PTS Laboratories, Inc.

8100 Secura Way • Santa Fe Springs, CA 90670
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October 10, 2013

Wade Beins
Crow Butte Resources, Inc.
PO Box 169
Crawford, NE 69339

Re: PTS File No: 43570
Physical Properties Data
Marsland Core

Dear Mr. Beins:

Please find enclosed report for Physical Properties analyses conducted upon samples received from your Marsland Core project. All analyses were performed by applicable ASTM, EPA, or API methodologies. An electronic version of the report has previously been sent to your attention via the internet. The samples are currently in storage and will be retained for thirty days past completion of testing at no charge. Please note that the samples will be disposed of at that time. You may contact me regarding storage, disposal, or return of the samples.

PTS Laboratories appreciates the opportunity to be of service. If you have any questions or require additional information, please contact Rachel Spitz at (562) 347-2504.

Sincerely,
PTS Laboratories, Inc.

Michael Mark Brady, P.G.
District Manager

Encl.

**PTS** Laboratories

**Project Name:** Marsland Core
**Project Number:** N/A

**PTS File No:** 43570
**Client:** Crow Butte Resources, Inc.

## TEST PROGRAM - 20130829

| CORE ID | Depth ft. | Core Recovery ft. | Grain Size Analysis | *X-Ray Diffraction Proprietary | | | Notes |
|---|---|---|---|---|---|---|---|
| | | Plugs: | Grab | Bulk | | | |
| Date Received: 20130829 | | | | | | | |
| M-533C Run 1, Sample 1 | 63.9-64.9 | N/A | X | X | | | |
| M-533C Run 1, Sample 2 | 68.8-69.8 | N/A | X | X | | | |
| M-533C Run 3, Sample 1 | 299.0-300.0 | N/A | X | X | | | |
| M-533C Run 3, Sample 2 | 306.0-307.0 | N/A | X | X | | | |
| M-533C Run 5, Sample 1 | 1052.5-1053.0 | N/A | X | X | | | |
| M-1635C Run 1, Sample 1 | 70.0-70.5 | N/A | X | X | | | |
| M-1635C Run 1, Sample 2 | 79.5-80.0 | N/A | X | X | | | |
| M-1635C Run 2, Sample 1 | 197.0-197.5 | N/A | X | X | | | |
| M-1635C Run 2, Sample 2 | 206.5-207.0 | N/A | X | X | | | |
| M-1635C Run 3, Sample 1 | 530.0-530.5 | N/A | X | X | | | |
| M-1635C Run 6, Sample 1 | 993.0-994.0 | N/A | X | X | | | |
| M-1912C Run 1, Sample 1 | 63.0-64.0 | N/A | X | X | | | |
| M-1912C Run 2, Sample 1 | 130.7-131.7 | N/A | X | X | | | |
| M-1912C Run 3, Sample 1 | 255.0-255.5 | N/A | X | X | | | |
| M-1912C Run 3, Sample 2 | 260.4-260.9 | N/A | X | X | | | |
| M-1912C Run 4, Sample 1 | 974.5-975.0 | N/A | X | X | | | |
| M-1912C Run 4, Sample 2 | 968.7-969.7 | N/A | X | X | | | |
| M-1956C Run 1, Sample 1 | 42.0-43.0 | N/A | X | X | | | |
| M-1956C Run 3, Sample 1 | 78.0-79.0 | N/A | X | X | | | |
| M-1956C Run 4, Sample 1 | 196.5-197.1 | N/A | X | X | | | |
| M-1956C Run 4, Sample 2 | 202.0-202.5 | N/A | X | X | | | |
| M-1956C Run 5, Sample 1 | 425.6-426.2 | N/A | X | X | | | |
| M-1956C Run 5, Sample 2 | 431.0-431.6 | N/A | X | X | | | |
| M-1956C Run 6, Sample 1 | 1011.8-1012.4 | N/A | X | X | | | |

**PTS** Laboratories

**Project Name:** Marsland Core
**Project Number:** N/A

**PTS File No:** 43570
**Client:** Crow Butte Resources, Inc.

## TEST PROGRAM - 20130829

| CORE ID | Depth ft. | Core Recovery ft. | Grain Size Analysis | *X-Ray Diffraction Proprietary | | | Notes |
|---|---|---|---|---|---|---|---|
| | | Plugs: | Grab | Bulk | | | |
| M-2169C Run 1, Sample 1 | 110.0-110.5 | N/A | X | X | | | |
| M-2169C Run 2, Sample 3 | 156.5-157.2 | N/A | X | X | | | |
| M-2169C Run 3, Sample 1 | 355.0-356.0 | N/A | X | X | | | |
| M-2169C Run 4, Sample 1 | 470.0-470.5 | N/A | X | X | | | |
| M-2169C Run 5, Sample 1 | 608.9-609.5 | N/A | X | X | | | |
| M-2169C Run 7, Sample 1 | 1135.5-1136.0 | N/A | X | X | | | |
| TOTALS: | 30 bags | | 30 | 30 | | | 30 |

**Laboratory Test Program Notes**

Contaminant identification: _____

**PTS** Laboratories, Inc.

Crow Butte Resources, Inc.
PTS File No: 43570

## PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422/D4464M)

PROJECT NAME: Marsland Core
PROJECT NO: N/A

| Sample ID | Depth, ft. | Mean Grain Size Description (1) | Median Grain Size mm | Particle Size Distribution, wt. percent | | | | | | Silt & Clay |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Gravel | Sand Size | | | Silt | Clay | |
| | | | | | Coarse | Medium | Fine | | | |
| M-533C Run 1, Sample 1 | 63.9-64.9 | Fine sand | 0.238 | 0.00 | 0.00 | 18.42 | 71.95 | 8.22 | 1.41 | 9.63 |
| M-533C Run 1, Sample 2 | 68.8-69.8 | Silt | 0.033 | 0.00 | 0.00 | 0.00 | 20.53 | 63.04 | 16.44 | 79.47 |
| M-533C Run 3, Sample 1 | 299.0-300.0 | Silt | 0.034 | 0.00 | 0.00 | 0.00 | 12.97 | 81.45 | 5.57 | 87.03 |
| M-533C Run 3, Sample 2 | 306.0-307.0 | Silt | 0.051 | 0.00 | 0.00 | 0.00 | 26.00 | 70.23 | 3.77 | 74.00 |
| M-533C Run 5, Sample 1 | 1052.5-1053.0 | Clay | 0.003 | 0.00 | 0.00 | 0.00 | 0.00 | 34.81 | 65.19 | 100.00 |
| M-1635C Run 1, Sample 1 | 70.0-70.5 | Silt | 0.046 | 0.00 | 0.00 | 0.00 | 27.88 | 60.57 | 11.55 | 72.12 |
| M-1635C Run 1, Sample 2 | 79.5-80.0 | Silt | 0.063 | 0.00 | 0.00 | 0.00 | 39.61 | 53.90 | 6.50 | 60.39 |
| M-1635C Run 2, Sample 1 | 197.0-197.5 | Silt | 0.041 | 0.00 | 0.00 | 0.00 | 13.73 | 81.80 | 4.47 | 86.27 |
| M-1635C Run 2, Sample 2 | 206.5-207.0 | Silt | 0.055 | 0.00 | 0.00 | 0.00 | 29.24 | 67.17 | 3.59 | 70.76 |
| M-1635C Run 3, Sample 1 | 530.0-530.5 | Silt | 0.040 | 0.00 | 0.00 | 2.83 | 25.96 | 61.01 | 10.20 | 71.21 |
| M-1635C Run 6, Sample 1 | 993.0-994.0 | Clay | 0.003 | 0.00 | 0.00 | 0.00 | 0.00 | 24.05 | 75.95 | 100.00 |
| M-1912C Run 1, Sample 1 | 63.0-64.0 | Fine sand | 0.135 | 0.00 | 0.00 | 3.85 | 76.54 | 17.60 | 2.01 | 19.61 |
| M-1912C Run 2, Sample 1 | 130.7-131.7 | Fine sand | 0.087 | 0.00 | 0.00 | 7.84 | 49.02 | 36.10 | 7.03 | 43.14 |
| M-1912C Run 3, Sample 1 | 255.0-255.5 | Fine sand | 0.072 | 0.00 | 0.00 | 4.42 | 43.67 | 48.95 | 2.96 | 51.91 |

(1) Based on Mean from Trask

## PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422/D4464M)

PROJECT NAME: Marsland Core
PROJECT NO: N/A

| Sample ID | Depth, ft. | Mean Grain Size Description (1) | Median Grain Size mm | Particle Size Distribution, wt. percent | | | | | | Silt & Clay |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Gravel | Sand Size | | | Silt | Clay | |
| | | | | | Coarse | Medium | Fine | | | |
| M-1912C Run 3, Sample 2 | 260.4-260.9 | Silt | 0.062 | 0.00 | 0.00 | 0.00 | 36.63 | 59.98 | 3.40 | 63.37 |
| M-1912C Run 4, Sample 1 | 974.5-975.0 | Clay | 0.003 | 0.00 | 0.00 | 0.00 | 0.00 | 28.79 | 71.21 | 100.00 |
| *M-1912C Run 4, Sample 2 | 968.7-969.7 | Clay | 0.003 | 0.00 | 0.00 | 0.00 | 0.00 | 27.94 | 72.06 | 100.00 |
| *M-1912C Run 4, Sample 2 Rerun | 968.7-969.7 | Silt | 0.004 | 0.00 | 0.00 | 0.00 | 5.35 | 36.27 | 58.38 | 94.65 |
| *M-1912C Run 4, Sample 2 Rerun 2 | 968.7-969.7 | Medium sand | 0.850 | 0.00 | 0.00 | 74.30 | 6.83 | 7.90 | 10.97 | 18.87 |
| M-1956C Run 1, Sample 1 | 42.0-43.0 | Fine sand | 0.266 | 0.00 | 0.00 | 16.97 | 79.36 | 2.75 | 0.92 | 3.67 |
| M-1956C Run 3, Sample 1 | 78.0-79.0 | Silt | 0.054 | 0.00 | 0.00 | 1.00 | 32.36 | 60.43 | 6.21 | 66.64 |
| M-1956C Run 4, Sample 1 | 196.5-197.1 | Silt | 0.062 | 0.00 | 0.00 | 2.22 | 37.09 | 56.30 | 4.39 | 60.69 |
| M-1956C Run 4, Sample 2 | 202.0-202.5 | Silt | 0.052 | 0.00 | 0.00 | 0.00 | 27.65 | 67.34 | 5.00 | 72.35 |
| M-1956C Run 5, Sample 1 | 425.6-426.2 | Silt | 0.029 | 0.00 | 0.00 | 0.00 | 12.54 | 73.63 | 13.84 | 87.46 |
| M-1956C Run 5, Sample 2 | 431.0-431.6 | Silt | 0.046 | 0.00 | 0.00 | 3.76 | 28.81 | 60.64 | 6.79 | 67.43 |
| M-1956C Run 6, Sample 1 | 1011.8-1012.4 | Clay | 0.004 | 0.00 | 0.00 | 0.00 | 0.00 | 39.14 | 60.86 | 100.00 |
| M-2169C Run 1, Sample 1 | 110.0-110.5 | Silt | 0.037 | 0.00 | 0.00 | 0.00 | 20.58 | 65.73 | 13.69 | 79.42 |
| M-2169C Run 2, Sample 3 | 156.5-157.2 | Silt | 0.059 | 0.00 | 0.00 | 0.00 | 37.21 | 54.28 | 8.51 | 62.79 |

(1) Based on Mean from Trask

## PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422/D4464M)

PROJECT NAME: Marsland Core
PROJECT NO: N/A

| Sample ID | Depth, ft. | Mean Grain Size Description (1) | Median Grain Size mm | Particle Size Distribution, wt. percent | | | | | | Silt & Clay |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Gravel | Sand Size | | | Silt | Clay | |
| | | | | | Coarse | Medium | Fine | | | |
| M-2169C Run 3, Sample 1 | 355.0-356.0 | Silt | 0.036 | 0.00 | 0.00 | 0.00 | 15.97 | 74.53 | 9.51 | 84.03 |
| M-2169C Run 4, Sample 1 | 470.0-470.5 | Silt | 0.040 | 0.00 | 0.00 | 1.05 | 24.67 | 64.33 | 9.95 | 74.28 |
| M-2169C Run 5, Sample 1 | 608.9-609.5 | Fine sand | 0.050 | 0.00 | 0.00 | 13.87 | 23.80 | 52.86 | 9.46 | 62.33 |
| M-2169C Run 7, Sample 1 | 1135.5-1136.0 | Silt | 0.004 | 0.00 | 0.00 | 0.00 | 0.00 | 45.40 | 54.60 | 100.00 |

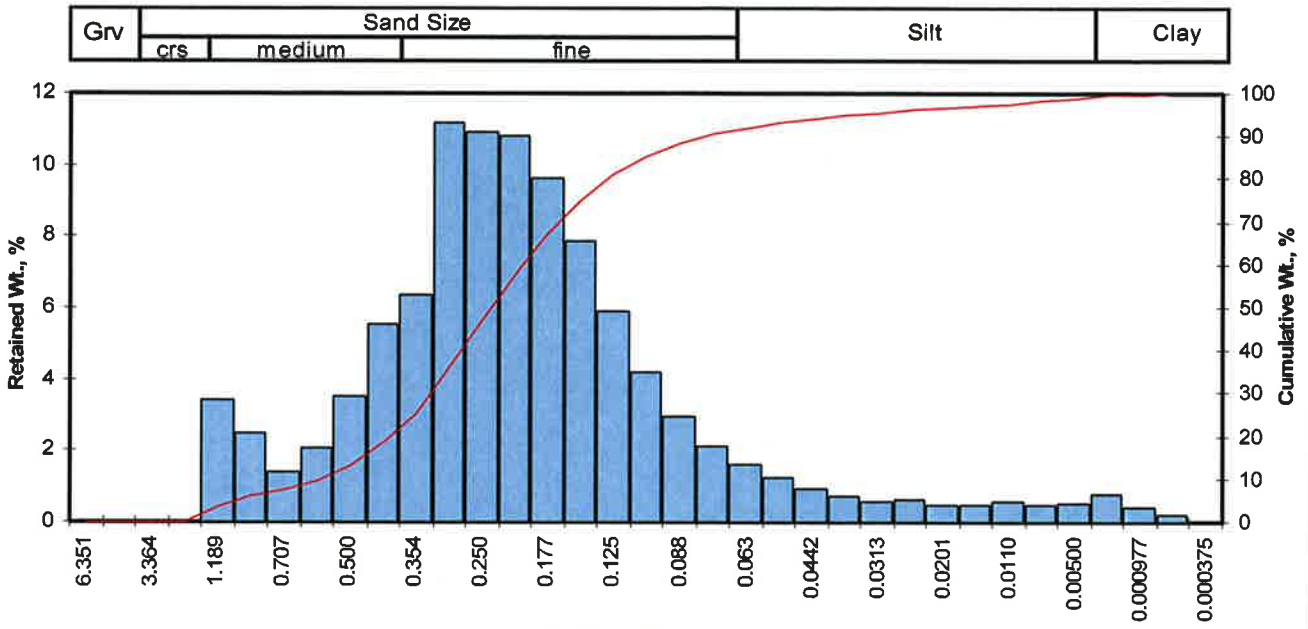
*Note: Sample M-1912C Run 4, Sample 2 is a heterogenous core consisting of clay with entrained sand. The small amount of sample volume required for LPSA (~1 gm) can over-represent the lithology depending on sample location and composition. Visual estimation of sand contained is 10-20%. MMB 20131008

(1) Based on Mean from Trask

# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-533C Run 1, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 63.9-64.9 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 3.42 | 3.42 | 3.42 |
| 0.0331 | 0.841 | 0.25 | 20 | 2.47 | 2.47 | 5.89 |
| 0.0278 | 0.707 | 0.50 | 25 | 1.42 | 1.42 | 7.31 |
| 0.0234 | 0.595 | 0.75 | 30 | 2.07 | 2.07 | 9.38 |
| 0.0197 | 0.500 | 1.00 | 35 | 3.50 | 3.50 | 12.87 |
| 0.0166 | 0.420 | 1.25 | 40 | 5.55 | 5.55 | 18.42 |
| 0.0139 | 0.354 | 1.50 | 45 | 6.39 | 6.39 | 24.81 |
| 0.0117 | 0.297 | 1.75 | 50 | 11.20 | 11.20 | 36.01 |
| 0.0098 | 0.250 | 2.00 | 60 | 10.90 | 10.90 | 46.90 |
| 0.0083 | 0.210 | 2.25 | 70 | 10.80 | 10.80 | 57.70 |
| 0.0070 | 0.177 | 2.50 | 80 | 9.65 | 9.65 | 67.34 |
| 0.0059 | 0.149 | 2.75 | 100 | 7.85 | 7.85 | 75.19 |
| 0.0049 | 0.125 | 3.00 | 120 | 5.92 | 5.92 | 81.11 |
| 0.0041 | 0.105 | 3.25 | 140 | 4.21 | 4.21 | 85.32 |
| 0.0035 | 0.088 | 3.50 | 170 | 2.94 | 2.94 | 88.25 |
| 0.0029 | 0.074 | 3.75 | 200 | 2.12 | 2.12 | 90.37 |
| 0.0025 | 0.063 | 4.00 | 230 | 1.60 | 1.60 | 91.97 |
| 0.0021 | 0.053 | 4.25 | 270 | 1.23 | 1.23 | 93.20 |
| 0.00174 | 0.0442 | 4.50 | 325 | 0.95 | 0.95 | 94.15 |
| 0.00146 | 0.0372 | 4.75 | 400 | 0.74 | 0.74 | 94.89 |
| 0.00123 | 0.0313 | 5.00 | 450 | 0.58 | 0.58 | 95.47 |
| 0.000986 | 0.0250 | 5.32 | 500 | 0.60 | 0.60 | 96.07 |
| 0.000790 | 0.0201 | 5.64 | 635 | 0.49 | 0.49 | 96.56 |
| 0.000615 | 0.0156 | 6.00 | | 0.47 | 0.47 | 97.03 |
| 0.000435 | 0.0110 | 6.50 | | 0.56 | 0.56 | 97.59 |
| 0.000308 | 0.00781 | 7.00 | | 0.48 | 0.48 | 98.07 |
| 0.000197 | 0.00500 | 7.65 | | 0.52 | 0.52 | 98.59 |
| 0.000077 | 0.00195 | 9.00 | | 0.80 | 0.80 | 99.39 |
| 0.000038 | 0.000977 | 10.00 | | 0.39 | 0.39 | 99.78 |
| 0.000019 | 0.000488 | 11.00 | | 0.20 | 0.20 | 99.98 |
| 0.000015 | 0.000375 | 11.38 | | 0.02 | 0.02 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

