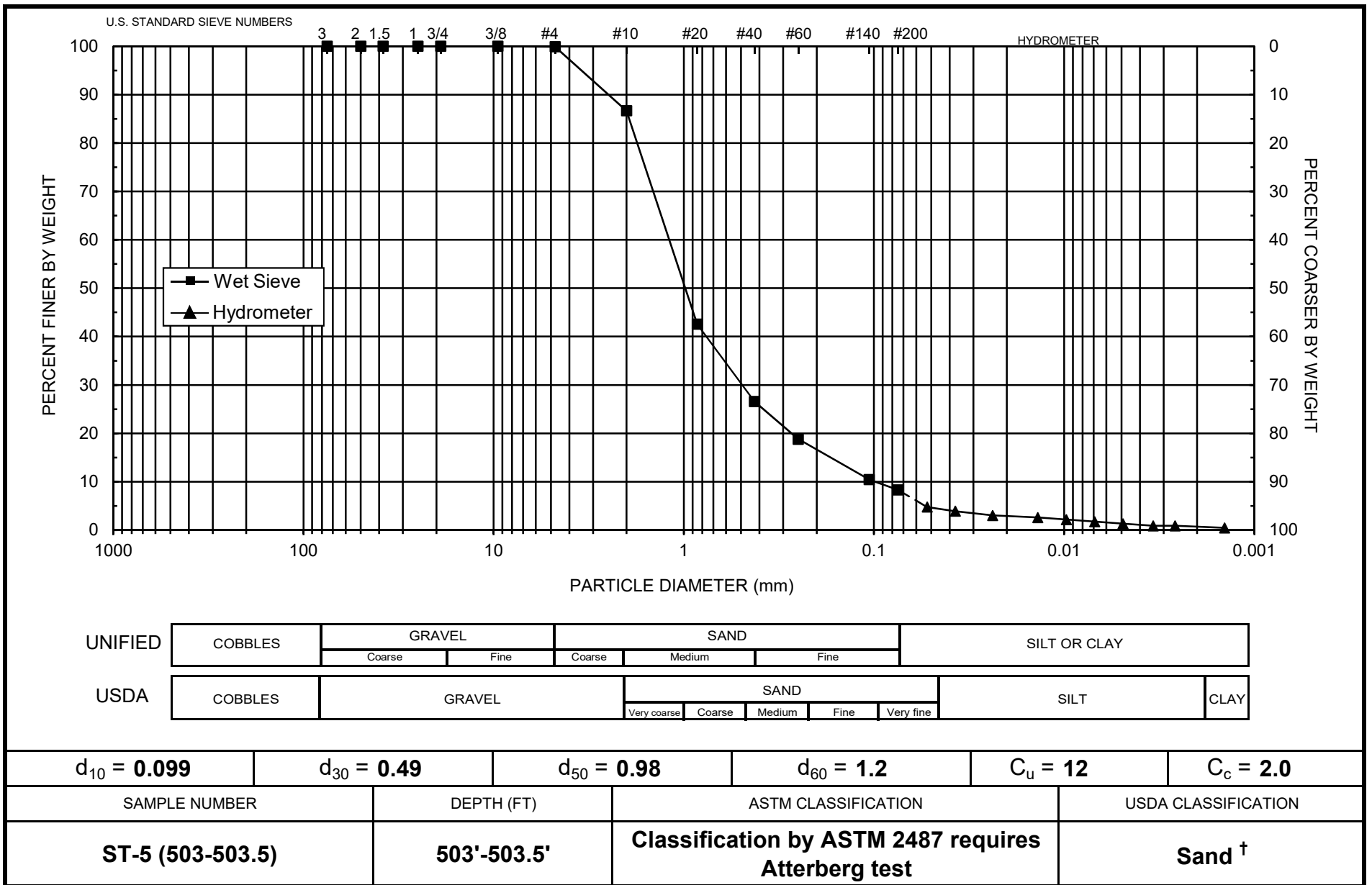
Type of Water Used: DISTILLED
Reaction with H_2O_2 : NA
Dispersant*: $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g): 100.20
Total Sample Wt. (g): 790.82
Wt. Passing #10 (g): 685.58