**Cumulative Weight Percent greater than**

| Weight percent | Phi Value | Particle Size Inches | Particle Size Millimeters |
|---|---|---|---|
| 5 | 0.07 | 0.0375 | 0.952 |
| 10 | 0.79 | 0.0227 | 0.577 |
| 16 | 1.14 | 0.0179 | 0.453 |
| 25 | 1.50 | 0.0139 | 0.353 |
| 40 | 1.84 | 0.0110 | 0.279 |
| 50 | 2.07 | 0.0094 | 0.238 |
| 60 | 2.31 | 0.0079 | 0.202 |
| 75 | 2.74 | 0.0059 | 0.149 |
| 84 | 3.17 | 0.0044 | 0.111 |
| 90 | 3.71 | 0.0030 | 0.077 |
| 95 | 4.80 | 0.0014 | 0.036 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 2.07 | 2.07 | 2.07 |
| Median, in. | 0.0094 | 0.0094 | 0.0094 |
| Median, mm | 0.238 | 0.238 | 0.238 |
| Mean, phi | 1.99 | 2.16 | 2.13 |
| Mean, in. | 0.0099 | 0.0088 | 0.0090 |
| Mean, mm | 0.251 | 0.224 | 0.229 |
| Sorting | 1.537 | 1.016 | 1.224 |
| Skewness | 0.964 | 0.083 | 0.118 |
| Kurtosis | 0.203 | 1.327 | 1.562 |
| **Grain Size Description** (ASTM-USCS Scale) | | Fine sand (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 18.42 |
| Fine Sand | 200 | 71.95 |
| Silt | >0.005 mm | 8.22 |
| Clay | <0.005 mm | 1.41 |
| | **Total** | **100** |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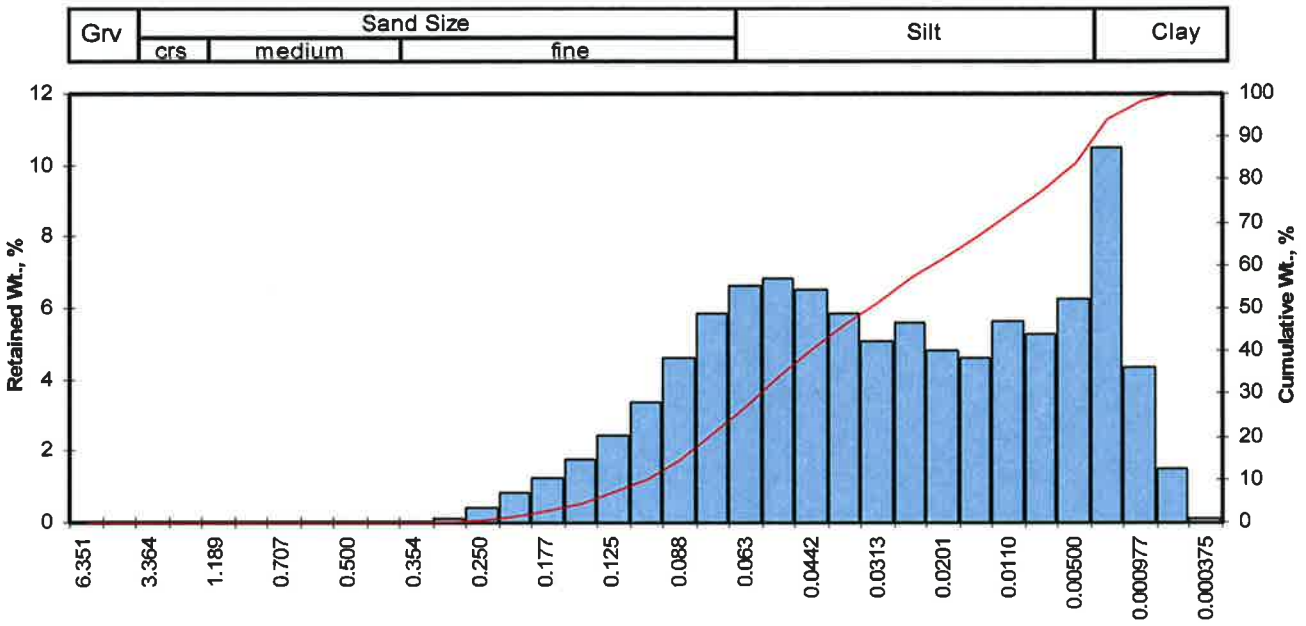
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-533C Run 1, Sample 2 |
| **Project No:** | N/A | **Depth, ft:** | 68.8-69.8 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.11 | 0.11 | 0.11 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.41 | 0.41 | 0.52 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.83 | 0.83 | 1.35 |
| 0.0070 | 0.177 | 2.50 | 80 | 1.24 | 1.24 | 2.59 |
| 0.0059 | 0.149 | 2.75 | 100 | 1.75 | 1.75 | 4.34 |
| 0.0049 | 0.125 | 3.00 | 120 | 2.41 | 2.41 | 6.75 |
| 0.0041 | 0.105 | 3.25 | 140 | 3.35 | 3.35 | 10.10 |
| 0.0035 | 0.088 | 3.50 | 170 | 4.59 | 4.59 | 14.69 |
| 0.0029 | 0.074 | 3.75 | 200 | 5.84 | 5.84 | 20.53 |
| 0.0025 | 0.063 | 4.00 | 230 | 6.64 | 6.64 | 27.17 |
| 0.0021 | 0.053 | 4.25 | 270 | 6.82 | 6.82 | 33.99 |
| 0.00174 | 0.0442 | 4.50 | 325 | 6.51 | 6.51 | 40.49 |
| 0.00146 | 0.0372 | 4.75 | 400 | 5.84 | 5.84 | 46.33 |
| 0.00123 | 0.0313 | 5.00 | 450 | 5.09 | 5.09 | 51.42 |
| 0.000986 | 0.0250 | 5.32 | 500 | 5.57 | 5.57 | 56.99 |
| 0.000790 | 0.0201 | 5.64 | 635 | 4.80 | 4.80 | 61.79 |
| 0.000615 | 0.0156 | 6.00 | | 4.61 | 4.61 | 66.40 |
| 0.000435 | 0.0110 | 6.50 | | 5.64 | 5.64 | 72.04 |
| 0.000308 | 0.00781 | 7.00 | | 5.27 | 5.27 | 77.31 |
| 0.000197 | 0.00500 | 7.65 | | 6.26 | 6.26 | 83.56 |
| 0.000077 | 0.00195 | 9.00 | | 10.50 | 10.50 | 94.06 |
| 0.000038 | 0.000977 | 10.00 | | 4.34 | 4.34 | 98.40 |
| 0.000019 | 0.000488 | 11.00 | | 1.49 | 1.49 | 99.89 |
| 0.000015 | 0.000375 | 11.38 | | 0.11 | 0.11 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 2.82 | 0.0056 | 0.142 |
| 10 | 3.24 | 0.0042 | 0.106 |
| 16 | 3.56 | 0.0033 | 0.085 |
| 25 | 3.92 | 0.0026 | 0.066 |
| 40 | 4.48 | 0.0018 | 0.045 |
| 50 | 4.93 | 0.0013 | 0.033 |
| 60 | 5.52 | 0.0009 | 0.022 |
| 75 | 6.78 | 0.0004 | 0.009 |
| 84 | 7.70 | 0.0002 | 0.005 |
| 90 | 8.48 | 0.0001 | 0.003 |
| 95 | 9.22 | 0.0001 | 0.002 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.93 | 4.93 | 4.93 |
| Median, in. | 0.0013 | 0.0013 | 0.0013 |
| Median, mm | 0.033 | 0.033 | 0.033 |
| Mean, phi | 4.73 | 5.63 | 5.40 |
| Mean, in. | 0.0015 | 0.0008 | 0.0009 |
| Mean, mm | 0.038 | 0.020 | 0.024 |
| Sorting | 2.697 | 2.073 | 2.006 |
| Skewness | 0.748 | 0.337 | 0.338 |
| Kurtosis | 0.277 | 0.543 | 0.916 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

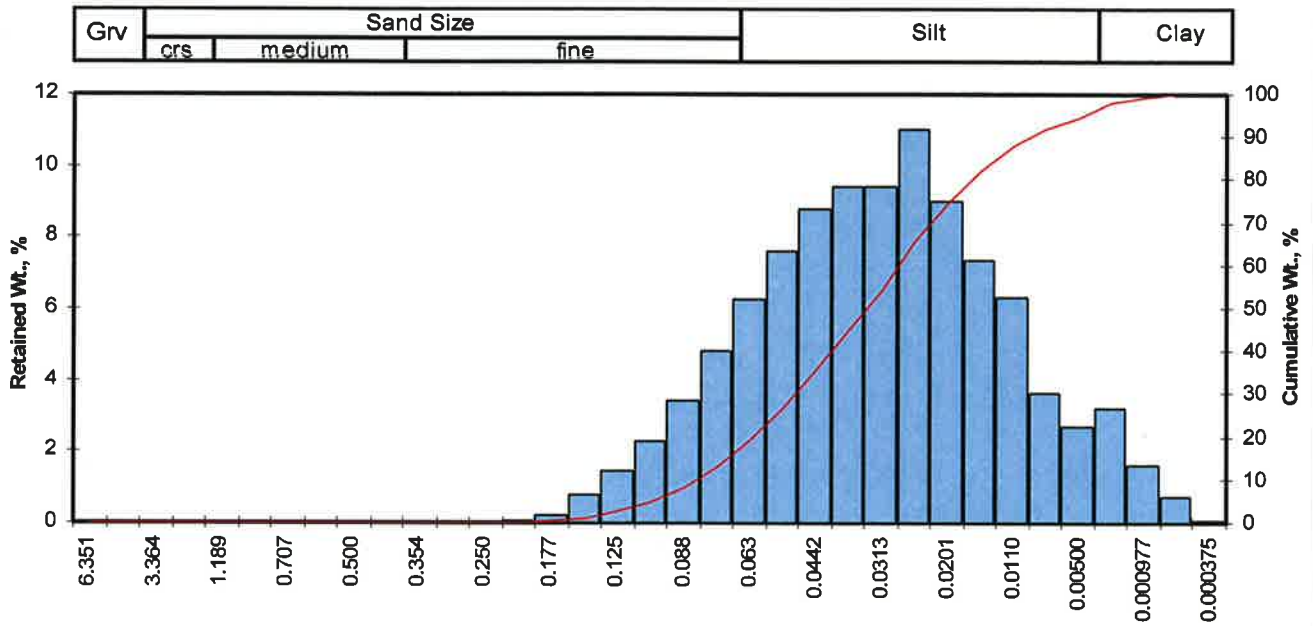
| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 20.53 |
| Silt | >0.005 mm | 63.04 |
| Clay | <0.005 mm | 16.44 |
| | **Total** | **100** |


Phone: (562) 907-3607 Fax: (562) 907-3610

# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-533C Run 3, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 299.0-300.0 |




**Particle Size, mm**

| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.03 | 0.03 | 0.03 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.23 | 0.23 | 0.26 |
| 0.0059 | 0.149 | 2.75 | 100 | 0.75 | 0.75 | 1.01 |
| 0.0049 | 0.125 | 3.00 | 120 | 1.43 | 1.43 | 2.44 |
| 0.0041 | 0.105 | 3.25 | 140 | 2.30 | 2.30 | 4.74 |
| 0.0035 | 0.088 | 3.50 | 170 | 3.43 | 3.43 | 8.17 |
| 0.0029 | 0.074 | 3.75 | 200 | 4.80 | 4.80 | 12.97 |
| 0.0025 | 0.063 | 4.00 | 230 | 6.25 | 6.25 | 19.22 |
| 0.0021 | 0.053 | 4.25 | 270 | 7.61 | 7.61 | 26.84 |
| 0.00174 | 0.0442 | 4.50 | 325 | 8.79 | 8.79 | 35.63 |
| 0.00146 | 0.0372 | 4.75 | 400 | 9.40 | 9.40 | 45.04 |
| 0.00123 | 0.0313 | 5.00 | 450 | 9.40 | 9.40 | 54.44 |
| 0.000986 | 0.0250 | 5.32 | 500 | 11.00 | 11.00 | 65.44 |
| 0.000790 | 0.0201 | 5.64 | 635 | 9.01 | 9.01 | 74.46 |
| 0.000615 | 0.0156 | 6.00 | | 7.36 | 7.36 | 81.82 |
| 0.000435 | 0.0110 | 6.50 | | 6.32 | 6.32 | 88.14 |
| 0.000308 | 0.00781 | 7.00 | | 3.60 | 3.60 | 91.74 |
| 0.000197 | 0.00500 | 7.65 | | 2.68 | 2.68 | 94.43 |
| 0.000077 | 0.00195 | 9.00 | | 3.23 | 3.23 | 97.66 |
| 0.000038 | 0.000977 | 10.00 | | 1.58 | 1.58 | 99.24 |
| 0.000019 | 0.000488 | 11.00 | | 0.70 | 0.70 | 99.94 |
| 0.000015 | 0.000375 | 11.38 | | 0.06 | 0.06 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 3.27 | 0.0041 | 0.104 |
| 10 | 3.60 | 0.0033 | 0.083 |
| 16 | 3.87 | 0.0027 | 0.068 |
| 25 | 4.19 | 0.0022 | 0.055 |
| 40 | 4.62 | 0.0016 | 0.041 |
| 50 | 4.88 | 0.0013 | 0.034 |
| 60 | 5.16 | 0.0011 | 0.028 |
| 75 | 5.67 | 0.0008 | 0.020 |
| 84 | 6.17 | 0.0005 | 0.014 |
| 90 | 6.76 | 0.0004 | 0.009 |
| 95 | 7.89 | 0.0002 | 0.004 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.88 | 4.88 | 4.88 |
| Median, in. | 0.0013 | 0.0013 | 0.0013 |
| Median, mm | 0.034 | 0.034 | 0.034 |
| Mean, phi | 4.75 | 5.02 | 4.98 |
| Mean, in. | 0.0015 | 0.0012 | 0.0013 |
| Mean, mm | 0.037 | 0.031 | 0.032 |
| Sorting | 1.668 | 1.151 | 1.275 |
| Skewness | 0.969 | 0.121 | 0.211 |
| Kurtosis | 0.239 | 1.006 | 1.281 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 12.97 |
| Silt | >0.005 mm | 81.45 |
| Clay | <0.005 mm | 5.57 |
| | **Total** | **100** |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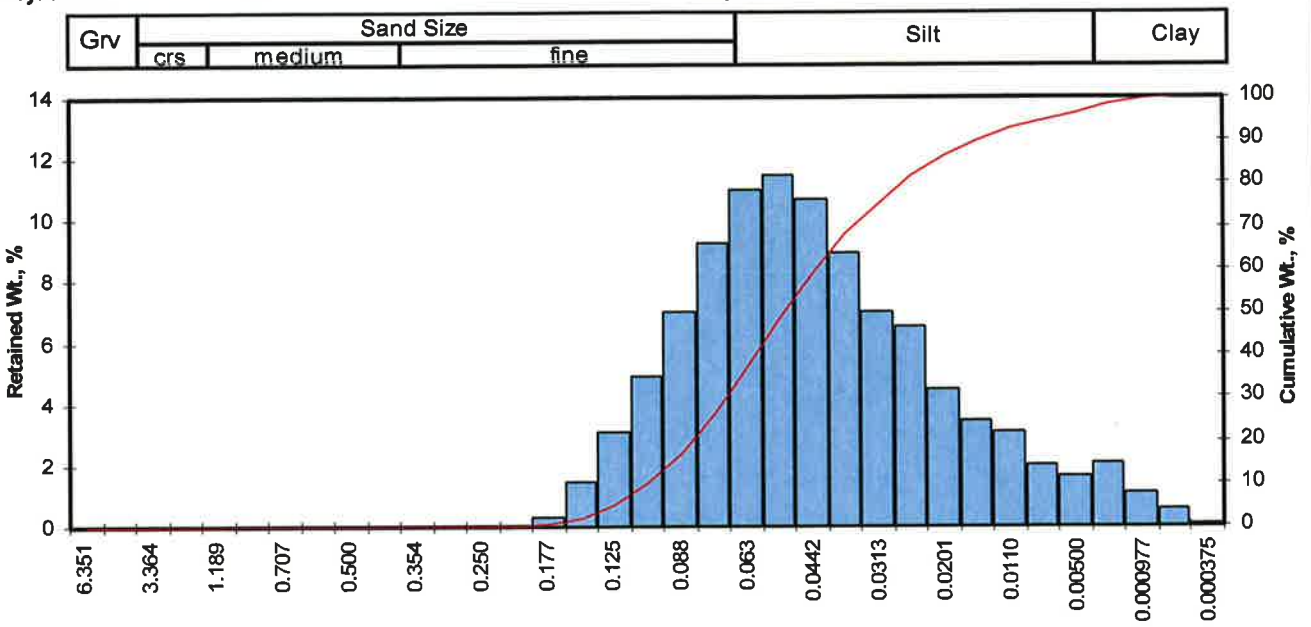
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-533C Run 3, Sample 2 |
| **Project No:** | N/A | **Depth, ft:** | 306.0-307.0 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.02 | 0.02 | 0.02 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.32 | 0.32 | 0.34 |
| 0.0059 | 0.149 | 2.75 | 100 | 1.46 | 1.46 | 1.80 |
| 0.0049 | 0.125 | 3.00 | 120 | 3.09 | 3.09 | 4.89 |
| 0.0041 | 0.105 | 3.25 | 140 | 4.89 | 4.89 | 9.77 |
| 0.0035 | 0.088 | 3.50 | 170 | 6.99 | 6.98 | 16.76 |
| 0.0029 | 0.074 | 3.75 | 200 | 9.25 | 9.24 | 26.00 |
| 0.0025 | 0.063 | 4.00 | 230 | 11.00 | 10.99 | 36.99 |
| 0.0021 | 0.053 | 4.25 | 270 | 11.50 | 11.49 | 48.48 |
| 0.00174 | 0.0442 | 4.50 | 325 | 10.70 | 10.69 | 59.16 |
| 0.00146 | 0.0372 | 4.75 | 400 | 8.92 | 8.91 | 68.08 |
| 0.00123 | 0.0313 | 5.00 | 450 | 6.98 | 6.97 | 75.05 |
| 0.000986 | 0.0250 | 5.32 | 500 | 6.53 | 6.52 | 81.57 |
| 0.000790 | 0.0201 | 5.64 | 635 | 4.48 | 4.48 | 86.05 |
| 0.000615 | 0.0156 | 6.00 | | 3.45 | 3.45 | 89.50 |
| 0.000435 | 0.0110 | 6.50 | | 3.10 | 3.10 | 92.59 |
| 0.000308 | 0.00781 | 7.00 | | 1.98 | 1.98 | 94.57 |
| 0.000197 | 0.00500 | 7.65 | | 1.66 | 1.66 | 96.23 |
| 0.000077 | 0.00195 | 9.00 | | 2.08 | 2.08 | 98.31 |
| 0.000038 | 0.000977 | 10.00 | | 1.08 | 1.08 | 99.39 |
| 0.000019 | 0.000488 | 11.00 | | 0.56 | 0.56 | 99.95 |
| 0.000015 | 0.000375 | 11.38 | | 0.06 | 0.05 | 100.00 |
| **TOTALS** | | | | **100.10** | **100.00** | **100.00** |

**Cumulative Weight Percent greater than**

| Weight percent | Phi Value | Particle Size Inches | Particle Size Millimeters |
|---|---|---|---|
| 5 | 3.01 | 0.0049 | 0.125 |
| 10 | 3.26 | 0.0041 | 0.105 |
| 16 | 3.47 | 0.0035 | 0.090 |
| 25 | 3.72 | 0.0030 | 0.076 |
| 40 | 4.07 | 0.0024 | 0.060 |
| 50 | 4.29 | 0.0020 | 0.051 |
| 60 | 4.52 | 0.0017 | 0.043 |
| 75 | 5.00 | 0.0012 | 0.031 |
| 84 | 5.49 | 0.0009 | 0.022 |
| 90 | 6.08 | 0.0006 | 0.015 |
| 95 | 7.17 | 0.0003 | 0.007 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.29 | 4.29 | 4.29 |
| Median, in. | 0.0020 | 0.0020 | 0.0020 |
| Median, mm | 0.051 | 0.051 | 0.051 |
| Mean, phi | 4.22 | 4.48 | 4.42 |
| Mean, in. | 0.0021 | 0.0018 | 0.0018 |
| Mean, mm | 0.054 | 0.045 | 0.047 |
| Sorting | 1.556 | 1.010 | 1.136 |
| Skewness | 0.949 | 0.196 | 0.290 |
| Kurtosis | 0.248 | 1.059 | 1.337 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 26.00 |
| Silt | >0.005 mm | 70.23 |
| Clay | <0.005 mm | 3.77 |
| | **Total** | **100** |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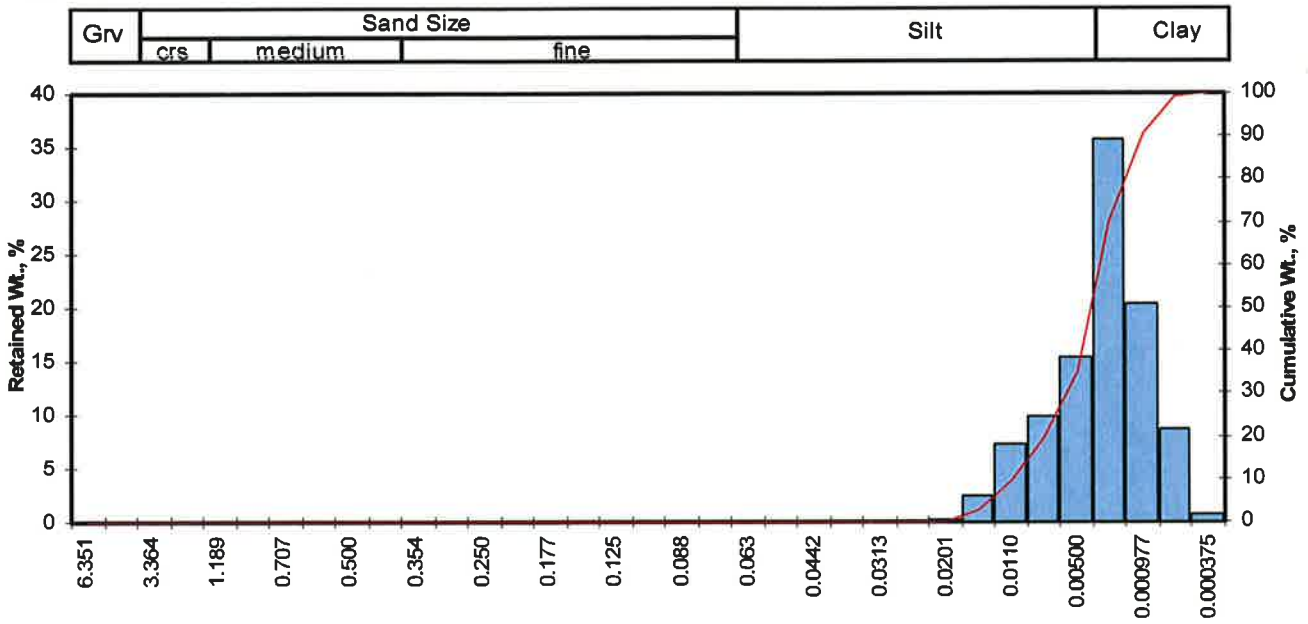
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-533C Run 5, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 1052.5-1053.0 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.00 | 0.00 | 0.00 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.00 | 0.00 | 0.00 |
| 0.0059 | 0.149 | 2.75 | 100 | 0.00 | 0.00 | 0.00 |
| 0.0049 | 0.125 | 3.00 | 120 | 0.00 | 0.00 | 0.00 |
| 0.0041 | 0.105 | 3.25 | 140 | 0.00 | 0.00 | 0.00 |
| 0.0035 | 0.088 | 3.50 | 170 | 0.00 | 0.00 | 0.00 |
| 0.0029 | 0.074 | 3.75 | 200 | 0.00 | 0.00 | 0.00 |
| 0.0025 | 0.063 | 4.00 | 230 | 0.00 | 0.00 | 0.00 |
| 0.0021 | 0.053 | 4.25 | 270 | 0.00 | 0.00 | 0.00 |
| 0.00174 | 0.0442 | 4.50 | 325 | 0.00 | 0.00 | 0.00 |
| 0.00146 | 0.0372 | 4.75 | 400 | 0.00 | 0.00 | 0.00 |
| 0.00123 | 0.0313 | 5.00 | 450 | 0.00 | 0.00 | 0.00 |
| 0.000986 | 0.0250 | 5.32 | 500 | 0.00 | 0.00 | 0.00 |
| 0.000790 | 0.0201 | 5.64 | 635 | 0.09 | 0.09 | 0.09 |
| 0.000615 | 0.0156 | 6.00 | | 2.33 | 2.33 | 2.42 |
| 0.000435 | 0.0110 | 6.50 | | 7.27 | 7.27 | 9.69 |
| 0.000308 | 0.00781 | 7.00 | | 9.81 | 9.81 | 19.50 |
| 0.000197 | 0.00500 | 7.65 | | 15.30 | 15.30 | 34.81 |
| 0.000077 | 0.00195 | 9.00 | | 35.60 | 35.61 | 70.41 |
| 0.000038 | 0.000977 | 10.00 | | 20.30 | 20.30 | 90.72 |
| 0.000019 | 0.000488 | 11.00 | | 8.56 | 8.56 | 99.28 |
| 0.000015 | 0.000375 | 11.38 | | 0.72 | 0.72 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 6.18 | 0.0005 | 0.014 |
| 10 | 6.52 | 0.0004 | 0.011 |
| 16 | 6.82 | 0.0003 | 0.009 |
| 25 | 7.23 | 0.0003 | 0.007 |
| 40 | 7.84 | 0.0002 | 0.004 |
| 50 | 8.22 | 0.0001 | 0.003 |
| 60 | 8.60 | 0.0001 | 0.003 |
| 75 | 9.23 | 0.0001 | 0.002 |
| 84 | 9.67 | 0.0000 | 0.001 |
| 90 | 9.96 | 0.0000 | 0.001 |
| 95 | 10.50 | 0.0000 | 0.001 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 8.22 | 8.22 | 8.22 |
| Median, in. | 0.0001 | 0.0001 | 0.0001 |
| Median, mm | 0.003 | 0.003 | 0.003 |
| Mean, phi | 7.91 | 8.25 | 8.24 |
| Mean, in. | 0.0002 | 0.0001 | 0.0001 |
| Mean, mm | 0.004 | 0.003 | 0.003 |
| Sorting | 1.996 | 1.424 | 1.367 |
| Skewness | 0.996 | 0.016 | 0.035 |
| Kurtosis | 0.251 | 0.518 | 0.888 |
| **Grain Size Description** (ASTM-USCS Scale) | | Clay (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 0.00 |
| Silt | >0.005 mm | 34.81 |
| Clay | <0.005 mm | 65.19 |
| | **Total** | **100** |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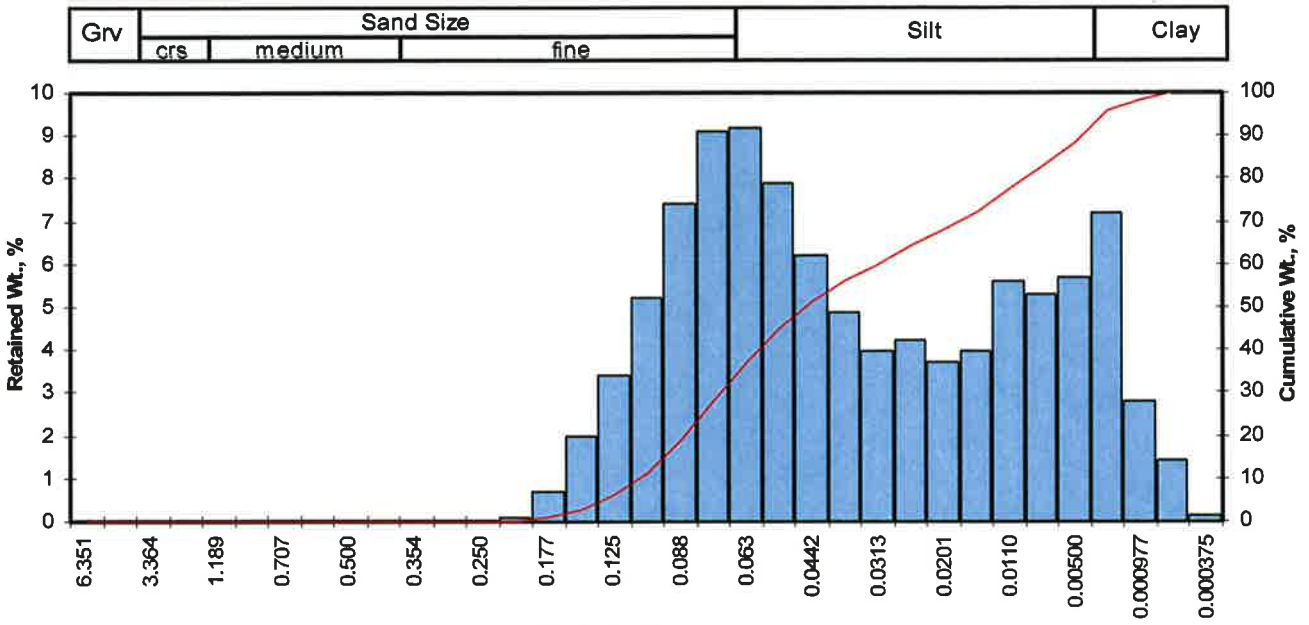
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1635C Run 1, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 70.0-70.5 |




| Opening (Inches) | Opening (Millimeters) | Phi of Screen | U.S. No. | Sample Weight, grams | Increment Weight, percent | Cumulative Weight, percent |
|---|---|---|---|---|---|---|
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.08 | 0.08 | 0.08 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.67 | 0.67 | 0.75 |
| 0.0059 | 0.149 | 2.75 | 100 | 1.98 | 1.98 | 2.73 |
| 0.0049 | 0.125 | 3.00 | 120 | 3.41 | 3.41 | 6.14 |
| 0.0041 | 0.105 | 3.25 | 140 | 5.23 | 5.23 | 11.37 |
| 0.0035 | 0.088 | 3.50 | 170 | 7.43 | 7.43 | 18.80 |
| 0.0029 | 0.074 | 3.75 | 200 | 9.08 | 9.08 | 27.88 |
| 0.0025 | 0.063 | 4.00 | 230 | 9.18 | 9.18 | 37.06 |
| 0.0021 | 0.053 | 4.25 | 270 | 7.90 | 7.90 | 44.97 |
| 0.00174 | 0.0442 | 4.50 | 325 | 6.22 | 6.22 | 51.19 |
| 0.00146 | 0.0372 | 4.75 | 400 | 4.87 | 4.87 | 56.06 |
| 0.00123 | 0.0313 | 5.00 | 450 | 3.96 | 3.96 | 60.02 |
| 0.000986 | 0.0250 | 5.32 | 500 | 4.21 | 4.21 | 64.23 |
| 0.000790 | 0.0201 | 5.64 | 635 | 3.69 | 3.69 | 67.92 |
| 0.000615 | 0.0156 | 6.00 | | 3.96 | 3.96 | 71.88 |
| 0.000435 | 0.0110 | 6.50 | | 5.59 | 5.59 | 77.47 |
| 0.000308 | 0.00781 | 7.00 | | 5.31 | 5.31 | 82.78 |
| 0.000197 | 0.00500 | 7.65 | | 5.67 | 5.67 | 88.45 |
| 0.000077 | 0.00195 | 9.00 | | 7.19 | 7.19 | 95.64 |
| 0.000038 | 0.000977 | 10.00 | | 2.79 | 2.79 | 98.43 |
| 0.000019 | 0.000488 | 11.00 | | 1.43 | 1.43 | 99.86 |
| 0.000015 | 0.000375 | 11.38 | | 0.14 | 0.14 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

**Cumulative Weight Percent greater than**

| Weight percent | Phi Value | Particle Size (Inches) | Particle Size (Millimeters) |
|---|---|---|---|
| 5 | 2.92 | 0.0052 | 0.132 |
| 10 | 3.18 | 0.0043 | 0.110 |
| 16 | 3.41 | 0.0037 | 0.094 |
| 25 | 3.67 | 0.0031 | 0.079 |
| 40 | 4.09 | 0.0023 | 0.059 |
| 50 | 4.45 | 0.0018 | 0.046 |
| 60 | 5.00 | 0.0012 | 0.031 |
| 75 | 6.28 | 0.0005 | 0.013 |
| 84 | 7.14 | 0.0003 | 0.007 |
| 90 | 7.94 | 0.0002 | 0.004 |
| 95 | 8.88 | 0.0001 | 0.002 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.45 | 4.45 | 4.45 |
| Median, in. | 0.0018 | 0.0018 | 0.0018 |
| Median, mm | 0.046 | 0.046 | 0.046 |
| Mean, phi | 4.45 | 5.27 | 5.00 |
| Mean, in. | 0.0018 | 0.0010 | 0.0012 |
| Mean, mm | 0.046 | 0.026 | 0.031 |
| Sorting | 2.470 | 1.867 | 1.837 |
| Skewness | 0.696 | 0.439 | 0.462 |
| Kurtosis | 0.310 | 0.597 | 0.937 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 27.88 |
| Silt | >0.005 mm | 60.57 |
| Clay | <0.005 mm | 11.55 |
| | **Total** | **100** |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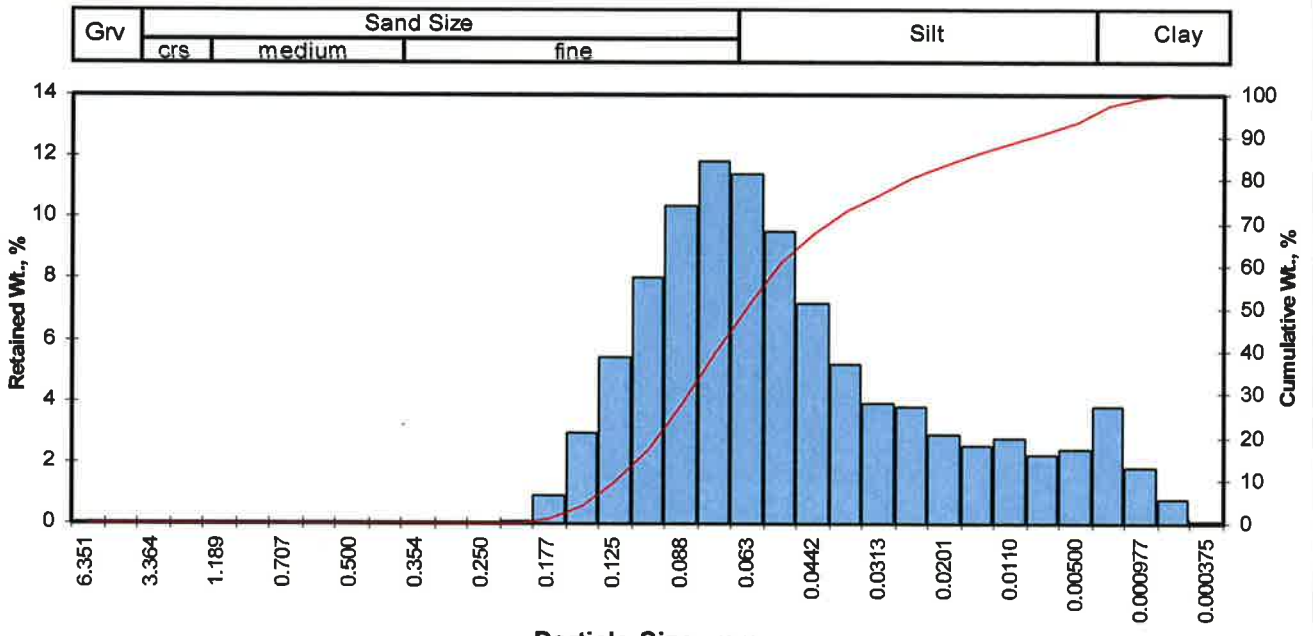
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1635C Run 1, Sample 2 |
| **Project No:** | N/A | **Depth, ft:** | 79.5-80.0 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.09 | 0.09 | 0.09 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.88 | 0.88 | 0.97 |
| 0.0059 | 0.149 | 2.75 | 100 | 2.96 | 2.96 | 3.93 |
| 0.0049 | 0.125 | 3.00 | 120 | 5.43 | 5.43 | 9.36 |
| 0.0041 | 0.105 | 3.25 | 140 | 8.03 | 8.03 | 17.40 |
| 0.0035 | 0.088 | 3.50 | 170 | 10.40 | 10.41 | 27.80 |
| 0.0029 | 0.074 | 3.75 | 200 | 11.80 | 11.81 | 39.61 |
| 0.0025 | 0.063 | 4.00 | 230 | 11.40 | 11.41 | 51.01 |
| 0.0021 | 0.053 | 4.25 | 270 | 9.55 | 9.55 | 60.57 |
| 0.00174 | 0.0442 | 4.50 | 325 | 7.16 | 7.16 | 67.73 |
| 0.00146 | 0.0372 | 4.75 | 400 | 5.21 | 5.21 | 72.94 |
| 0.00123 | 0.0313 | 5.00 | 450 | 3.91 | 3.91 | 76.86 |
| 0.000986 | 0.0250 | 5.32 | 500 | 3.82 | 3.82 | 80.68 |
| 0.000790 | 0.0201 | 5.64 | 635 | 2.89 | 2.89 | 83.57 |
| 0.000615 | 0.0156 | 6.00 | | 2.52 | 2.52 | 86.09 |
| 0.000435 | 0.0110 | 6.50 | | 2.77 | 2.77 | 88.86 |
| 0.000308 | 0.00781 | 7.00 | | 2.25 | 2.25 | 91.11 |
| 0.000197 | 0.00500 | 7.65 | | 2.39 | 2.39 | 93.50 |
| 0.000077 | 0.00195 | 9.00 | | 3.82 | 3.82 | 97.33 |
| 0.000038 | 0.000977 | 10.00 | | 1.80 | 1.80 | 99.13 |
| 0.000019 | 0.000488 | 11.00 | | 0.80 | 0.80 | 99.93 |
| 0.000015 | 0.000375 | 11.38 | | 0.07 | 0.07 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 2.80 | 0.0057 | 0.144 |
| 10 | 3.02 | 0.0049 | 0.123 |
| 16 | 3.21 | 0.0043 | 0.108 |
| 25 | 3.43 | 0.0036 | 0.093 |
| 40 | 3.76 | 0.0029 | 0.074 |
| 50 | 3.98 | 0.0025 | 0.063 |
| 60 | 4.24 | 0.0021 | 0.053 |
| 75 | 4.88 | 0.0013 | 0.034 |
| 84 | 5.70 | 0.0008 | 0.019 |
| 90 | 6.75 | 0.0004 | 0.009 |
| 95 | 8.18 | 0.0001 | 0.003 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 3.98 | 3.98 | 3.98 |
| Median, in. | 0.0025 | 0.0025 | 0.0025 |
| Median, mm | 0.063 | 0.063 | 0.063 |
| Mean, phi | 3.98 | 4.45 | 4.30 |
| Mean, in. | 0.0025 | 0.0018 | 0.0020 |
| Mean, mm | 0.063 | 0.046 | 0.051 |
| Sorting | 1.652 | 1.247 | 1.438 |
| Skewness | 0.883 | 0.382 | 0.472 |
| Kurtosis | 0.257 | 1.155 | 1.521 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 39.61 |
| Silt | >0.005 mm | 53.90 |
| Clay | <0.005 mm | 6.50 |
| | **Total** | **100** |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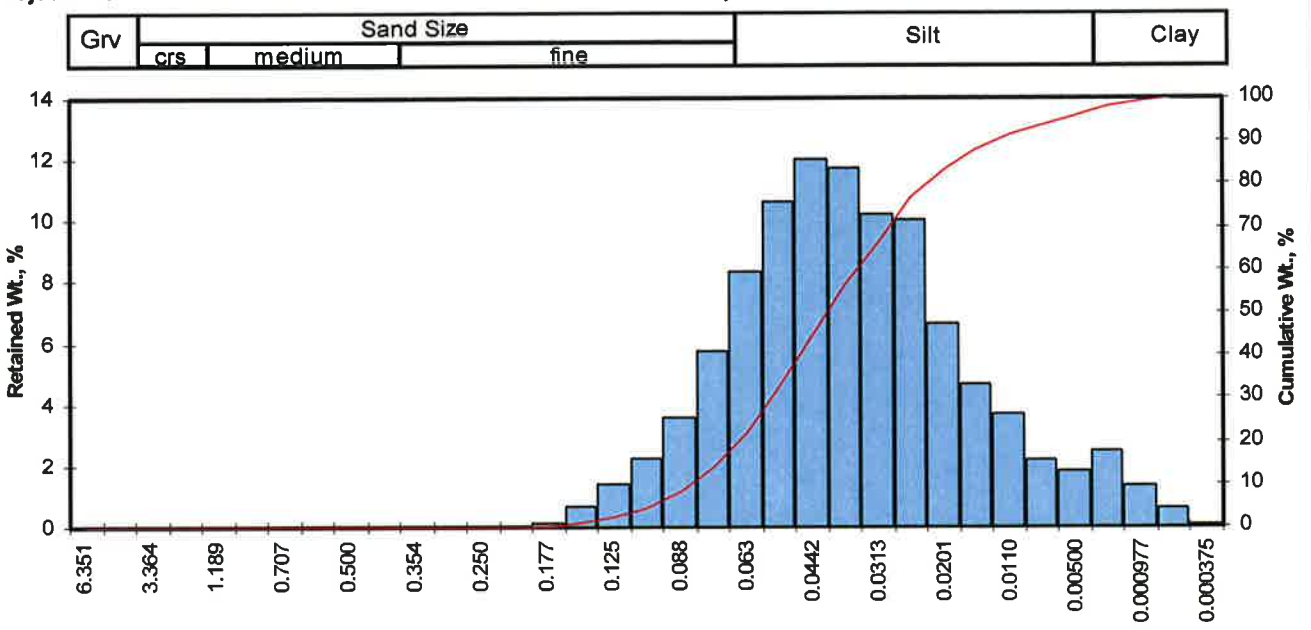
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1635C Run 2, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 197.0-197.5 |




| Opening (Inches) | Opening (Millimeters) | Phi of Screen | U.S. No. | Sample Weight, grams | Increment Weight, percent | Cumulative Weight, percent |
|---|---|---|---|---|---|---|
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.00 | 0.00 | 0.00 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.11 | 0.11 | 0.11 |
| 0.0059 | 0.149 | 2.75 | 100 | 0.66 | 0.66 | 0.77 |
| 0.0049 | 0.125 | 3.00 | 120 | 1.41 | 1.41 | 2.18 |
| 0.0041 | 0.105 | 3.25 | 140 | 2.24 | 2.24 | 4.42 |
| 0.0035 | 0.088 | 3.50 | 170 | 3.58 | 3.58 | 8.00 |
| 0.0029 | 0.074 | 3.75 | 200 | 5.73 | 5.73 | 13.73 |
| 0.0025 | 0.063 | 4.00 | 230 | 8.34 | 8.34 | 22.07 |
| 0.0021 | 0.053 | 4.25 | 270 | 10.60 | 10.60 | 32.67 |
| 0.00174 | 0.0442 | 4.50 | 325 | 12.00 | 12.00 | 44.67 |
| 0.00146 | 0.0372 | 4.75 | 400 | 11.70 | 11.70 | 56.37 |
| 0.00123 | 0.0313 | 5.00 | 450 | 10.20 | 10.20 | 66.57 |
| 0.000986 | 0.0250 | 5.32 | 500 | 10.00 | 10.00 | 76.57 |
| 0.000790 | 0.0201 | 5.64 | 635 | 6.66 | 6.66 | 83.23 |
| 0.000615 | 0.0156 | 6.00 | | 4.67 | 4.67 | 87.90 |
| 0.000435 | 0.0110 | 6.50 | | 3.67 | 3.67 | 91.57 |
| 0.000308 | 0.00781 | 7.00 | | 2.16 | 2.16 | 93.73 |
| 0.000197 | 0.00500 | 7.65 | | 1.80 | 1.80 | 95.53 |
| 0.000077 | 0.00195 | 9.00 | | 2.48 | 2.48 | 98.01 |
| 0.000038 | 0.000977 | 10.00 | | 1.30 | 1.30 | 99.31 |
| 0.000019 | 0.000488 | 11.00 | | 0.63 | 0.63 | 99.94 |
| 0.000015 | 0.000375 | 11.38 | | 0.06 | 0.06 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