Date	Time (min)	Temp (°C)	R (g/L)	R _L (g/L)	R _{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
1-Dec-16	1	19.0	11.0	5.5	5.5	14.5	0.05256	5.5	4.8
	2	19.0	10.0	5.5	4.5	14.7	0.03737	4.5	3.9
	5	19.0	9.0	5.5	3.5	14.8	0.02377	3.5	3.0
	15	19.0	8.5	5.5	3.0	14.9	0.01376	3.0	2.6
	30	19.1	8.0	5.5	2.5	15.0	0.00975	2.5	2.2
	60	19.1	7.5	5.5	2.0	15.1	0.00691	2.0	1.7
	120	19.1	7.0	5.5	1.5	15.2	0.00490	1.5	1.3
	250	19.1	6.5	5.5	1.0	15.2	0.00340	1.0	0.9
	425	19.1	6.5	5.5	1.0	15.2	0.00261	1.0	0.9
2-Dec-16	1406	19.3	6.0	5.5	0.5	15.3	0.00144	0.5	0.4

Comments:

* Dispersion device: mechanically operated stirring device

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



[†] Greater than 10% of sample is coarse material



Daniel B. Stephens & Associates, Inc.



Particle Size Analysis Wet Sieve Data (#10 Split)

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: DG-2 (482-483)
Date Sampled: 9/12/2016
Depth (ft): 482'-483'
Test Date: 6-Dec-16

Initial Dry Weight of Sample (g): 650.47
Weight Passing #10 (g): 629.48
Weight Retained #10 (g): 20.99
Weight of Hydrometer Sample (g): 100.96
Calculated Weight of Sieve Sample (g): 104.33

Shape: Angular
Hardness: Weathered and friable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10	3"	75	0.00	0.00	650.47	100.00
	2"	50	0.00	0.00	650.47	100.00
	1.5"	38.1	0.00	0.00	650.47	100.00
	1"	25	0.00	0.00	650.47	100.00
	3/4"	19.0	0.00	0.00	650.47	100.00
	3/8"	9.5	0.00	0.00	650.47	100.00
	4	4.75	0.16	0.16	650.31	99.98
	10	2.00	20.83	20.99	629.48	96.77
-10	(Based on calculated sieve wt.)					
	20	0.85	58.73	62.10	42.23	40.48
	40	0.425	9.95	72.05	32.28	30.94
	60	0.250	11.34	83.39	20.94	20.07
	140	0.106	12.76	96.15	8.18	7.84
	200	0.075	1.47	97.62	6.71	6.43
	dry pan		0.89	98.51	5.82	
	wet pan			5.82	0.00	

d₁₀ (mm): 0.12 d₅₀ (mm): 0.98
d₁₆ (mm): 0.19 d₆₀ (mm): 1.1
d₃₀ (mm): 0.41 d₈₄ (mm): 1.6

Median Particle Diameter--d₅₀ (mm): 0.98
Uniformity Coefficient, Cu--[d₆₀/d₁₀] (mm): 9.2
Coefficient of Curvature, Cc--[d₃₀²/(d₁₀*d₆₀)] (mm): 1.3
Mean Particle Diameter--[d₁₆+d₅₀+d₈₄]/3] (mm): 0.92

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: Sand

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



Daniel B. Stephens & Associates, Inc.

Particle Size Analysis Hydrometer Data

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: DG-2 (482-483)
Date Sampled: 9/12/2016
Depth (ft): 482'-483'
Test Date: 1-Dec-16
Start Time: 8:30