**Cumulative Weight Percent greater than**

| Weight percent | Phi Value | Particle Size (Inches) | Particle Size (Millimeters) |
|---|---|---|---|
| 5 | 3.29 | 0.0040 | 0.102 |
| 10 | 3.59 | 0.0033 | 0.083 |
| 16 | 3.82 | 0.0028 | 0.071 |
| 25 | 4.07 | 0.0023 | 0.060 |
| 40 | 4.40 | 0.0019 | 0.047 |
| 50 | 4.61 | 0.0016 | 0.041 |
| 60 | 4.84 | 0.0014 | 0.035 |
| 75 | 5.27 | 0.0010 | 0.026 |
| 84 | 5.70 | 0.0008 | 0.019 |
| 90 | 6.29 | 0.0005 | 0.013 |
| 95 | 7.45 | 0.0002 | 0.006 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.61 | 4.61 | 4.61 |
| Median, in. | 0.0016 | 0.0016 | 0.0016 |
| Median, mm | 0.041 | 0.041 | 0.041 |
| Mean, phi | 4.55 | 4.76 | 4.71 |
| Mean, in. | 0.0017 | 0.0015 | 0.0015 |
| Mean, mm | 0.043 | 0.037 | 0.038 |
| Sorting | 1.516 | 0.941 | 1.101 |
| Skewness | 0.962 | 0.154 | 0.259 |
| Kurtosis | 0.239 | 1.214 | 1.421 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 13.73 |
| Silt | >0.005 mm | 81.80 |
| Clay | <0.005 mm | 4.47 |
| | **Total** | **100** |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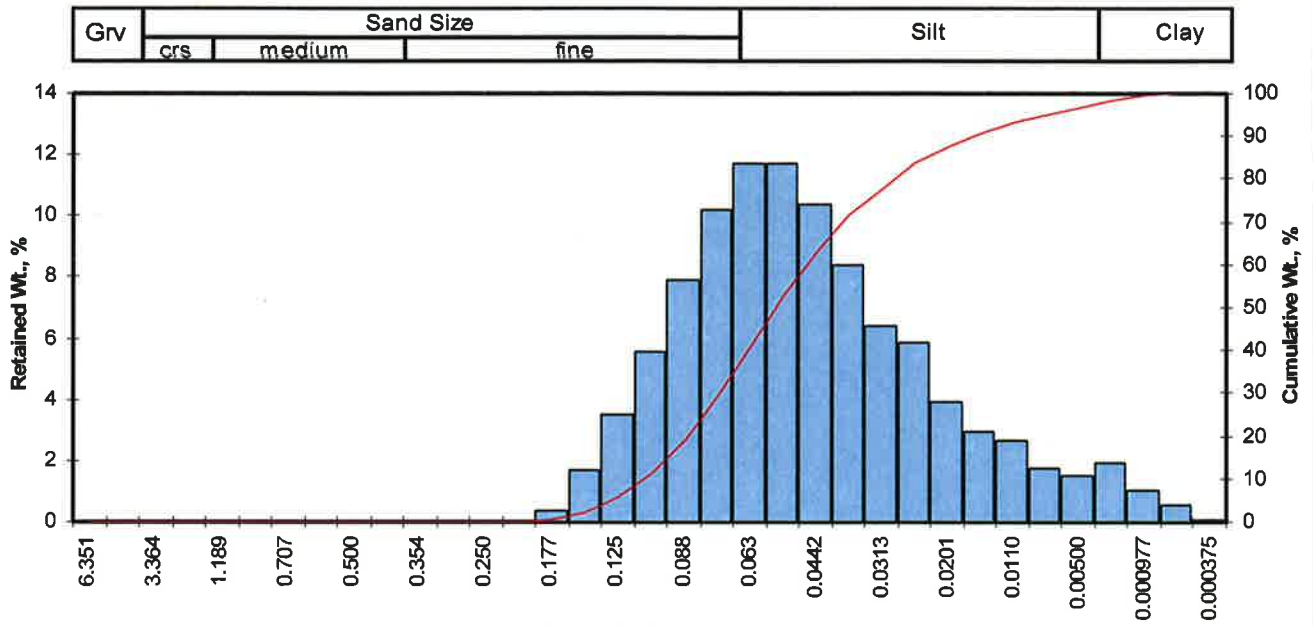
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1635C Run 2, Sample 2 |
| **Project No:** | N/A | **Depth, ft:** | 206.5-207.0 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.03 | 0.03 | 0.03 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.39 | 0.39 | 0.42 |
| 0.0059 | 0.149 | 2.75 | 100 | 1.67 | 1.67 | 2.09 |
| 0.0049 | 0.125 | 3.00 | 120 | 3.49 | 3.49 | 5.58 |
| 0.0041 | 0.105 | 3.25 | 140 | 5.56 | 5.56 | 11.14 |
| 0.0035 | 0.088 | 3.50 | 170 | 7.91 | 7.91 | 19.04 |
| 0.0029 | 0.074 | 3.75 | 200 | 10.20 | 10.20 | 29.24 |
| 0.0025 | 0.063 | 4.00 | 230 | 11.70 | 11.70 | 40.94 |
| 0.0021 | 0.053 | 4.25 | 270 | 11.70 | 11.70 | 52.63 |
| 0.00174 | 0.0442 | 4.50 | 325 | 10.40 | 10.40 | 63.03 |
| 0.00146 | 0.0372 | 4.75 | 400 | 8.38 | 8.38 | 71.41 |
| 0.00123 | 0.0313 | 5.00 | 450 | 6.39 | 6.39 | 77.79 |
| 0.000986 | 0.0250 | 5.32 | 500 | 5.85 | 5.85 | 83.64 |
| 0.000790 | 0.0201 | 5.64 | 635 | 3.93 | 3.93 | 87.57 |
| 0.000615 | 0.0156 | 6.00 | | 2.97 | 2.97 | 90.54 |
| 0.000435 | 0.0110 | 6.50 | | 2.65 | 2.65 | 93.19 |
| 0.000308 | 0.00781 | 7.00 | | 1.73 | 1.73 | 94.92 |
| 0.000197 | 0.00500 | 7.65 | | 1.49 | 1.49 | 96.41 |
| 0.000077 | 0.00195 | 9.00 | | 1.96 | 1.96 | 98.37 |
| 0.000038 | 0.000977 | 10.00 | | 1.03 | 1.03 | 99.40 |
| 0.000019 | 0.000488 | 11.00 | | 0.55 | 0.55 | 99.95 |
| 0.000015 | 0.000375 | 11.38 | | 0.05 | 0.05 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 2.96 | 0.0051 | 0.129 |
| 10 | 3.20 | 0.0043 | 0.109 |
| 16 | 3.40 | 0.0037 | 0.094 |
| 25 | 3.65 | 0.0031 | 0.080 |
| 40 | 3.98 | 0.0025 | 0.063 |
| 50 | 4.19 | 0.0022 | 0.055 |
| 60 | 4.43 | 0.0018 | 0.046 |
| 75 | 4.89 | 0.0013 | 0.034 |
| 84 | 5.35 | 0.0010 | 0.025 |
| 90 | 5.93 | 0.0006 | 0.016 |
| 95 | 7.04 | 0.0003 | 0.008 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.19 | 4.19 | 4.19 |
| Median, in. | 0.0022 | 0.0022 | 0.0022 |
| Median, mm | 0.055 | 0.055 | 0.055 |
| Mean, phi | 4.14 | 4.38 | 4.32 |
| Mean, in. | 0.0022 | 0.0019 | 0.0020 |
| Mean, mm | 0.057 | 0.048 | 0.050 |
| Sorting | 1.539 | 0.973 | 1.104 |
| Skewness | 0.950 | 0.188 | 0.291 |
| Kurtosis | 0.249 | 1.096 | 1.342 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 29.24 |
| Silt | >0.005 mm | 67.17 |
| Clay | <0.005 mm | 3.59 |
| | **Total** | **100** |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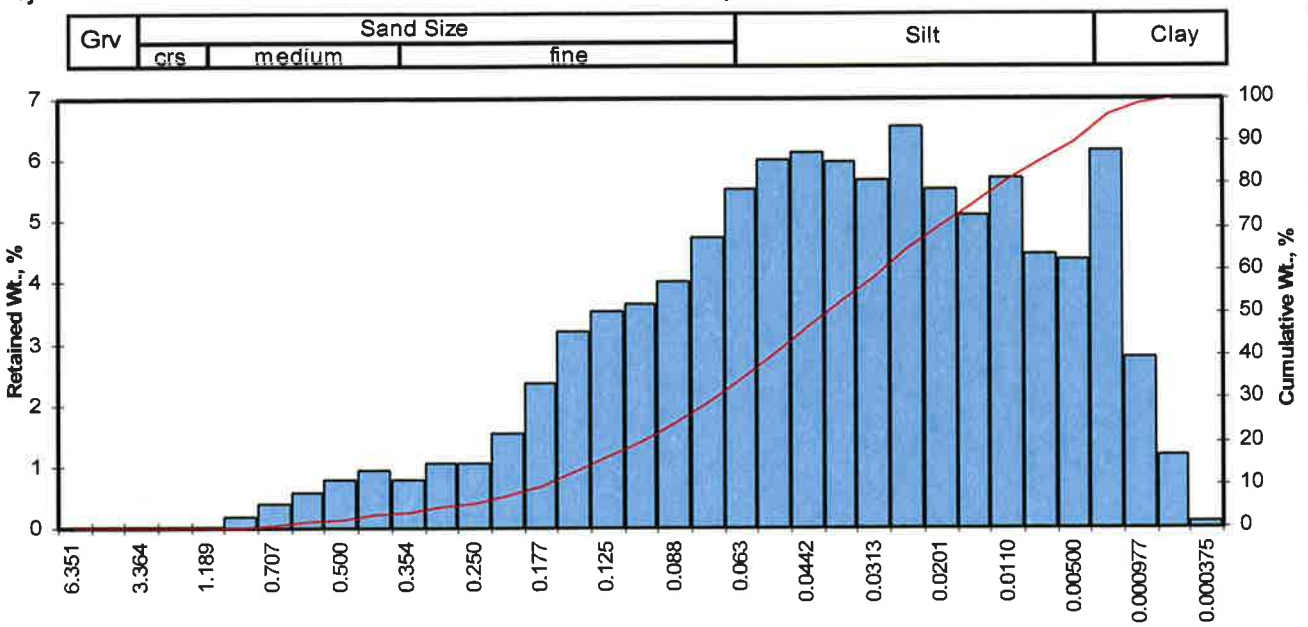
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1635C Run 3, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 530.0-530.5 |




**Particle Size, mm**

| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.17 | 0.17 | 0.17 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.40 | 0.40 | 0.57 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.56 | 0.56 | 1.13 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.77 | 0.77 | 1.90 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.93 | 0.93 | 2.83 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.79 | 0.79 | 3.62 |
| 0.0117 | 0.297 | 1.75 | 50 | 1.07 | 1.07 | 4.69 |
| 0.0098 | 0.250 | 2.00 | 60 | 1.05 | 1.05 | 5.74 |
| 0.0083 | 0.210 | 2.25 | 70 | 1.53 | 1.53 | 7.27 |
| 0.0070 | 0.177 | 2.50 | 80 | 2.36 | 2.36 | 9.63 |
| 0.0059 | 0.149 | 2.75 | 100 | 3.19 | 3.19 | 12.82 |
| 0.0049 | 0.125 | 3.00 | 120 | 3.54 | 3.54 | 16.36 |
| 0.0041 | 0.105 | 3.25 | 140 | 3.66 | 3.66 | 20.02 |
| 0.0035 | 0.088 | 3.50 | 170 | 4.02 | 4.02 | 24.04 |
| 0.0029 | 0.074 | 3.75 | 200 | 4.75 | 4.75 | 28.79 |
| 0.0025 | 0.063 | 4.00 | 230 | 5.53 | 5.53 | 34.32 |
| 0.0021 | 0.053 | 4.25 | 270 | 5.99 | 5.99 | 40.31 |
| 0.00174 | 0.0442 | 4.50 | 325 | 6.12 | 6.12 | 46.43 |
| 0.00146 | 0.0372 | 4.75 | 400 | 5.98 | 5.98 | 52.41 |
| 0.00123 | 0.0313 | 5.00 | 450 | 5.68 | 5.68 | 58.09 |
| 0.000986 | 0.0250 | 5.32 | 500 | 6.54 | 6.54 | 64.63 |
| 0.000790 | 0.0201 | 5.64 | 635 | 5.53 | 5.53 | 70.16 |
| 0.000615 | 0.0156 | 6.00 | | 5.10 | 5.10 | 75.26 |
| 0.000435 | 0.0110 | 6.50 | | 5.70 | 5.70 | 80.96 |
| 0.000308 | 0.00781 | 7.00 | | 4.47 | 4.47 | 85.43 |
| 0.000197 | 0.00500 | 7.65 | | 4.37 | 4.37 | 89.80 |
| 0.000077 | 0.00195 | 9.00 | | 6.15 | 6.15 | 95.95 |
| 0.000038 | 0.000977 | 10.00 | | 2.77 | 2.77 | 98.72 |
| 0.000019 | 0.000488 | 11.00 | | 1.18 | 1.18 | 99.90 |
| 0.000015 | 0.000375 | 11.38 | | 0.10 | 0.10 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

**Cumulative Weight Percent greater than**

| Weight percent | Phi Value | Particle Size Inches | Particle Size Millimeters |
|---|---|---|---|
| 5 | 1.82 | 0.0111 | 0.282 |
| 10 | 2.53 | 0.0068 | 0.173 |
| 16 | 2.97 | 0.0050 | 0.127 |
| 25 | 3.55 | 0.0034 | 0.085 |
| 40 | 4.24 | 0.0021 | 0.053 |
| 50 | 4.65 | 0.0016 | 0.040 |
| 60 | 5.09 | 0.0012 | 0.029 |
| 75 | 5.98 | 0.0006 | 0.016 |
| 84 | 6.84 | 0.0003 | 0.009 |
| 90 | 7.69 | 0.0002 | 0.005 |
| 95 | 8.79 | 0.0001 | 0.002 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.65 | 4.65 | 4.65 |
| Median, in. | 0.0016 | 0.0016 | 0.0016 |
| Median, mm | 0.040 | 0.040 | 0.040 |
| Mean, phi | 4.31 | 4.91 | 4.82 |
| Mean, in. | 0.0020 | 0.0013 | 0.0014 |
| Mean, mm | 0.051 | 0.033 | 0.035 |
| Sorting | 2.322 | 1.933 | 2.022 |
| Skewness | 0.922 | 0.134 | 0.161 |
| Kurtosis | 0.206 | 0.802 | 1.174 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 2.83 |
| Fine Sand | 200 | 25.96 |
| Silt | >0.005 mm | 61.01 |
| Clay | <0.005 mm | 10.20 |
| | **Total** | **100** |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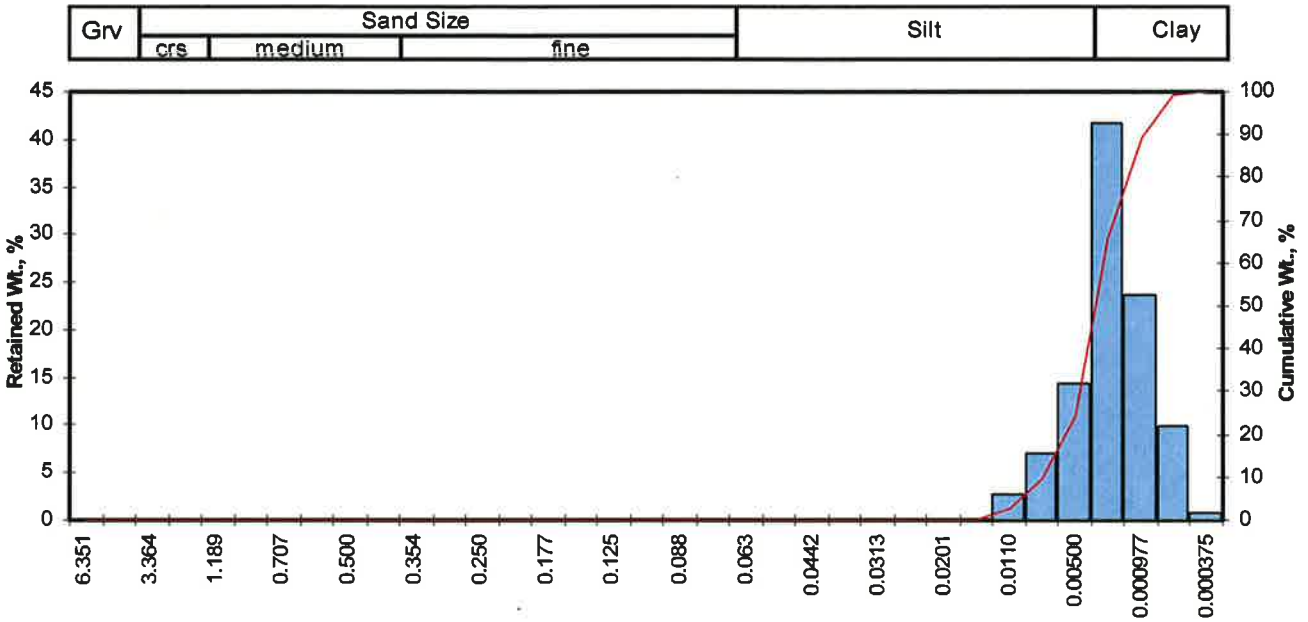
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1635C Run 6, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 993.0-994.0 |