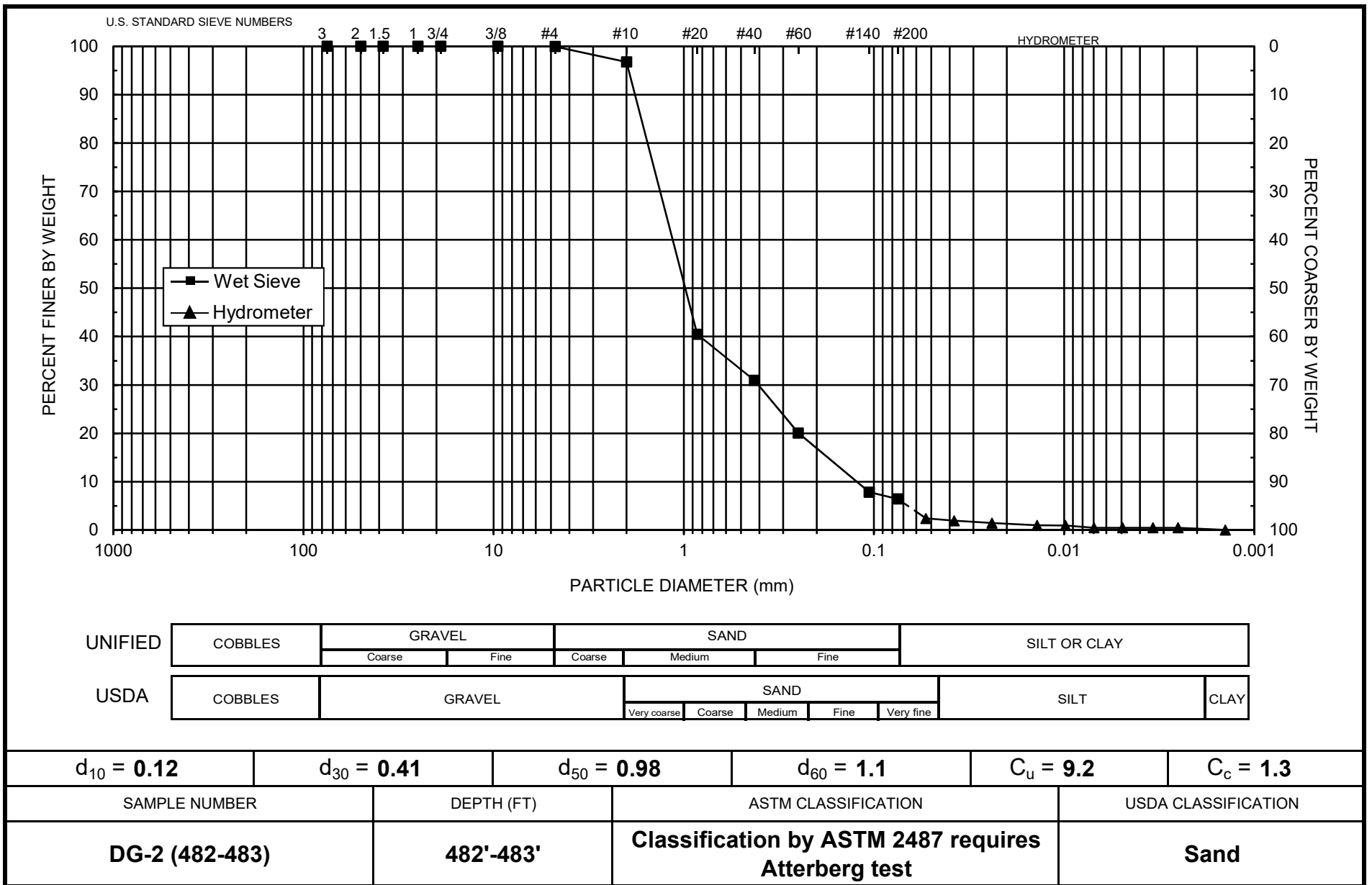
Type of Water Used: DISTILLED
Reaction with H_2O_2 : NA
Dispersant*: $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g): 100.96
Total Sample Wt. (g): 650.47
Wt. Passing #10 (g): 629.48

Date	Time (min)	Temp (°C)	R (g/L)	R _L (g/L)	R _{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
1-Dec-16	1	19.1	8.0	5.5	2.5	15.0	0.05338	2.5	2.4
	2	19.1	7.5	5.5	2.0	15.1	0.03785	2.0	1.9
	5	19.1	7.0	5.5	1.5	15.2	0.02400	1.5	1.4
	15	19.1	6.5	5.5	1.0	15.2	0.01389	1.0	1.0
	30	19.0	6.5	5.5	1.0	15.2	0.00984	1.0	1.0
	60	19.0	6.0	5.5	0.5	15.3	0.00697	0.5	0.5
	120	19.1	6.0	5.5	0.5	15.3	0.00493	0.5	0.5
	250	19.1	6.0	5.5	0.5	15.3	0.00341	0.5	0.5
	460	19.1	6.0	5.5	0.5	15.3	0.00252	0.5	0.5
2-Dec-16	1440	19.3	5.5	5.5	0.0	15.4	0.00142	0.0	0.0

Comments:

* Dispersion device: mechanically operated stirring device

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



Daniel B. Stephens & Associates, Inc.



Particle Size Analysis Wet Sieve Data (#10 Split)

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: DG-2 (504-505)
Date Sampled: 9/13/2016
Depth (ft): 504'-505'
Test Date: 6-Dec-16

Initial Dry Weight of Sample (g): 694.08
Weight Passing #10 (g): 694.08
Weight Retained #10 (g): 0.00
Weight of Hydrometer Sample (g): 99.79
Calculated Weight of Sieve Sample (g): 99.79

Shape: Rounded
Hardness: Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10	3"	75	0.00	0.00	694.08	100.00
	2"	50	0.00	0.00	694.08	100.00
	1.5"	38.1	0.00	0.00	694.08	100.00
	1"	25	0.00	0.00	694.08	100.00
	3/4"	19.0	0.00	0.00	694.08	100.00
	3/8"	9.5	0.00	0.00	694.08	100.00
	4	4.75	0.00	0.00	694.08	100.00
	10	2.00	0.00	0.00	694.08	100.00
-10	(Based on calculated sieve wt.)					
	20	0.85	8.81	8.81	90.98	91.17
	40	0.425	38.04	46.85	52.94	53.05
	60	0.250	31.53	78.38	21.41	21.46
	140	0.106	15.82	94.20	5.59	5.60
	200	0.075	1.41	95.61	4.18	4.19
	dry pan		0.28	95.89	3.90	
	wet pan			3.90	0.00	

d₁₀ (mm): 0.13 d₅₀ (mm): 0.40
d₁₆ (mm): 0.19 d₆₀ (mm): 0.48
d₃₀ (mm): 0.29 d₈₄ (mm): 0.75

Median Particle Diameter--d₅₀ (mm): 0.40
Uniformity Coefficient, Cu--[d₆₀/d₁₀] (mm): 3.7
Coefficient of Curvature, Cc--[(d₃₀)²/(d₁₀*d₆₀)] (mm): 1.3
Mean Particle Diameter--[(d₁₆+d₅₀+d₈₄)/3] (mm): 0.45

ASTM Soil Classification: Poorly-graded sand (SP)
USDA Soil Classification: Sand

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



Daniel B. Stephens & Associates, Inc.

Particle Size Analysis Hydrometer Data

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: DG-2 (504-505)
Date Sampled: 9/13/2016
Depth (ft): 504'-505'
Test Date: 1-Dec-16
Start Time: 8:36

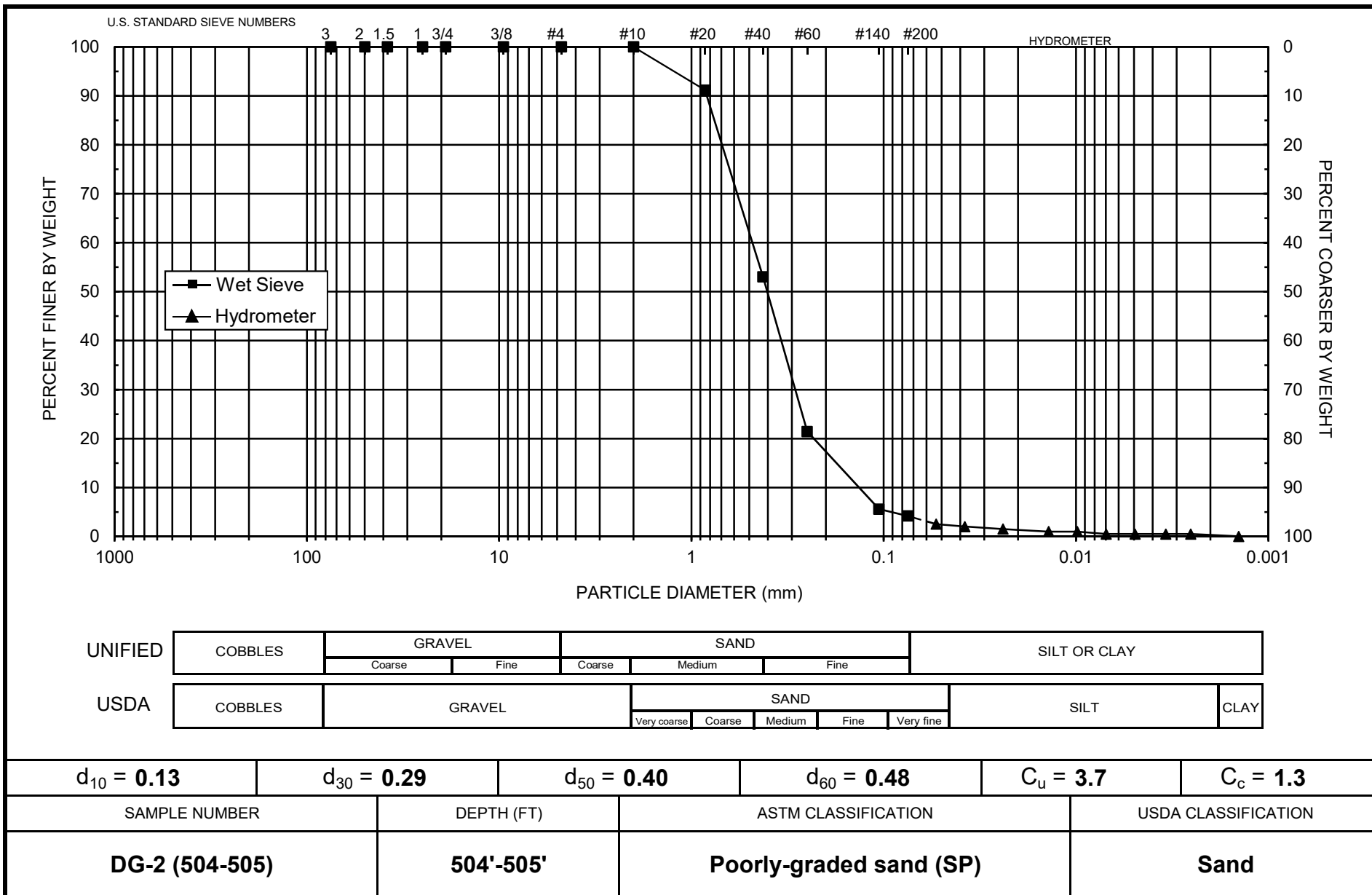
Type of Water Used: DISTILLED
Reaction with H_2O_2 : NA
Dispersant*: $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g): 99.79
Total Sample Wt. (g): 694.08
Wt. Passing #10 (g): 694.08