| Opening (Inches) | Opening (Millimeters) | Phi of Screen | U.S. No. | Sample Weight, grams | Increment Weight, percent | Cumulative Weight, percent |
|---|---|---|---|---|---|---|
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.00 | 0.00 | 0.00 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.00 | 0.00 | 0.00 |
| 0.0059 | 0.149 | 2.75 | 100 | 0.00 | 0.00 | 0.00 |
| 0.0049 | 0.125 | 3.00 | 120 | 0.00 | 0.00 | 0.00 |
| 0.0041 | 0.105 | 3.25 | 140 | 0.00 | 0.00 | 0.00 |
| 0.0035 | 0.088 | 3.50 | 170 | 0.00 | 0.00 | 0.00 |
| 0.0029 | 0.074 | 3.75 | 200 | 0.00 | 0.00 | 0.00 |
| 0.0025 | 0.063 | 4.00 | 230 | 0.00 | 0.00 | 0.00 |
| 0.0021 | 0.053 | 4.25 | 270 | 0.00 | 0.00 | 0.00 |
| 0.00174 | 0.0442 | 4.50 | 325 | 0.00 | 0.00 | 0.00 |
| 0.00146 | 0.0372 | 4.75 | 400 | 0.00 | 0.00 | 0.00 |
| 0.00123 | 0.0313 | 5.00 | 450 | 0.00 | 0.00 | 0.00 |
| 0.000986 | 0.0250 | 5.32 | 500 | 0.00 | 0.00 | 0.00 |
| 0.000790 | 0.0201 | 5.64 | 635 | 0.00 | 0.00 | 0.00 |
| 0.000615 | 0.0156 | 6.00 | | 0.06 | 0.06 | 0.06 |
| 0.000435 | 0.0110 | 6.50 | | 2.68 | 2.68 | 2.75 |
| 0.000308 | 0.00781 | 7.00 | | 6.89 | 6.89 | 9.64 |
| 0.000197 | 0.00500 | 7.65 | | 14.40 | 14.41 | 24.05 |
| 0.000077 | 0.00195 | 9.00 | | 41.60 | 41.62 | 65.67 |
| 0.000038 | 0.000977 | 10.00 | | 23.60 | 23.61 | 89.28 |
| 0.000019 | 0.000488 | 11.00 | | 9.86 | 9.87 | 99.15 |
| 0.000015 | 0.000375 | 11.38 | | 0.85 | 0.85 | 100.00 |
| **TOTALS** | | | | **99.90** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight percent | Phi Value | Particle Size Inches | Particle Size Millimeters |
| 5 | 6.66 | 0.0004 | 0.010 |
| 10 | 7.02 | 0.0003 | 0.008 |
| 16 | 7.28 | 0.0003 | 0.006 |
| 25 | 7.68 | 0.0002 | 0.005 |
| 40 | 8.16 | 0.0001 | 0.003 |
| 50 | 8.49 | 0.0001 | 0.003 |
| 60 | 8.82 | 0.0001 | 0.002 |
| 75 | 9.40 | 0.0001 | 0.001 |
| 84 | 9.78 | 0.0000 | 0.001 |
| 90 | 10.07 | 0.0000 | 0.001 |
| 95 | 10.58 | 0.0000 | 0.001 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 8.49 | 8.49 | 8.49 |
| Median, in. | 0.0001 | 0.0001 | 0.0001 |
| Median, mm | 0.003 | 0.003 | 0.003 |
| Mean, phi | 8.29 | 8.53 | 8.52 |
| Mean, in. | 0.0001 | 0.0001 | 0.0001 |
| Mean, mm | 0.003 | 0.003 | 0.003 |
| Sorting | 1.814 | 1.246 | 1.216 |
| Skewness | 0.969 | 0.033 | 0.050 |
| Kurtosis | 0.250 | 0.572 | 0.934 |
| **Grain Size Description** (ASTM-USCS Scale) | | Clay (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 0.00 |
| Silt | >0.005 mm | 24.05 |
| Clay | <0.005 mm | 75.95 |
| | **Total** | **100** |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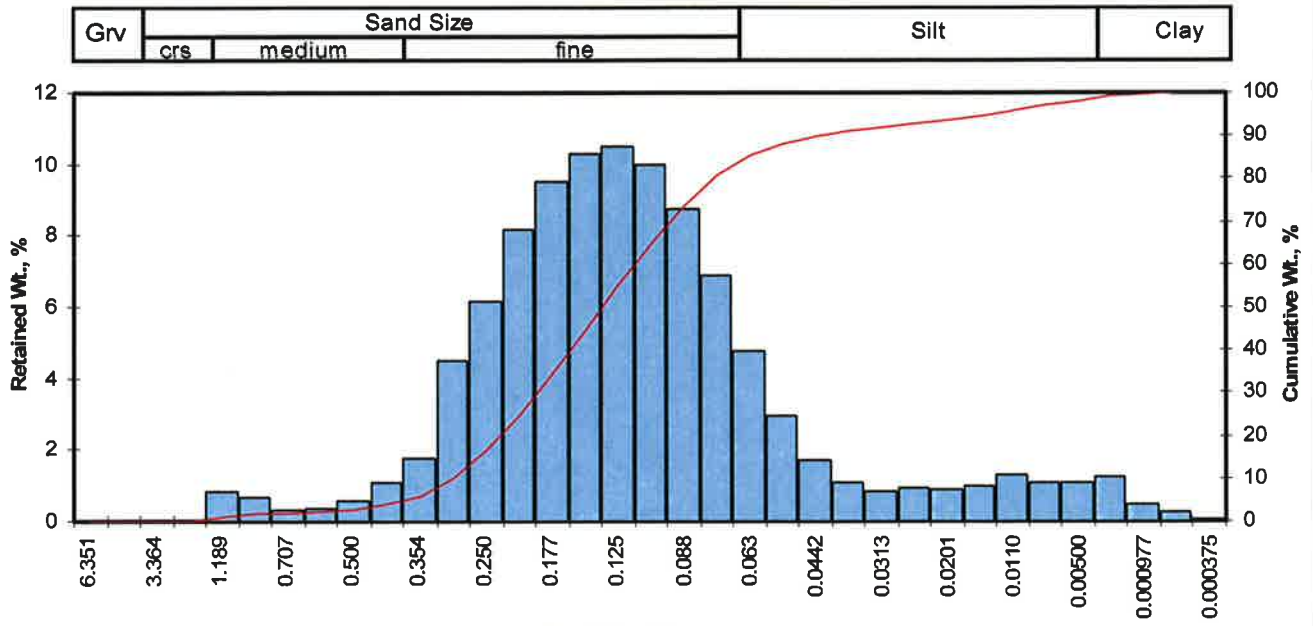
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1912C Run 1, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 63.0-64.0 |




| Opening (Inches) | Opening (Millimeters) | Phi of Screen | U.S. No. | Sample Weight, grams | Increment Weight, percent | Cumulative Weight, percent |
|---|---|---|---|---|---|---|
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.82 | 0.82 | 0.82 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.69 | 0.69 | 1.51 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.32 | 0.32 | 1.83 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.35 | 0.35 | 2.18 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.56 | 0.56 | 2.74 |
| 0.0166 | 0.420 | 1.25 | 40 | 1.11 | 1.11 | 3.85 |
| 0.0139 | 0.354 | 1.50 | 45 | 1.76 | 1.76 | 5.61 |
| 0.0117 | 0.297 | 1.75 | 50 | 4.49 | 4.49 | 10.11 |
| 0.0098 | 0.250 | 2.00 | 60 | 6.17 | 6.17 | 16.28 |
| 0.0083 | 0.210 | 2.25 | 70 | 8.15 | 8.16 | 24.44 |
| 0.0070 | 0.177 | 2.50 | 80 | 9.52 | 9.53 | 33.96 |
| 0.0059 | 0.149 | 2.75 | 100 | 10.30 | 10.31 | 44.27 |
| 0.0049 | 0.125 | 3.00 | 120 | 10.50 | 10.51 | 54.77 |
| 0.0041 | 0.105 | 3.25 | 140 | 9.99 | 10.00 | 64.77 |
| 0.0035 | 0.088 | 3.50 | 170 | 8.74 | 8.75 | 73.52 |
| 0.0029 | 0.074 | 3.75 | 200 | 6.87 | 6.87 | 80.39 |
| 0.0025 | 0.063 | 4.00 | 230 | 4.77 | 4.77 | 85.16 |
| 0.0021 | 0.053 | 4.25 | 270 | 2.95 | 2.95 | 88.11 |
| 0.00174 | 0.0442 | 4.50 | 325 | 1.73 | 1.73 | 89.85 |
| 0.00146 | 0.0372 | 4.75 | 400 | 1.11 | 1.11 | 90.96 |
| 0.00123 | 0.0313 | 5.00 | 450 | 0.83 | 0.83 | 91.79 |
| 0.000986 | 0.0250 | 5.32 | 500 | 0.92 | 0.92 | 92.71 |
| 0.000790 | 0.0201 | 5.64 | 635 | 0.88 | 0.88 | 93.59 |
| 0.000615 | 0.0156 | 6.00 | | 0.97 | 0.97 | 94.56 |
| 0.000435 | 0.0110 | 6.50 | | 1.28 | 1.28 | 95.84 |
| 0.000308 | 0.00781 | 7.00 | | 1.09 | 1.09 | 96.93 |
| 0.000197 | 0.00500 | 7.65 | | 1.06 | 1.06 | 97.99 |
| 0.000077 | 0.00195 | 9.00 | | 1.22 | 1.22 | 99.21 |
| 0.000038 | 0.000977 | 10.00 | | 0.49 | 0.49 | 99.70 |
| 0.000019 | 0.000488 | 11.00 | | 0.27 | 0.27 | 99.97 |
| 0.000015 | 0.000375 | 11.38 | | 0.03 | 0.03 | 100.00 |
| **TOTALS** | | | | **99.90** | **100.00** | **100.00** |

**Cumulative Weight Percent greater than**

| Weight percent | Phi Value | Particle Size (Inches) | Particle Size (Millimeters) |
|---|---|---|---|
| 5 | 1.41 | 0.0148 | 0.376 |
| 10 | 1.74 | 0.0118 | 0.299 |
| 16 | 1.99 | 0.0099 | 0.252 |
| 25 | 2.26 | 0.0082 | 0.208 |
| 40 | 2.65 | 0.0063 | 0.160 |
| 50 | 2.89 | 0.0053 | 0.135 |
| 60 | 3.13 | 0.0045 | 0.114 |
| 75 | 3.55 | 0.0034 | 0.085 |
| 84 | 3.94 | 0.0026 | 0.065 |
| 90 | 4.53 | 0.0017 | 0.043 |
| 95 | 6.17 | 0.0005 | 0.014 |

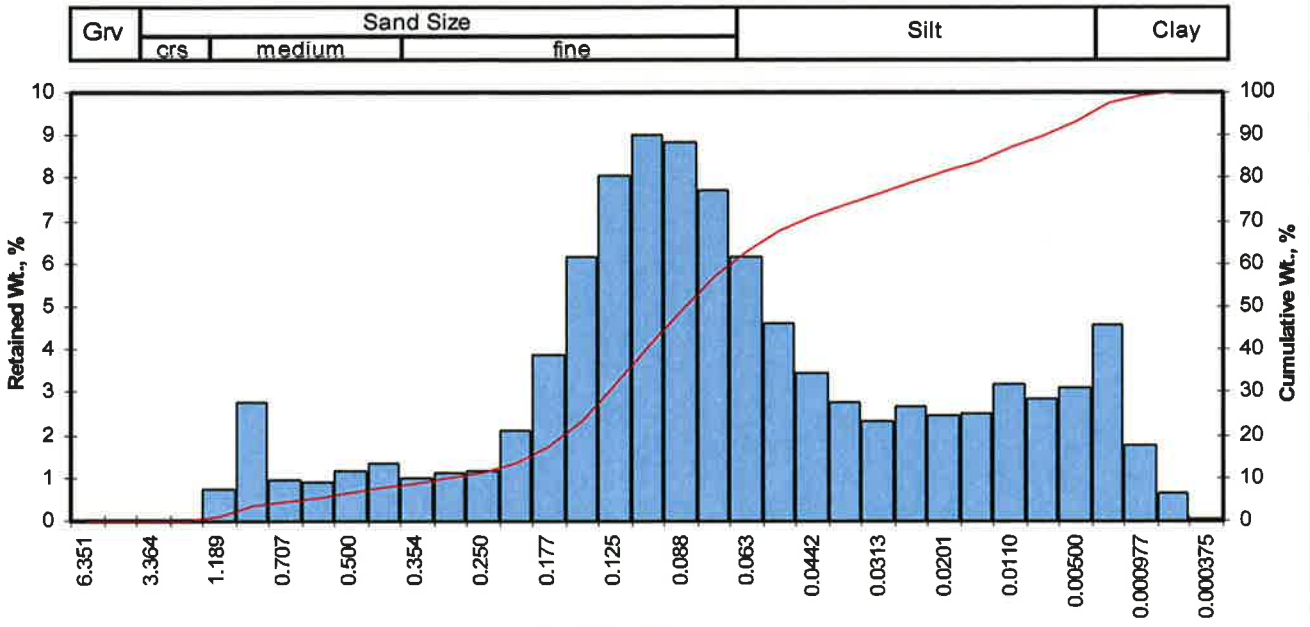
| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 2.89 | 2.89 | 2.89 |
| Median, in. | 0.0053 | 0.0053 | 0.0053 |
| Median, mm | 0.135 | 0.135 | 0.135 |
| Mean, phi | 2.77 | 2.96 | 2.94 |
| Mean, in. | 0.0058 | 0.0050 | 0.0051 |
| Mean, mm | 0.147 | 0.128 | 0.130 |
| Sorting | 1.563 | 0.975 | 1.209 |
| Skewness | 0.984 | 0.079 | 0.230 |
| Kurtosis | 0.241 | 1.440 | 1.513 |
| **Grain Size Description** (ASTM-USCS Scale) | | Fine sand (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 3.85 |
| Fine Sand | 200 | 76.54 |
| Silt | >0.005 mm | 17.60 |
| Clay | <0.005 mm | 2.01 |
| | **Total** | **100** |

# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1912C Run 2, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 130.7-131.7 |




| Opening Inches | Opening Millimeters | Phi of Screen | U.S. No. | Sample Weight, grams | Increment Weight, percent | Cumulative Weight, percent |
|---|---|---|---|---|---|---|
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.74 | 0.74 | 0.74 |
| 0.0331 | 0.841 | 0.25 | 20 | 2.75 | 2.75 | 3.49 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.96 | 0.96 | 4.45 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.89 | 0.89 | 5.34 |
| 0.0197 | 0.500 | 1.00 | 35 | 1.17 | 1.17 | 6.51 |
| 0.0166 | 0.420 | 1.25 | 40 | 1.33 | 1.33 | 7.84 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.98 | 0.98 | 8.82 |
| 0.0117 | 0.297 | 1.75 | 50 | 1.10 | 1.10 | 9.92 |
| 0.0098 | 0.250 | 2.00 | 60 | 1.17 | 1.17 | 11.09 |
| 0.0083 | 0.210 | 2.25 | 70 | 2.13 | 2.13 | 13.22 |
| 0.0070 | 0.177 | 2.50 | 80 | 3.87 | 3.87 | 17.09 |
| 0.0059 | 0.149 | 2.75 | 100 | 6.15 | 6.15 | 23.24 |
| 0.0049 | 0.125 | 3.00 | 120 | 8.05 | 8.05 | 31.29 |
| 0.0041 | 0.105 | 3.25 | 140 | 9.01 | 9.01 | 40.30 |
| 0.0035 | 0.088 | 3.50 | 170 | 8.83 | 8.83 | 49.13 |
| 0.0029 | 0.074 | 3.75 | 200 | 7.73 | 7.73 | 56.86 |
| 0.0025 | 0.063 | 4.00 | 230 | 6.16 | 6.16 | 63.02 |
| 0.0021 | 0.053 | 4.25 | 270 | 4.63 | 4.63 | 67.65 |
| 0.00174 | 0.0442 | 4.50 | 325 | 3.46 | 3.46 | 71.11 |
| 0.00146 | 0.0372 | 4.75 | 400 | 2.74 | 2.74 | 73.86 |
| 0.00123 | 0.0313 | 5.00 | 450 | 2.34 | 2.34 | 76.20 |
| 0.000986 | 0.0250 | 5.32 | 500 | 2.67 | 2.67 | 78.87 |
| 0.000790 | 0.0201 | 5.64 | 635 | 2.44 | 2.44 | 81.31 |
| 0.000615 | 0.0156 | 6.00 | | 2.50 | 2.50 | 83.81 |
| 0.000435 | 0.0110 | 6.50 | | 3.19 | 3.19 | 87.00 |
| 0.000308 | 0.00781 | 7.00 | | 2.85 | 2.85 | 89.85 |
| 0.000197 | 0.00500 | 7.65 | | 3.12 | 3.12 | 92.97 |
| 0.000077 | 0.00195 | 9.00 | | 4.56 | 4.56 | 97.53 |
| 0.000038 | 0.000977 | 10.00 | | 1.77 | 1.77 | 99.30 |
| 0.000019 | 0.000488 | 11.00 | | 0.65 | 0.65 | 99.95 |
| 0.000015 | 0.000375 | 11.38 | | 0.05 | 0.05 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

**Cumulative Weight Percent greater than**

| Weight percent | Phi Value | Particle Size Inches | Particle Size Millimeters |
|---|---|---|---|
| 5 | 0.65 | 0.0250 | 0.635 |
| 10 | 1.77 | 0.0116 | 0.294 |
| 16 | 2.43 | 0.0073 | 0.186 |
| 25 | 2.80 | 0.0056 | 0.143 |
| 40 | 3.24 | 0.0042 | 0.106 |
| 50 | 3.53 | 0.0034 | 0.087 |
| 60 | 3.88 | 0.0027 | 0.068 |
| 75 | 4.87 | 0.0013 | 0.034 |
| 84 | 6.03 | 0.0006 | 0.015 |
| 90 | 7.03 | 0.0003 | 0.008 |
| 95 | 8.25 | 0.0001 | 0.003 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 3.53 | 3.53 | 3.53 |
| Median, in. | 0.0034 | 0.0034 | 0.0034 |
| Median, mm | 0.087 | 0.087 | 0.087 |
| Mean, phi | 3.50 | 4.23 | 4.00 |
| Mean, in. | 0.0035 | 0.0021 | 0.0025 |
| Mean, mm | 0.089 | 0.053 | 0.063 |
| Sorting | 2.047 | 1.800 | 2.051 |
| Skewness | 0.806 | 0.390 | 0.317 |
| Kurtosis | 0.190 | 1.109 | 1.505 |
| **Grain Size Description** (ASTM-USCS Scale) | | Fine sand (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 7.84 |
| Fine Sand | 200 | 49.02 |
| Silt | >0.005 mm | 36.10 |
| Clay | <0.005 mm | 7.03 |
| | **Total** | **100** |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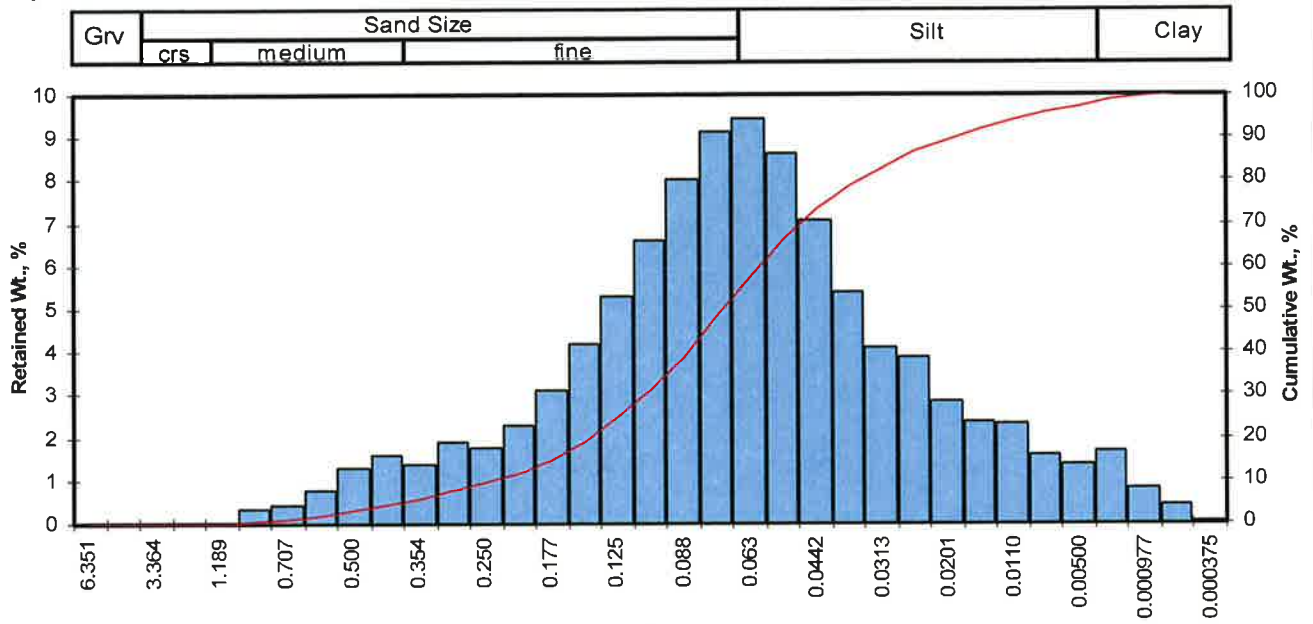
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1912C Run 3, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 255.0-255.5 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.02 | 0.02 | 0.02 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.35 | 0.35 | 0.37 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.41 | 0.41 | 0.78 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.78 | 0.78 | 1.56 |
| 0.0197 | 0.500 | 1.00 | 35 | 1.28 | 1.28 | 2.84 |
| 0.0166 | 0.420 | 1.25 | 40 | 1.58 | 1.58 | 4.42 |
| 0.0139 | 0.354 | 1.50 | 45 | 1.38 | 1.38 | 5.80 |
| 0.0117 | 0.297 | 1.75 | 50 | 1.89 | 1.89 | 7.69 |
| 0.0098 | 0.250 | 2.00 | 60 | 1.77 | 1.77 | 9.46 |
| 0.0083 | 0.210 | 2.25 | 70 | 2.28 | 2.28 | 11.74 |
| 0.0070 | 0.177 | 2.50 | 80 | 3.12 | 3.12 | 14.86 |
| 0.0059 | 0.149 | 2.75 | 100 | 4.20 | 4.20 | 19.06 |
| 0.0049 | 0.125 | 3.00 | 120 | 5.30 | 5.30 | 24.36 |
| 0.0041 | 0.105 | 3.25 | 140 | 6.58 | 6.58 | 30.94 |
| 0.0035 | 0.088 | 3.50 | 170 | 8.00 | 8.00 | 38.94 |
| 0.0029 | 0.074 | 3.75 | 200 | 9.15 | 9.15 | 48.09 |
| 0.0025 | 0.063 | 4.00 | 230 | 9.44 | 9.44 | 57.53 |
| 0.0021 | 0.053 | 4.25 | 270 | 8.62 | 8.62 | 66.15 |
| 0.00174 | 0.0442 | 4.50 | 325 | 7.06 | 7.06 | 73.21 |
| 0.00146 | 0.0372 | 4.75 | 400 | 5.39 | 5.39 | 78.60 |
| 0.00123 | 0.0313 | 5.00 | 450 | 4.08 | 4.08 | 82.68 |
| 0.000986 | 0.0250 | 5.32 | 500 | 3.90 | 3.90 | 86.58 |
| 0.000790 | 0.0201 | 5.64 | 635 | 2.85 | 2.85 | 89.43 |
| 0.000615 | 0.0156 | 6.00 | | 2.36 | 2.36 | 91.79 |
| 0.000435 | 0.0110 | 6.50 | | 2.31 | 2.31 | 94.10 |
| 0.000308 | 0.00781 | 7.00 | | 1.58 | 1.58 | 95.68 |
| 0.000197 | 0.00500 | 7.65 | | 1.36 | 1.36 | 97.04 |
| 0.000077 | 0.00195 | 9.00 | | 1.66 | 1.66 | 98.70 |
| 0.000038 | 0.000977 | 10.00 | | 0.82 | 0.82 | 99.52 |
| 0.000019 | 0.000488 | 11.00 | | 0.44 | 0.44 | 99.96 |
| 0.000015 | 0.000375 | 11.38 | | 0.04 | 0.04 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

**Cumulative Weight Percent greater than**

| Weight | Phi | Particle Size | |
|---|---|---|---|
| percent | Value | Inches | Millimeters |
| 5 | 1.35 | 0.0154 | 0.391 |
| 10 | 2.06 | 0.0094 | 0.240 |
| 16 | 2.57 | 0.0066 | 0.169 |
| 25 | 3.02 | 0.0048 | 0.123 |
| 40 | 3.53 | 0.0034 | 0.087 |
| 50 | 3.80 | 0.0028 | 0.072 |
| 60 | 4.07 | 0.0023 | 0.059 |
| 75 | 4.58 | 0.0016 | 0.042 |
| 84 | 5.11 | 0.0011 | 0.029 |
| 90 | 5.73 | 0.0007 | 0.019 |
| 95 | 6.79 | 0.0004 | 0.009 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 3.80 | 3.80 | 3.80 |
| Median, in. | 0.0028 | 0.0028 | 0.0028 |
| Median, mm | 0.072 | 0.072 | 0.072 |
| Mean, phi | 3.60 | 3.84 | 3.83 |
| Mean, in. | 0.0032 | 0.0028 | 0.0028 |
| Mean, mm | 0.082 | 0.070 | 0.071 |
| Sorting | 1.716 | 1.270 | 1.458 |
| Skewness | 0.998 | 0.030 | 0.064 |
| Kurtosis | 0.184 | 1.138 | 1.428 |
| **Grain Size Description** (ASTM-USCS Scale) | | Fine sand (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 4.42 |
| Fine Sand | 200 | 43.67 |
| Silt | >0.005 mm | 48.95 |
| Clay | <0.005 mm | 2.96 |
| | **Total** | **100** |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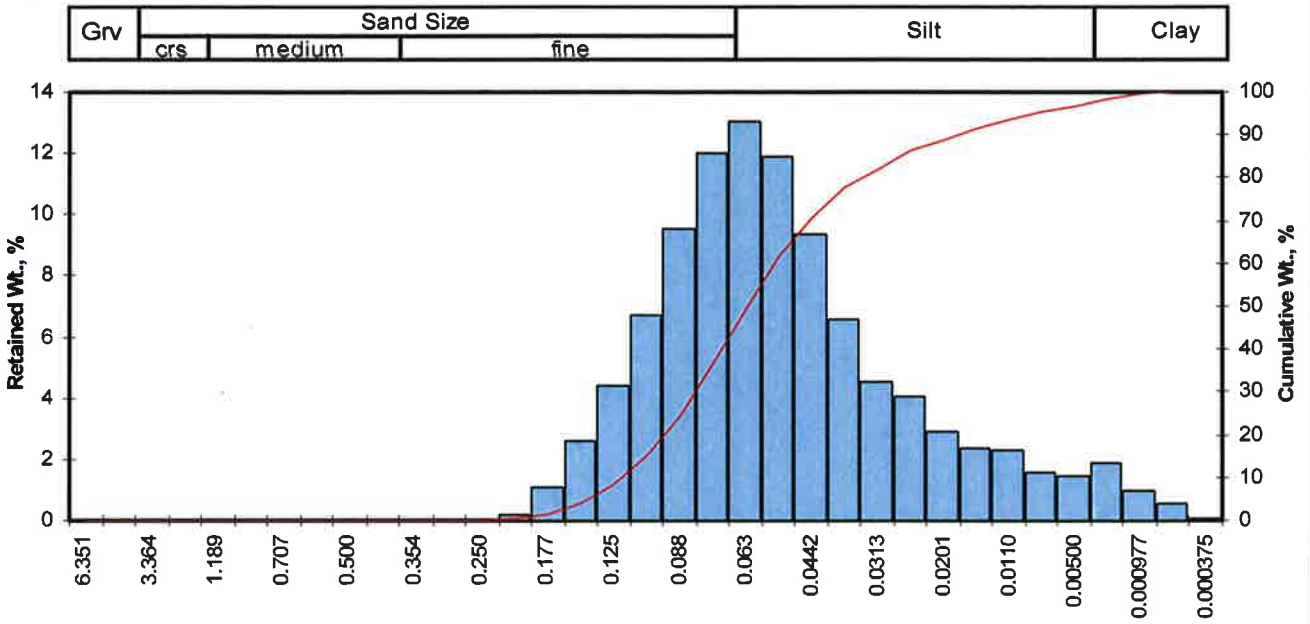
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1912C Run 3, Sample 2 |
| **Project No:** | N/A | **Depth, ft:** | 260.4-260.9 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.01 | 0.01 | 0.01 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.21 | 0.21 | 0.22 |
| 0.0070 | 0.177 | 2.50 | 80 | 1.09 | 1.09 | 1.31 |
| 0.0059 | 0.149 | 2.75 | 100 | 2.62 | 2.62 | 3.93 |
| 0.0049 | 0.125 | 3.00 | 120 | 4.42 | 4.42 | 8.36 |
| 0.0041 | 0.105 | 3.25 | 140 | 6.72 | 6.73 | 15.08 |
| 0.0035 | 0.088 | 3.50 | 170 | 9.52 | 9.53 | 24.61 |
| 0.0029 | 0.074 | 3.75 | 200 | 12.00 | 12.01 | 36.63 |
| 0.0025 | 0.063 | 4.00 | 230 | 13.00 | 13.01 | 49.64 |
| 0.0021 | 0.053 | 4.25 | 270 | 11.90 | 11.91 | 61.55 |
| 0.00174 | 0.0442 | 4.50 | 325 | 9.34 | 9.35 | 70.90 |
| 0.00146 | 0.0372 | 4.75 | 400 | 6.58 | 6.59 | 77.49 |
| 0.00123 | 0.0313 | 5.00 | 450 | 4.53 | 4.53 | 82.02 |
| 0.000986 | 0.0250 | 5.32 | 500 | 4.03 | 4.03 | 86.05 |
| 0.000790 | 0.0201 | 5.64 | 635 | 2.87 | 2.87 | 88.93 |
| 0.000615 | 0.0156 | 6.00 | | 2.36 | 2.36 | 91.29 |
| 0.000435 | 0.0110 | 6.50 | | 2.30 | 2.30 | 93.59 |
| 0.000308 | 0.00781 | 7.00 | | 1.59 | 1.59 | 95.18 |
| 0.000197 | 0.00500 | 7.65 | | 1.42 | 1.42 | 96.60 |
| 0.000077 | 0.00195 | 9.00 | | 1.87 | 1.87 | 98.48 |
| 0.000038 | 0.000977 | 10.00 | | 0.95 | 0.95 | 99.43 |
| 0.000019 | 0.000488 | 11.00 | | 0.52 | 0.52 | 99.95 |
| 0.000015 | 0.000375 | 11.38 | | 0.05 | 0.05 | 100.00 |
| **TOTALS** | | | | **99.90** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 2.81 | 0.0056 | 0.143 |
| 10 | 3.06 | 0.0047 | 0.120 |
| 16 | 3.27 | 0.0041 | 0.103 |
| 25 | 3.51 | 0.0035 | 0.088 |
| 40 | 3.81 | 0.0028 | 0.071 |
| 50 | 4.01 | 0.0024 | 0.062 |
| 60 | 4.22 | 0.0021 | 0.054 |
| 75 | 4.66 | 0.0016 | 0.040 |
| 84 | 5.16 | 0.0011 | 0.028 |
| 90 | 5.80 | 0.0007 | 0.018 |
| 95 | 6.94 | 0.0003 | 0.008 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.01 | 4.01 | 4.01 |
| Median, in. | 0.0024 | 0.0024 | 0.0024 |
| Median, mm | 0.062 | 0.062 | 0.062 |
| Mean, phi | 3.97 | 4.22 | 4.15 |
| Mean, in. | 0.0025 | 0.0021 | 0.0022 |
| Mean, mm | 0.064 | 0.054 | 0.056 |
| Sorting | 1.488 | 0.942 | 1.097 |
| Skewness | 0.950 | 0.221 | 0.321 |
| Kurtosis | 0.237 | 1.194 | 1.476 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 36.63 |
| Silt | >0.005 mm | 59.98 |
| Clay | <0.005 mm | 3.40 |
| | **Total** | **100** |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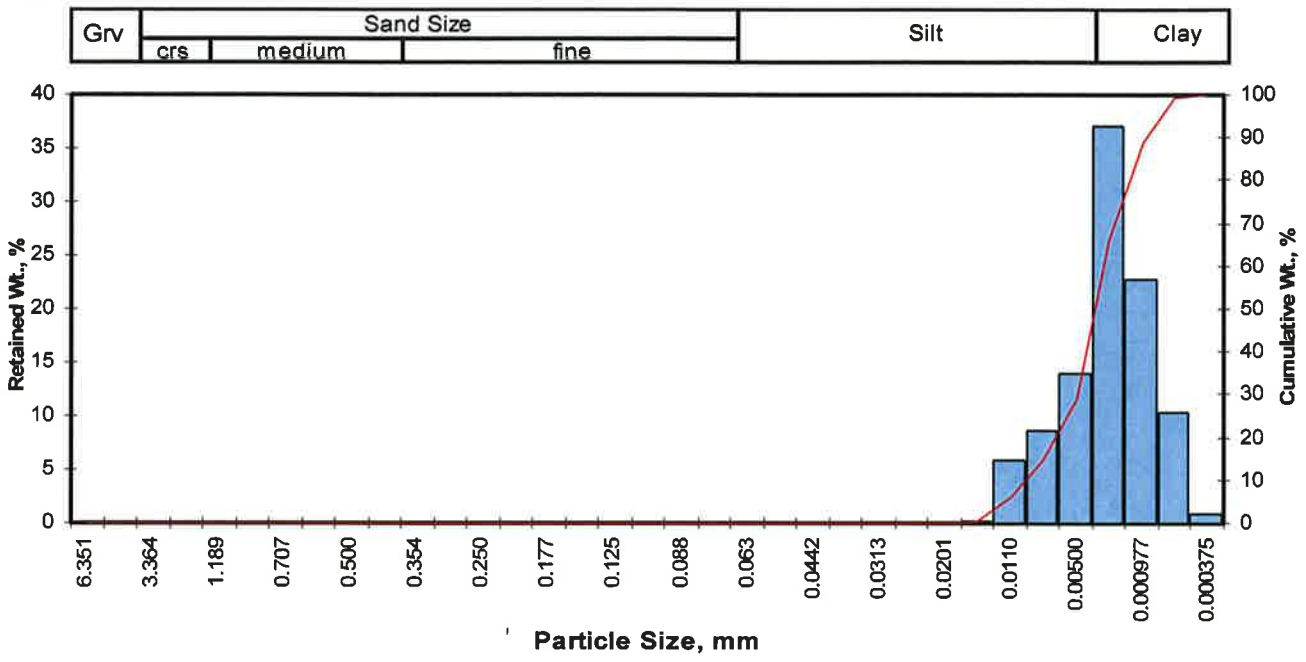
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1912C Run 4, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 974.5-975.0 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.00 | 0.00 | 0.00 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.00 | 0.00 | 0.00 |
| 0.0059 | 0.149 | 2.75 | 100 | 0.00 | 0.00 | 0.00 |
| 0.0049 | 0.125 | 3.00 | 120 | 0.00 | 0.00 | 0.00 |
| 0.0041 | 0.105 | 3.25 | 140 | 0.00 | 0.00 | 0.00 |
| 0.0035 | 0.088 | 3.50 | 170 | 0.00 | 0.00 | 0.00 |
| 0.0029 | 0.074 | 3.75 | 200 | 0.00 | 0.00 | 0.00 |
| 0.0025 | 0.063 | 4.00 | 230 | 0.00 | 0.00 | 0.00 |
| 0.0021 | 0.053 | 4.25 | 270 | 0.00 | 0.00 | 0.00 |
| 0.00174 | 0.0442 | 4.50 | 325 | 0.00 | 0.00 | 0.00 |
| 0.00146 | 0.0372 | 4.75 | 400 | 0.00 | 0.00 | 0.00 |
| 0.00123 | 0.0313 | 5.00 | 450 | 0.00 | 0.00 | 0.00 |
| 0.000986 | 0.0250 | 5.32 | 500 | 0.00 | 0.00 | 0.00 |
| 0.000790 | 0.0201 | 5.64 | 635 | 0.00 | 0.00 | 0.00 |
| 0.000615 | 0.0156 | 6.00 | | 0.22 | 0.22 | 0.22 |
| 0.000435 | 0.0110 | 6.50 | | 5.93 | 5.93 | 6.15 |
| 0.000308 | 0.00781 | 7.00 | | 8.65 | 8.65 | 14.80 |
| 0.000197 | 0.00500 | 7.65 | | 14.00 | 14.00 | 28.79 |
| 0.000077 | 0.00195 | 9.00 | | 37.10 | 37.09 | 65.89 |
| 0.000038 | 0.000977 | 10.00 | | 22.80 | 22.80 | 88.68 |
| 0.000019 | 0.000488 | 11.00 | | 10.40 | 10.40 | 99.08 |
| 0.000015 | 0.000375 | 11.38 | | 0.92 | 0.92 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 6.40 | 0.0005 | 0.012 |
| 10 | 6.72 | 0.0004 | 0.009 |
| 16 | 7.06 | 0.0003 | 0.008 |
| 25 | 7.47 | 0.0002 | 0.006 |
| 40 | 8.05 | 0.0001 | 0.004 |
| 50 | 8.42 | 0.0001 | 0.003 |
| 60 | 8.78 | 0.0001 | 0.002 |
| 75 | 9.40 | 0.0001 | 0.001 |
| 84 | 9.79 | 0.0000 | 0.001 |
| 90 | 10.13 | 0.0000 | 0.001 |
| 95 | 10.61 | 0.0000 | 0.001 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 8.42 | 8.42 | 8.42 |
| Median, in. | 0.0001 | 0.0001 | 0.0001 |
| Median, mm | 0.003 | 0.003 | 0.003 |
| Mean, phi | 8.13 | 8.43 | 8.42 |
| Mean, in. | 0.0001 | 0.0001 | 0.0001 |
| Mean, mm | 0.004 | 0.003 | 0.003 |
| Sorting | 1.952 | 1.370 | 1.322 |
| Skewness | 0.989 | 0.004 | 0.022 |
| Kurtosis | 0.243 | 0.535 | 0.893 |
| **Grain Size Description** (ASTM-USCS Scale) | | Clay (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 0.00 |
| Silt | >0.005 mm | 28.79 |
| Clay | <0.005 mm | 71.21 |
| | **Total** | **100** |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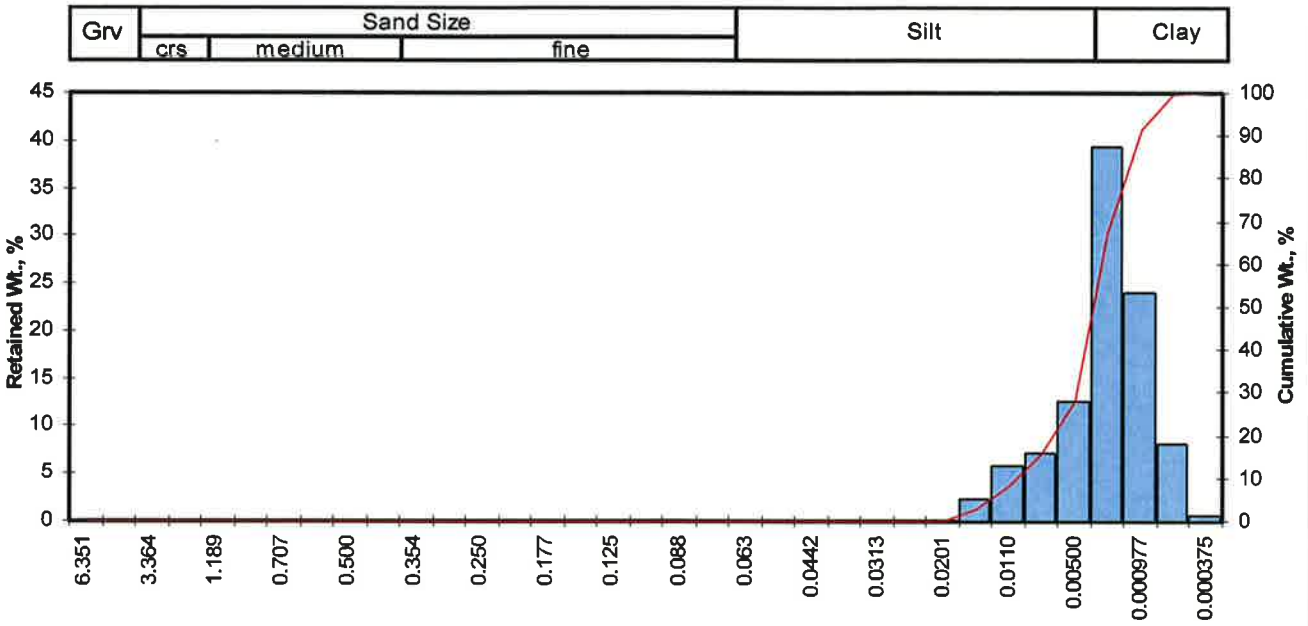
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1912C Run 4, Sample 2 |
| **Project No:** | N/A | **Depth, ft:** | 968.7-969.7 |