Date	Time (min)	Temp (°C)	R (g/L)	R _L (g/L)	R _{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
1-Dec-16	1	19.1	8.0	5.5	2.5	15.0	0.05338	2.5	2.5
	2	19.1	7.5	5.5	2.0	15.1	0.03785	2.0	2.0
	5	19.1	7.0	5.5	1.5	15.2	0.02400	1.5	1.5
	15	19.1	6.5	5.5	1.0	15.2	0.01389	1.0	1.0
	30	19.0	6.5	5.5	1.0	15.2	0.00984	1.0	1.0
	60	19.0	6.0	5.5	0.5	15.3	0.00697	0.5	0.5
	120	19.1	6.0	5.5	0.5	15.3	0.00493	0.5	0.5
	250	19.1	6.0	5.5	0.5	15.3	0.00341	0.5	0.5
	455	19.1	6.0	5.5	0.5	15.3	0.00253	0.5	0.5
	1436	19.3	5.5	5.5	0.0	15.4	0.00142	0.0	0.0
2-Dec-16	1436	19.3	5.5	5.5	0.0	15.4	0.00142	0.0	0.0

Comments:

* Dispersion device: mechanically operated stirring device

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



Daniel B. Stephens & Associates, Inc.



Particle Size Analysis Wet Sieve Data (#10 Split)

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: DG-3 (524-525)
Date Sampled: 9/20/2016
Depth (ft): 524'-525'
Test Date: 6-Dec-16

Initial Dry Weight of Sample (g): 539.70
Weight Passing #10 (g): 539.43
Weight Retained #10 (g): 0.27
Weight of Hydrometer Sample (g): 90.85
Calculated Weight of Sieve Sample (g): 90.90

Shape: Rounded
Hardness: Weathered and friable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10	3"	75	0.00	0.00	539.70	100.00
	2"	50	0.00	0.00	539.70	100.00
	1.5"	38.1	0.00	0.00	539.70	100.00
	1"	25	0.00	0.00	539.70	100.00
	3/4"	19.0	0.00	0.00	539.70	100.00
	3/8"	9.5	0.00	0.00	539.70	100.00
	4	4.75	0.00	0.00	539.70	100.00
	10	2.00	0.27	0.27	539.43	99.95
-10	(Based on calculated sieve wt.)					
	20	0.85	5.36	5.41	85.49	94.05
	40	0.425	26.30	31.71	59.19	65.12
	60	0.250	29.50	61.21	29.69	32.66
	140	0.106	24.19	85.40	5.50	6.05
	200	0.075	1.57	86.97	3.93	4.32
	dry pan		0.54	87.51	3.39	
	wet pan			3.39	0.00	

d₁₀ (mm): 0.12 d₅₀ (mm): 0.33
d₁₆ (mm): 0.15 d₆₀ (mm): 0.39
d₃₀ (mm): 0.23 d₈₄ (mm): 0.67

Median Particle Diameter--d₅₀ (mm): 0.33
Uniformity Coefficient, Cu--[d₆₀/d₁₀] (mm): 3.3
Coefficient of Curvature, Cc--[d₃₀²/(d₁₀*d₆₀)] (mm): 1.1
Mean Particle Diameter--[d₁₆+d₅₀+d₈₄]/3] (mm): 0.38

ASTM Soil Classification: Poorly-graded sand (SP)
USDA Soil Classification: Sand

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



Daniel B. Stephens & Associates, Inc.

Particle Size Analysis Hydrometer Data

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: DG-3 (524-525)
Date Sampled: 9/20/2016
Depth (ft): 524'-525'
Test Date: 1-Dec-16
Start Time: 8:42

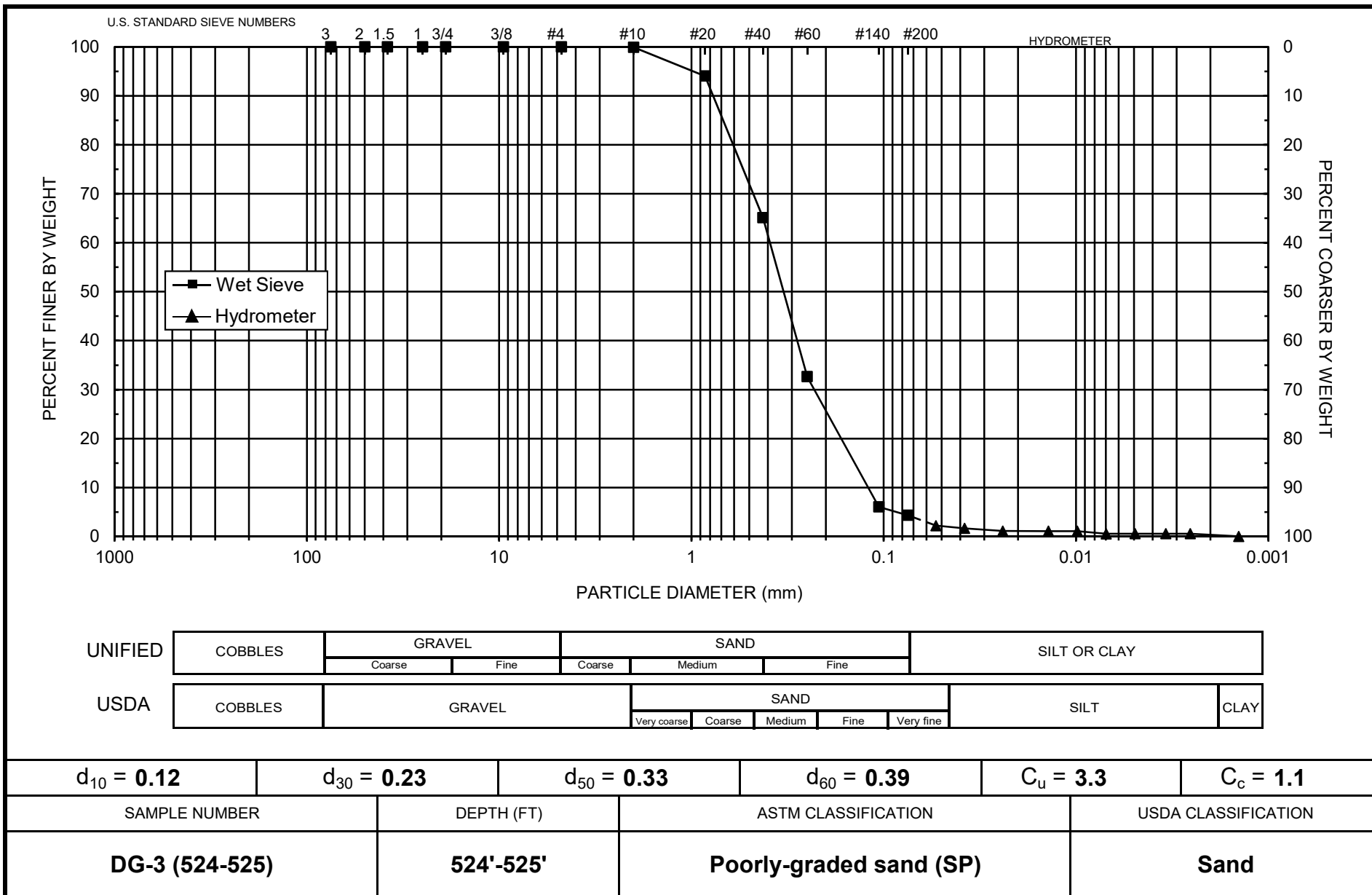
Type of Water Used: DISTILLED
Reaction with H_2O_2 : NA
Dispersant*: $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g): 90.85
Total Sample Wt. (g): 539.70
Wt. Passing #10 (g): 539.43