**Particle Size, mm**

| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.00 | 0.00 | 0.00 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.00 | 0.00 | 0.00 |
| 0.0059 | 0.149 | 2.75 | 100 | 0.00 | 0.00 | 0.00 |
| 0.0049 | 0.125 | 3.00 | 120 | 0.00 | 0.00 | 0.00 |
| 0.0041 | 0.105 | 3.25 | 140 | 0.00 | 0.00 | 0.00 |
| 0.0035 | 0.088 | 3.50 | 170 | 0.00 | 0.00 | 0.00 |
| 0.0029 | 0.074 | 3.75 | 200 | 0.00 | 0.00 | 0.00 |
| 0.0025 | 0.063 | 4.00 | 230 | 0.00 | 0.00 | 0.00 |
| 0.0021 | 0.053 | 4.25 | 270 | 0.00 | 0.00 | 0.00 |
| 0.00174 | 0.0442 | 4.50 | 325 | 0.00 | 0.00 | 0.00 |
| 0.00146 | 0.0372 | 4.75 | 400 | 0.00 | 0.00 | 0.00 |
| 0.00123 | 0.0313 | 5.00 | 450 | 0.00 | 0.00 | 0.00 |
| 0.000986 | 0.0250 | 5.32 | 500 | 0.00 | 0.00 | 0.00 |
| 0.000790 | 0.0201 | 5.64 | 635 | 0.10 | 0.10 | 0.10 |
| 0.000615 | 0.0156 | 6.00 | | 2.33 | 2.33 | 2.42 |
| 0.000435 | 0.0110 | 6.50 | | 5.79 | 5.79 | 8.21 |
| 0.000308 | 0.00781 | 7.00 | | 7.14 | 7.14 | 15.35 |
| 0.000197 | 0.00500 | 7.65 | | 12.60 | 12.59 | 27.94 |
| 0.000077 | 0.00195 | 9.00 | | 39.40 | 39.38 | 67.32 |
| 0.000038 | 0.000977 | 10.00 | | 24.00 | 23.99 | 91.30 |
| 0.000019 | 0.000488 | 11.00 | | 8.14 | 8.14 | 99.44 |
| 0.000015 | 0.000375 | 11.38 | | 0.56 | 0.56 | 100.00 |
| **TOTALS** | | | | **100.10** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 6.22 | 0.0005 | 0.013 |
| 10 | 6.63 | 0.0004 | 0.010 |
| 16 | 7.03 | 0.0003 | 0.008 |
| 25 | 7.49 | 0.0002 | 0.006 |
| 40 | 8.06 | 0.0001 | 0.004 |
| 50 | 8.40 | 0.0001 | 0.003 |
| 60 | 8.75 | 0.0001 | 0.002 |
| 75 | 9.32 | 0.0001 | 0.002 |
| 84 | 9.70 | 0.0000 | 0.001 |
| 90 | 9.95 | 0.0000 | 0.001 |
| 95 | 10.45 | 0.0000 | 0.001 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 8.40 | 8.40 | 8.40 |
| Median, in. | 0.0001 | 0.0001 | 0.0001 |
| Median, mm | 0.003 | 0.003 | 0.003 |
| Mean, phi | 8.14 | 8.36 | 8.38 |
| Mean, in. | 0.0001 | 0.0001 | 0.0001 |
| Mean, mm | 0.004 | 0.003 | 0.003 |
| Sorting | 1.883 | 1.331 | 1.307 |
| Skewness | 0.998 | -0.030 | -0.030 |
| Kurtosis | 0.218 | 0.590 | 0.950 |
| **Grain Size Description** (ASTM-USCS Scale) | | Clay (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 0.00 |
| Silt | >0.005 mm | 27.94 |
| Clay | <0.005 mm | 72.06 |
| | **Total** | **100** |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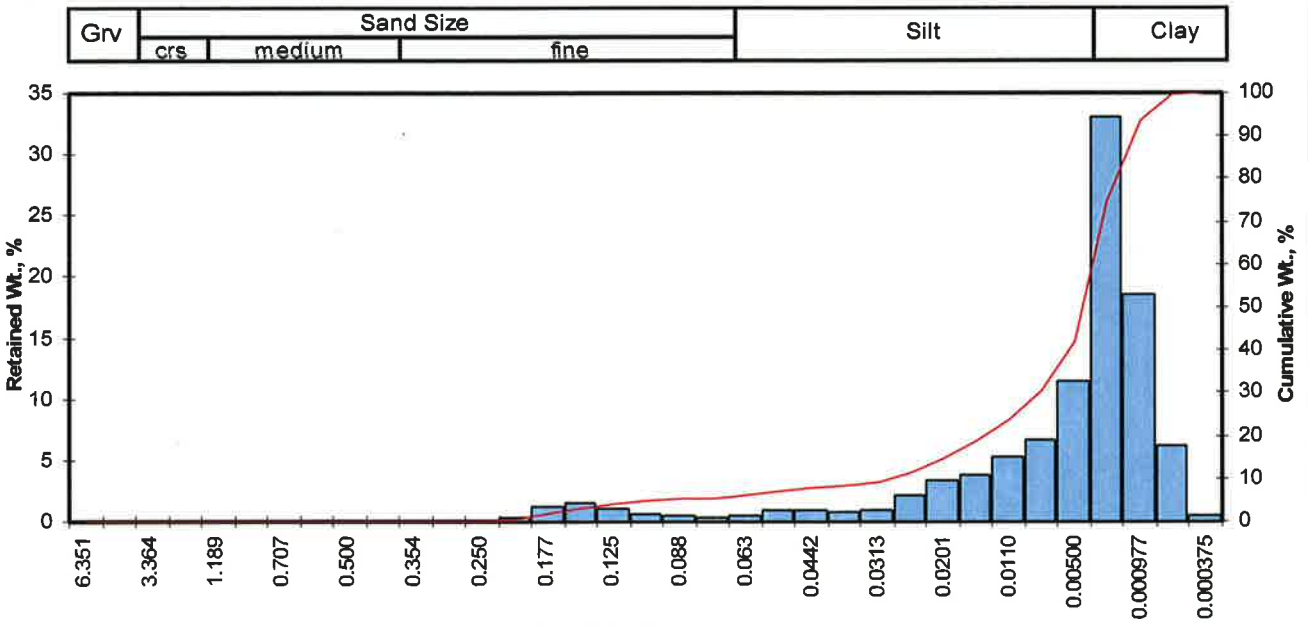
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1912C Run 4, Sample 2 Rerun |
| **Project No:** | N/A | **Depth, ft:** | 968.7-969.7 |




| Opening (Inches) | Opening (Millimeters) | Phi of Screen | U.S. No. | Sample Weight, grams | Increment Weight, percent | Cumulative Weight, percent |
|---|---|---|---|---|---|---|
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.02 | 0.02 | 0.02 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.33 | 0.33 | 0.35 |
| 0.0070 | 0.177 | 2.50 | 80 | 1.18 | 1.18 | 1.53 |
| 0.0059 | 0.149 | 2.75 | 100 | 1.48 | 1.48 | 3.01 |
| 0.0049 | 0.125 | 3.00 | 120 | 1.03 | 1.03 | 4.04 |
| 0.0041 | 0.105 | 3.25 | 140 | 0.63 | 0.63 | 4.67 |
| 0.0035 | 0.088 | 3.50 | 170 | 0.39 | 0.39 | 5.06 |
| 0.0029 | 0.074 | 3.75 | 200 | 0.29 | 0.29 | 5.35 |
| 0.0025 | 0.063 | 4.00 | 230 | 0.48 | 0.48 | 5.83 |
| 0.0021 | 0.053 | 4.25 | 270 | 0.86 | 0.86 | 6.69 |
| 0.00174 | 0.0442 | 4.50 | 325 | 0.91 | 0.91 | 7.60 |
| 0.00146 | 0.0372 | 4.75 | 400 | 0.71 | 0.71 | 8.31 |
| 0.00123 | 0.0313 | 5.00 | 450 | 0.86 | 0.86 | 9.17 |
| 0.000986 | 0.0250 | 5.32 | 500 | 2.12 | 2.12 | 11.29 |
| 0.000790 | 0.0201 | 5.64 | 635 | 3.31 | 3.31 | 14.60 |
| 0.000615 | 0.0156 | 6.00 | | 3.78 | 3.78 | 18.38 |
| 0.000435 | 0.0110 | 6.50 | | 5.24 | 5.24 | 23.62 |
| 0.000308 | 0.00781 | 7.00 | | 6.60 | 6.60 | 30.22 |
| 0.000197 | 0.00500 | 7.65 | | 11.40 | 11.40 | 41.62 |
| 0.000077 | 0.00195 | 9.00 | | 33.10 | 33.10 | 74.72 |
| 0.000038 | 0.000977 | 10.00 | | 18.60 | 18.60 | 93.32 |
| 0.000019 | 0.000488 | 11.00 | | 6.24 | 6.24 | 99.56 |
| 0.000015 | 0.000375 | 11.38 | | 0.44 | 0.44 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight percent | Phi Value | Particle Size (Inches) | Particle Size (Millimeters) |
| 5 | 3.46 | 0.0036 | 0.091 |
| 10 | 5.13 | 0.0011 | 0.029 |
| 16 | 5.77 | 0.0007 | 0.018 |
| 25 | 6.60 | 0.0004 | 0.010 |
| 40 | 7.55 | 0.0002 | 0.005 |
| 50 | 7.99 | 0.0002 | 0.004 |
| 60 | 8.40 | 0.0001 | 0.003 |
| 75 | 9.02 | 0.0001 | 0.002 |
| 84 | 9.50 | 0.0001 | 0.001 |
| 90 | 9.82 | 0.0000 | 0.001 |
| 95 | 10.27 | 0.0000 | 0.001 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 7.99 | 7.99 | 7.99 |
| Median, in. | 0.0002 | 0.0002 | 0.0002 |
| Median, mm | 0.004 | 0.004 | 0.004 |
| Mean, phi | 7.36 | 7.64 | 7.75 |
| Mean, in. | 0.0002 | 0.0002 | 0.0002 |
| Mean, mm | 0.006 | 0.005 | 0.005 |
| Sorting | 2.306 | 1.863 | 1.963 |
| Skewness | 1.131 | -0.189 | -0.259 |
| Kurtosis | 0.151 | 0.827 | 1.157 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 5.35 |
| Silt | >0.005 mm | 36.27 |
| Clay | <0.005 mm | 58.38 |
| | **Total** | **100** |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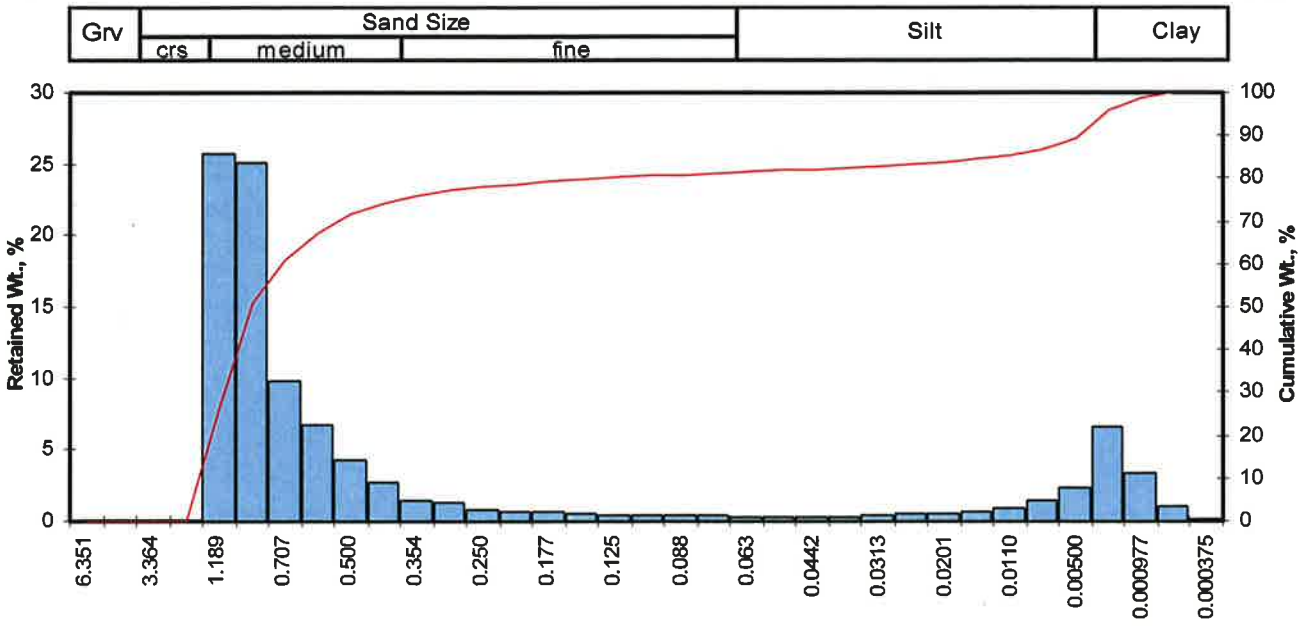
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1912C Run 4, Sample 2 Rerun 2 |
| **Project No:** | N/A | **Depth, ft:** | 968.7-969.7 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 25.70 | 25.70 | 25.70 |
| 0.0331 | 0.841 | 0.25 | 20 | 25.10 | 25.10 | 50.81 |
| 0.0278 | 0.707 | 0.50 | 25 | 9.82 | 9.82 | 60.63 |
| 0.0234 | 0.595 | 0.75 | 30 | 6.77 | 6.77 | 67.40 |
| 0.0197 | 0.500 | 1.00 | 35 | 4.24 | 4.24 | 71.64 |
| 0.0166 | 0.420 | 1.25 | 40 | 2.66 | 2.66 | 74.30 |
| 0.0139 | 0.354 | 1.50 | 45 | 1.46 | 1.46 | 75.76 |
| 0.0117 | 0.297 | 1.75 | 50 | 1.33 | 1.33 | 77.09 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.82 | 0.82 | 77.91 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.70 | 0.70 | 78.61 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.59 | 0.59 | 79.20 |
| 0.0059 | 0.149 | 2.75 | 100 | 0.48 | 0.48 | 79.68 |
| 0.0049 | 0.125 | 3.00 | 120 | 0.40 | 0.40 | 80.08 |
| 0.0041 | 0.105 | 3.25 | 140 | 0.37 | 0.37 | 80.45 |
| 0.0035 | 0.088 | 3.50 | 170 | 0.35 | 0.35 | 80.80 |
| 0.0029 | 0.074 | 3.75 | 200 | 0.33 | 0.33 | 81.13 |
| 0.0025 | 0.063 | 4.00 | 230 | 0.31 | 0.31 | 81.44 |
| 0.0021 | 0.053 | 4.25 | 270 | 0.30 | 0.30 | 81.74 |
| 0.00174 | 0.0442 | 4.50 | 325 | 0.30 | 0.30 | 82.04 |
| 0.00146 | 0.0372 | 4.75 | 400 | 0.31 | 0.31 | 82.35 |
| 0.00123 | 0.0313 | 5.00 | 450 | 0.33 | 0.33 | 82.68 |
| 0.000986 | 0.0250 | 5.32 | 500 | 0.48 | 0.48 | 83.16 |
| 0.000790 | 0.0201 | 5.64 | 635 | 0.56 | 0.56 | 83.72 |
| 0.000615 | 0.0156 | 6.00 | | 0.63 | 0.63 | 84.35 |
| 0.000435 | 0.0110 | 6.50 | | 0.94 | 0.94 | 85.29 |
| 0.000308 | 0.00781 | 7.00 | | 1.36 | 1.36 | 86.65 |
| 0.000197 | 0.00500 | 7.65 | | 2.38 | 2.38 | 89.03 |
| 0.000077 | 0.00195 | 9.00 | | 6.53 | 6.53 | 95.56 |
| 0.000038 | 0.000977 | 10.00 | | 3.35 | 3.35 | 98.91 |
| 0.000019 | 0.000488 | 11.00 | | 1.02 | 1.02 | 99.93 |
| 0.000015 | 0.000375 | 11.38 | | 0.07 | 0.07 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | -0.85 | 0.0712 | 1.808 |
| 10 | -0.71 | 0.0643 | 1.634 |
| 16 | -0.53 | 0.0570 | 1.447 |
| 25 | -0.27 | 0.0475 | 1.206 |
| 40 | 0.03 | 0.0384 | 0.976 |
| 50 | 0.23 | 0.0335 | 0.850 |
| 60 | 0.48 | 0.0281 | 0.715 |
| 75 | 1.37 | 0.0152 | 0.387 |
| 84 | 5.80 | 0.0007 | 0.018 |
| 90 | 7.85 | 0.0002 | 0.004 |
| 95 | 8.88 | 0.0001 | 0.002 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 0.23 | 0.23 | 0.23 |
| Median, in. | 0.0335 | 0.0335 | 0.0335 |
| Median, mm | 0.850 | 0.850 | 0.850 |
| Mean, phi | 0.33 | 2.63 | 1.83 |
| Mean, in. | 0.0314 | 0.0063 | 0.0110 |
| Mean, mm | 0.797 | 0.161 | 0.281 |
| Sorting | 1.766 | 3.166 | 3.058 |
| Skewness | 0.803 | 0.758 | 0.767 |
| Kurtosis | 0.251 | 0.538 | 2.433 |
| **Grain Size Description** (ASTM-USCS Scale) | | Medium sand (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 74.30 |
| Fine Sand | 200 | 6.83 |
| Silt | >0.005 mm | 7.90 |
| Clay | <0.005 mm | 10.97 |
| | **Total** | **100** |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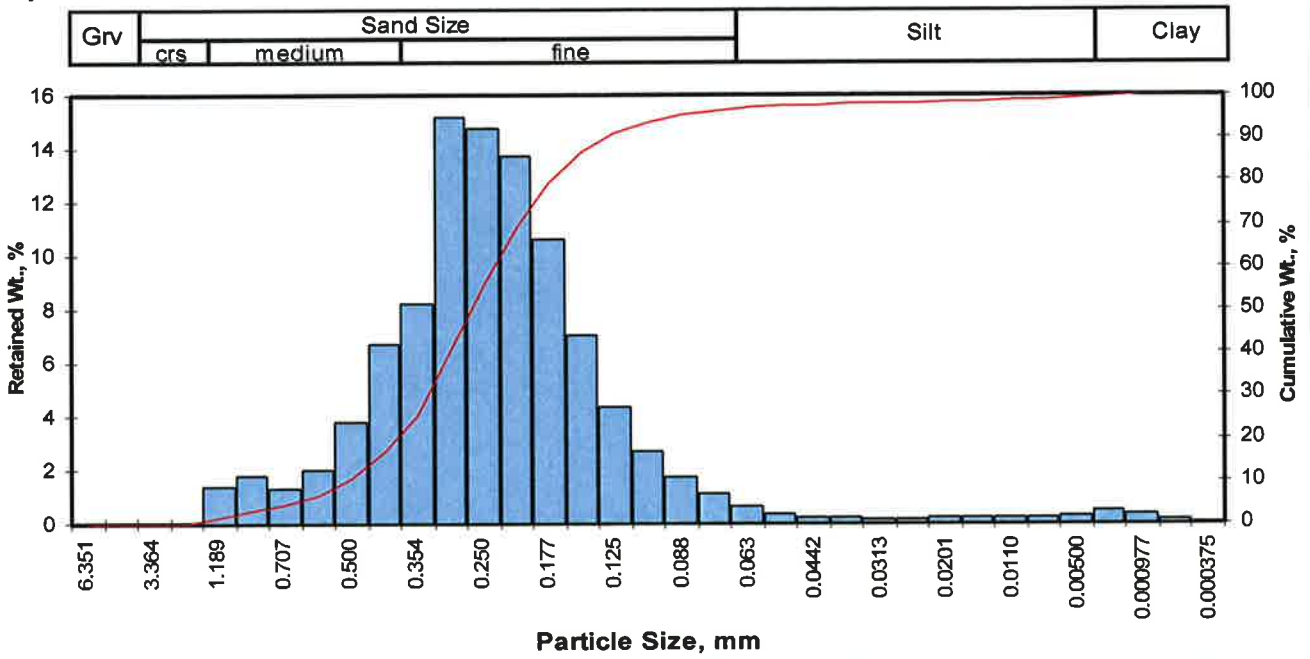
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1956C Run 1, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 42.0-43.0 |




| Opening (Inches) | Opening (Millimeters) | Phi of Screen | U.S. No. | Sample Weight, grams | Increment Weight, percent | Cumulative Weight, percent |
|---|---|---|---|---|---|---|
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 1.37 | 1.37 | 1.37 |
| 0.0331 | 0.841 | 0.25 | 20 | 1.79 | 1.79 | 3.16 |
| 0.0278 | 0.707 | 0.50 | 25 | 1.31 | 1.31 | 4.47 |
| 0.0234 | 0.595 | 0.75 | 30 | 2.02 | 2.02 | 6.49 |
| 0.0197 | 0.500 | 1.00 | 35 | 3.82 | 3.82 | 10.30 |
| 0.0166 | 0.420 | 1.25 | 40 | 6.67 | 6.67 | 16.97 |
| 0.0139 | 0.354 | 1.50 | 45 | 8.24 | 8.24 | 25.20 |
| 0.0117 | 0.297 | 1.75 | 50 | 15.20 | 15.19 | 40.40 |
| 0.0098 | 0.250 | 2.00 | 60 | 14.80 | 14.79 | 55.19 |
| 0.0083 | 0.210 | 2.25 | 70 | 13.70 | 13.69 | 68.88 |
| 0.0070 | 0.177 | 2.50 | 80 | 10.60 | 10.59 | 79.47 |
| 0.0059 | 0.149 | 2.75 | 100 | 7.02 | 7.02 | 86.49 |
| 0.0049 | 0.125 | 3.00 | 120 | 4.36 | 4.36 | 90.85 |
| 0.0041 | 0.105 | 3.25 | 140 | 2.69 | 2.69 | 93.53 |
| 0.0035 | 0.088 | 3.50 | 170 | 1.72 | 1.72 | 95.25 |
| 0.0029 | 0.074 | 3.75 | 200 | 1.08 | 1.08 | 96.33 |
| 0.0025 | 0.063 | 4.00 | 230 | 0.62 | 0.62 | 96.95 |
| 0.0021 | 0.053 | 4.25 | 270 | 0.34 | 0.34 | 97.29 |
| 0.00174 | 0.0442 | 4.50 | 325 | 0.22 | 0.22 | 97.51 |
| 0.00146 | 0.0372 | 4.75 | 400 | 0.18 | 0.18 | 97.69 |
| 0.00123 | 0.0313 | 5.00 | 450 | 0.15 | 0.15 | 97.84 |
| 0.000986 | 0.0250 | 5.32 | 500 | 0.17 | 0.17 | 98.01 |
| 0.000790 | 0.0201 | 5.64 | 635 | 0.18 | 0.18 | 98.19 |
| 0.000615 | 0.0156 | 6.00 | | 0.19 | 0.19 | 98.38 |
| 0.000435 | 0.0110 | 6.50 | | 0.23 | 0.23 | 98.61 |
| 0.000308 | 0.00781 | 7.00 | | 0.21 | 0.21 | 98.82 |
| 0.000197 | 0.00500 | 7.65 | | 0.26 | 0.26 | 99.08 |
| 0.000077 | 0.00195 | 9.00 | | 0.47 | 0.47 | 99.55 |
| 0.000038 | 0.000977 | 10.00 | | 0.32 | 0.32 | 99.87 |
| 0.000019 | 0.000488 | 11.00 | | 0.13 | 0.13 | 100.00 |
| 0.000015 | 0.000375 | 11.38 | | 0.00 | 0.00 | 100.00 |
| **TOTALS** | | | | **100.10** | **100.00** | **100.00** |