Date	Time (min)	Temp (°C)	R (g/L)	R _L (g/L)	R _{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
1-Dec-16	1	19.1	7.5	5.5	2.0	15.1	0.05352	2.2	2.2
	2	19.1	7.0	5.5	1.5	15.2	0.03795	1.7	1.7
	5	19.1	6.5	5.5	1.0	15.2	0.02407	1.1	1.1
	15	19.0	6.5	5.5	1.0	15.2	0.01391	1.1	1.1
	30	19.0	6.5	5.5	1.0	15.2	0.00984	1.1	1.1
	60	19.1	6.0	5.5	0.5	15.3	0.00697	0.6	0.6
	120	19.1	6.0	5.5	0.5	15.3	0.00493	0.6	0.6
	250	19.1	6.0	5.5	0.5	15.3	0.00341	0.6	0.6
	449	19.1	6.0	5.5	0.5	15.3	0.00255	0.6	0.6
2-Dec-16	1430	19.3	5.5	5.5	0.0	15.4	0.00143	0.0	0.0

Comments:

* Dispersion device: mechanically operated stirring device

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



Daniel B. Stephens & Associates, Inc.



Particle Size Analysis Wet Sieve Data (#10 Split)

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: DG-3 (551-551.7)
Date Sampled: 9/20/2016
Depth (ft): 551'-551.7'
Test Date: 6-Dec-16

Initial Dry Weight of Sample (g): 522.77
Weight Passing #10 (g): 499.04
Weight Retained #10 (g): 23.73
Weight of Hydrometer Sample (g): 99.48
Calculated Weight of Sieve Sample (g): 104.21

Shape: Angular
Hardness: Weathered and friable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10	3"	75	0.00	0.00	522.77	100.00
	2"	50	0.00	0.00	522.77	100.00
	1.5"	38.1	0.00	0.00	522.77	100.00
	1"	25	0.00	0.00	522.77	100.00
	3/4"	19.0	0.00	0.00	522.77	100.00
	3/8"	9.5	0.00	0.00	522.77	100.00
	4	4.75	0.20	0.20	522.57	99.96
	10	2.00	23.53	23.73	499.04	95.46
-10	(Based on calculated sieve wt.)					
	20	0.85	68.05	72.78	31.43	30.16
	40	0.425	14.58	87.36	16.85	16.17
	60	0.250	3.55	90.91	13.30	12.76
	140	0.106	7.43	98.34	5.87	5.63
	200	0.075	1.49	99.83	4.38	4.20
	dry pan		0.52	100.35	3.86	
	wet pan			3.86	0.00	

d₁₀ (mm): 0.18 d₅₀ (mm): 1.1
d₁₆ (mm): 0.41 d₆₀ (mm): 1.3
d₃₀ (mm): 0.84 d₈₄ (mm): 1.7

Median Particle Diameter--d₅₀ (mm): 1.1
Uniformity Coefficient, Cu--[d₆₀/d₁₀] (mm): 7.2
Coefficient of Curvature, Cc--[d₃₀²/(d₁₀*d₆₀)] (mm): 3.0
Mean Particle Diameter--[d₁₆+d₅₀+d₈₄]/3] (mm): 1.1

ASTM Soil Classification: Poorly-graded sand (SP)
USDA Soil Classification: Sand

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



Daniel B. Stephens & Associates, Inc.

Particle Size Analysis Hydrometer Data

Job Name: Power Resources, Inc.
Job Number: NM16.0192.00
Sample Number: DG-3 (551-551.7)
Date Sampled: 9/20/2016
Depth (ft): 551'-551.7'
Test Date: 1-Dec-16
Start Time: 8:48

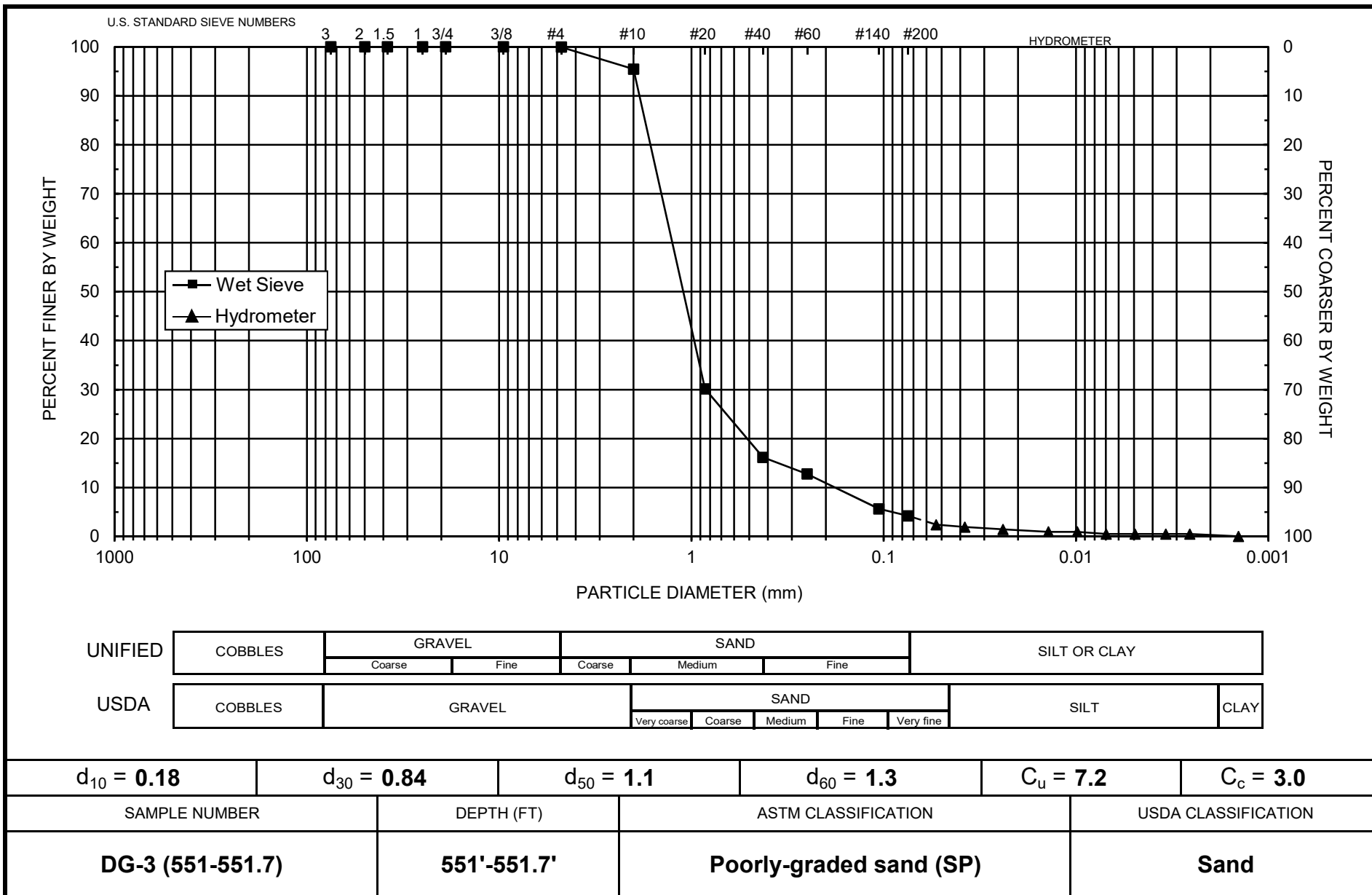
Type of Water Used: DISTILLED
Reaction with H_2O_2 : na
Dispersant*: $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g): 99.48
Total Sample Wt. (g): 522.77
Wt. Passing #10 (g): 499.04

Date	Time (min)	Temp (°C)	R (g/L)	R _L (g/L)	R _{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
1-Dec-16	1	19.1	8.0	5.5	2.5	15.0	0.05338	2.5	2.4
	2	19.1	7.5	5.5	2.0	15.1	0.03785	2.0	1.9
	5	19.1	7.0	5.5	1.5	15.2	0.02400	1.5	1.4
	15	19.0	6.5	5.5	1.0	15.2	0.01391	1.0	1.0
	30	19.0	6.5	5.5	1.0	15.2	0.00984	1.0	1.0
	60	19.1	6.0	5.5	0.5	15.3	0.00697	0.5	0.5
	120	19.1	6.0	5.5	0.5	15.3	0.00493	0.5	0.5
	250	19.1	6.0	5.5	0.5	15.3	0.00341	0.5	0.5
	444	19.1	6.0	5.5	0.5	15.3	0.00256	0.5	0.5
2-Dec-16	1426	19.3	5.5	5.5	0.0	15.4	0.00143	0.0	0.0

Comments:

* Dispersion device: mechanically operated stirring device

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



Daniel B. Stephens & Associates, Inc.

Laboratory Tests and Methods



Tests and Methods

Dry Bulk Density:	ASTM D7263
Moisture Content:	ASTM D7263, ASTM D2216
Calculated Porosity:	ASTM D7263
Water Potential (Dewpoint Potentiometer) Method:	ASTM D6836
Particle Size Analysis:	ASTM D422 / D6913
USDA Classification:	ASTM D422, USDA Soil Textural Triangle
Effective Porosity:	ASTM D6836; Stephens, D.B., 1997, Hydrology Journal (1998) 6:6156-165, A Comparison of Estimated and Calculated Effective Porosity