**Cumulative Weight Percent greater than**

| Weight percent | Phi Value | Particle Size (Inches) | Particle Size (Millimeters) |
|---|---|---|---|
| 5 | 0.57 | 0.0266 | 0.676 |
| 10 | 0.98 | 0.0200 | 0.507 |
| 16 | 1.21 | 0.0170 | 0.431 |
| 25 | 1.49 | 0.0140 | 0.355 |
| 40 | 1.74 | 0.0118 | 0.299 |
| 50 | 1.91 | 0.0105 | 0.266 |
| 60 | 2.09 | 0.0093 | 0.235 |
| 75 | 2.39 | 0.0075 | 0.190 |
| 84 | 2.66 | 0.0062 | 0.158 |
| 90 | 2.95 | 0.0051 | 0.129 |
| 95 | 3.46 | 0.0036 | 0.091 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 1.91 | 1.91 | 1.91 |
| Median, in. | 0.0105 | 0.0105 | 0.0105 |
| Median, mm | 0.266 | 0.266 | 0.266 |
| Mean, phi | 1.87 | 1.94 | 1.93 |
| Mean, in. | 0.0107 | 0.0103 | 0.0103 |
| Mean, mm | 0.273 | 0.261 | 0.263 |
| Sorting | 1.366 | 0.724 | 0.801 |
| Skewness | 0.978 | 0.035 | 0.053 |
| Kurtosis | 0.218 | 1.001 | 1.318 |
| **Grain Size Description** (ASTM-USCS Scale) | | Fine sand (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 16.97 |
| Fine Sand | 200 | 79.36 |
| Silt | >0.005 mm | 2.75 |
| Clay | <0.005 mm | 0.92 |
| | **Total** | **100** |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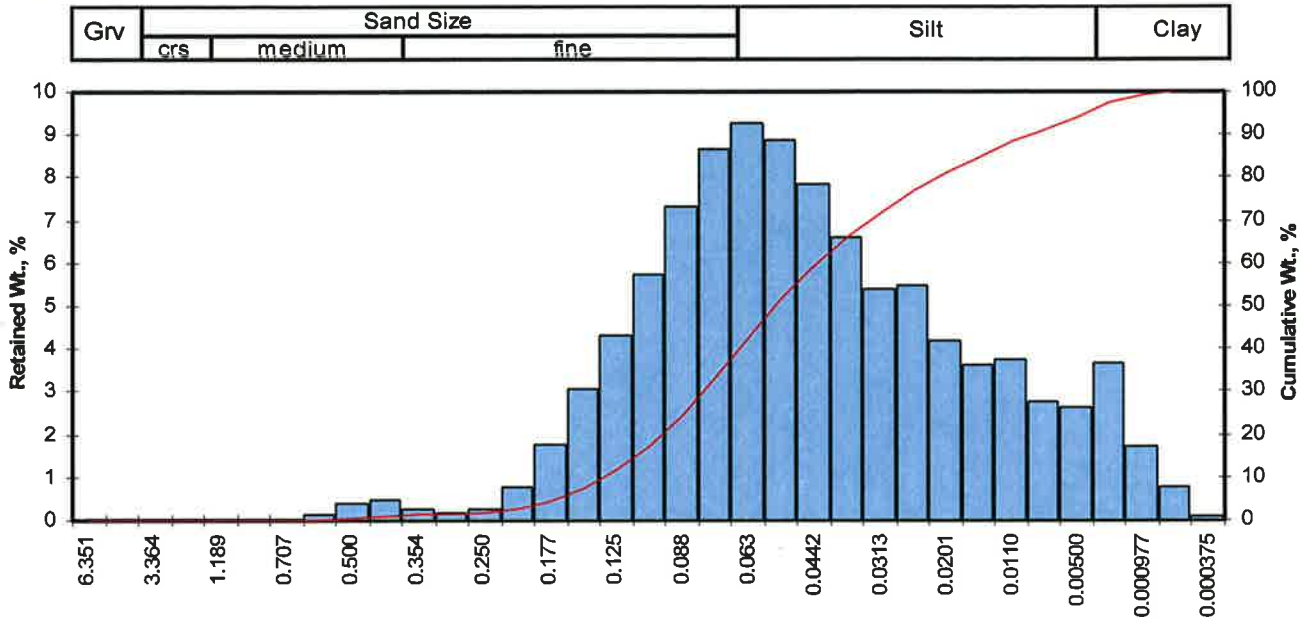
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1956C Run 3, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 78.0-79.0 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.01 | 0.01 | 0.01 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.14 | 0.14 | 0.15 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.39 | 0.39 | 0.54 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.46 | 0.46 | 1.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.27 | 0.27 | 1.27 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.19 | 0.19 | 1.46 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.25 | 0.25 | 1.71 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.78 | 0.78 | 2.49 |
| 0.0070 | 0.177 | 2.50 | 80 | 1.77 | 1.77 | 4.26 |
| 0.0059 | 0.149 | 2.75 | 100 | 3.04 | 3.04 | 7.30 |
| 0.0049 | 0.125 | 3.00 | 120 | 4.33 | 4.33 | 11.63 |
| 0.0041 | 0.105 | 3.25 | 140 | 5.74 | 5.74 | 17.37 |
| 0.0035 | 0.088 | 3.50 | 170 | 7.32 | 7.32 | 24.69 |
| 0.0029 | 0.074 | 3.75 | 200 | 8.67 | 8.67 | 33.36 |
| 0.0025 | 0.063 | 4.00 | 230 | 9.27 | 9.27 | 42.63 |
| 0.0021 | 0.053 | 4.25 | 270 | 8.89 | 8.89 | 51.52 |
| 0.00174 | 0.0442 | 4.50 | 325 | 7.85 | 7.85 | 59.37 |
| 0.00146 | 0.0372 | 4.75 | 400 | 6.58 | 6.58 | 65.95 |
| 0.00123 | 0.0313 | 5.00 | 450 | 5.41 | 5.41 | 71.36 |
| 0.000986 | 0.0250 | 5.32 | 500 | 5.49 | 5.49 | 76.84 |
| 0.000790 | 0.0201 | 5.64 | 635 | 4.19 | 4.19 | 81.03 |
| 0.000615 | 0.0156 | 6.00 | | 3.60 | 3.60 | 84.63 |
| 0.000435 | 0.0110 | 6.50 | | 3.74 | 3.74 | 88.37 |
| 0.000308 | 0.00781 | 7.00 | | 2.78 | 2.78 | 91.15 |
| 0.000197 | 0.00500 | 7.65 | | 2.64 | 2.64 | 93.79 |
| 0.000077 | 0.00195 | 9.00 | | 3.67 | 3.67 | 97.46 |
| 0.000038 | 0.000977 | 10.00 | | 1.71 | 1.71 | 99.17 |
| 0.000019 | 0.000488 | 11.00 | | 0.76 | 0.76 | 99.93 |
| 0.000015 | 0.000375 | 11.38 | | 0.07 | 0.07 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 2.56 | 0.0067 | 0.170 |
| 10 | 2.91 | 0.0053 | 0.133 |
| 16 | 3.19 | 0.0043 | 0.110 |
| 25 | 3.51 | 0.0035 | 0.088 |
| 40 | 3.93 | 0.0026 | 0.066 |
| 50 | 4.21 | 0.0021 | 0.054 |
| 60 | 4.52 | 0.0017 | 0.043 |
| 75 | 5.21 | 0.0011 | 0.027 |
| 84 | 5.94 | 0.0006 | 0.016 |
| 90 | 6.79 | 0.0004 | 0.009 |
| 95 | 8.09 | 0.0001 | 0.004 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.21 | 4.21 | 4.21 |
| Median, in. | 0.0021 | 0.0021 | 0.0021 |
| Median, mm | 0.054 | 0.054 | 0.054 |
| Mean, phi | 4.12 | 4.56 | 4.44 |
| Mean, in. | 0.0023 | 0.0017 | 0.0018 |
| Mean, mm | 0.057 | 0.042 | 0.046 |
| Sorting | 1.805 | 1.373 | 1.525 |
| Skewness | 0.899 | 0.259 | 0.332 |
| Kurtosis | 0.245 | 1.014 | 1.330 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 1.00 |
| Fine Sand | 200 | 32.36 |
| Silt | >0.005 mm | 60.43 |
| Clay | <0.005 mm | 6.21 |
| | **Total** | **100** |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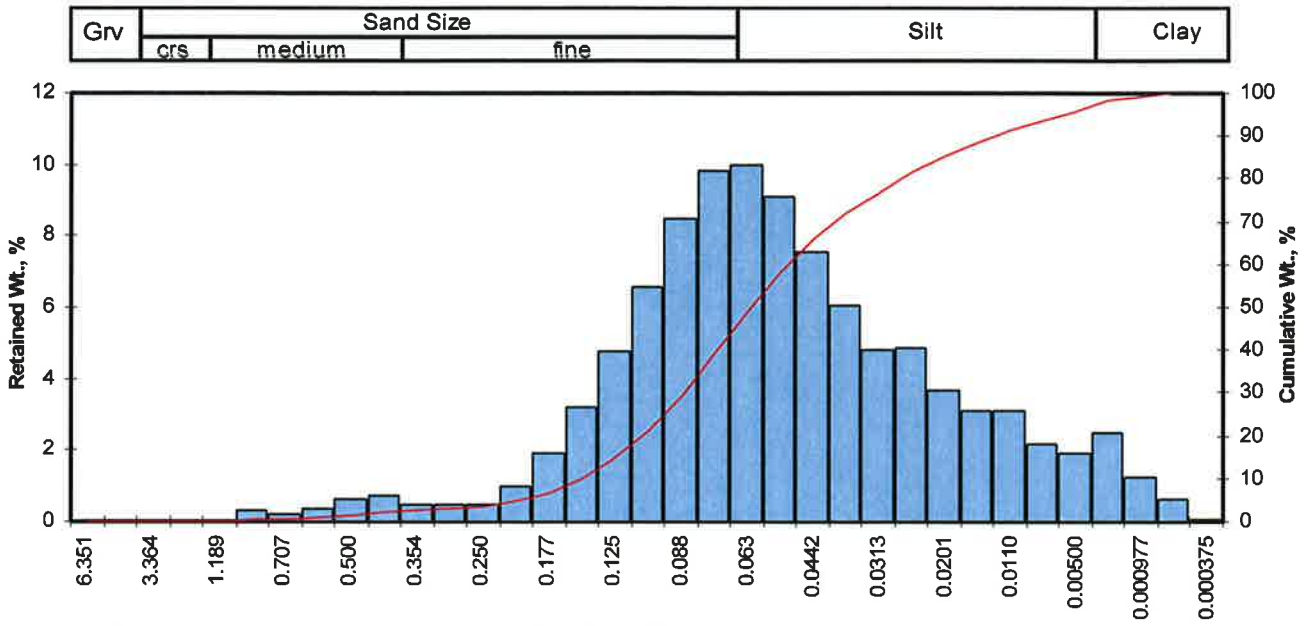
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1956C Run 4, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 196.5-197.1 |




| Opening (Inches) | Opening (Millimeters) | Phi of Screen | U.S. No. | Sample Weight, grams | Increment Weight, percent | Cumulative Weight, percent |
|---|---|---|---|---|---|---|
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.03 | 0.03 | 0.03 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.30 | 0.30 | 0.33 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.19 | 0.19 | 0.52 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.34 | 0.34 | 0.86 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.64 | 0.64 | 1.50 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.72 | 0.72 | 2.22 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.48 | 0.48 | 2.70 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.46 | 0.46 | 3.16 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.47 | 0.47 | 3.63 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.97 | 0.97 | 4.60 |
| 0.0070 | 0.177 | 2.50 | 80 | 1.90 | 1.90 | 6.50 |
| 0.0059 | 0.149 | 2.75 | 100 | 3.20 | 3.20 | 9.70 |
| 0.0049 | 0.125 | 3.00 | 120 | 4.74 | 4.74 | 14.44 |
| 0.0041 | 0.105 | 3.25 | 140 | 6.58 | 6.58 | 21.02 |
| 0.0035 | 0.088 | 3.50 | 170 | 8.47 | 8.47 | 29.50 |
| 0.0029 | 0.074 | 3.75 | 200 | 9.81 | 9.81 | 39.31 |
| 0.0025 | 0.063 | 4.00 | 230 | 10.00 | 10.00 | 49.31 |
| 0.0021 | 0.053 | 4.25 | 270 | 9.08 | 9.08 | 58.40 |
| 0.00174 | 0.0442 | 4.50 | 325 | 7.55 | 7.55 | 65.95 |
| 0.00146 | 0.0372 | 4.75 | 400 | 6.03 | 6.03 | 71.98 |
| 0.00123 | 0.0313 | 5.00 | 450 | 4.83 | 4.83 | 76.81 |
| 0.000986 | 0.0250 | 5.32 | 500 | 4.86 | 4.86 | 81.68 |
| 0.000790 | 0.0201 | 5.64 | 635 | 3.68 | 3.68 | 85.36 |
| 0.000615 | 0.0156 | 6.00 | | 3.10 | 3.10 | 88.46 |
| 0.000435 | 0.0110 | 6.50 | | 3.08 | 3.08 | 91.54 |
| 0.000308 | 0.00781 | 7.00 | | 2.15 | 2.15 | 93.69 |
| 0.000197 | 0.00500 | 7.65 | | 1.92 | 1.92 | 95.61 |
| 0.000077 | 0.00195 | 9.00 | | 2.50 | 2.50 | 98.11 |
| 0.000038 | 0.000977 | 10.00 | | 1.22 | 1.22 | 99.33 |
| 0.000019 | 0.000488 | 11.00 | | 0.61 | 0.61 | 99.94 |
| 0.000015 | 0.000375 | 11.38 | | 0.06 | 0.06 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

**Cumulative Weight Percent greater than**

| Weight percent | Phi Value | Particle Size (Inches) | Particle Size (Millimeters) |
|---|---|---|---|
| 5 | 2.30 | 0.0080 | 0.203 |
| 10 | 2.77 | 0.0058 | 0.147 |
| 16 | 3.06 | 0.0047 | 0.120 |
| 25 | 3.37 | 0.0038 | 0.097 |
| 40 | 3.77 | 0.0029 | 0.073 |
| 50 | 4.02 | 0.0024 | 0.062 |
| 60 | 4.30 | 0.0020 | 0.051 |
| 75 | 4.91 | 0.0013 | 0.033 |
| 84 | 5.52 | 0.0009 | 0.022 |
| 90 | 6.25 | 0.0005 | 0.013 |
| 95 | 7.44 | 0.0002 | 0.006 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.02 | 4.02 | 4.02 |
| Median, in. | 0.0024 | 0.0024 | 0.0024 |
| Median, mm | 0.062 | 0.062 | 0.062 |
| Mean, phi | 3.94 | 4.29 | 4.20 |
| Mean, in. | 0.0026 | 0.0020 | 0.0021 |
| Mean, mm | 0.065 | 0.051 | 0.054 |
| Sorting | 1.705 | 1.231 | 1.394 |
| Skewness | 0.922 | 0.221 | 0.276 |
| Kurtosis | 0.237 | 1.086 | 1.368 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 2.22 |
| Fine Sand | 200 | 37.09 |
| Silt | >0.005 mm | 56.30 |
| Clay | <0.005 mm | 4.39 |
| | **Total** | **100** |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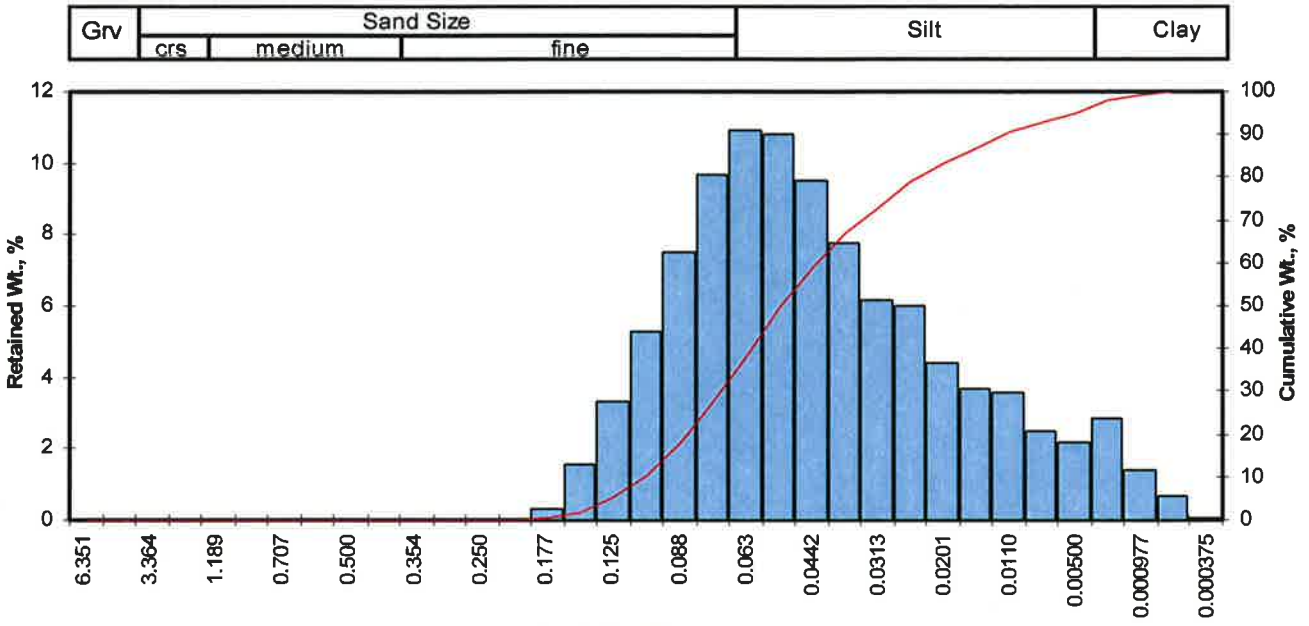
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1956C Run 4, Sample 2 |
| **Project No:** | N/A | **Depth, ft:** | 202.0-202.5 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.02 | 0.02 | 0.02 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.32 | 0.32 | 0.34 |
| 0.0059 | 0.149 | 2.75 | 100 | 1.54 | 1.54 | 1.88 |
| 0.0049 | 0.125 | 3.00 | 120 | 3.30 | 3.30 | 5.18 |
| 0.0041 | 0.105 | 3.25 | 140 | 5.27 | 5.27 | 10.45 |
| 0.0035 | 0.088 | 3.50 | 170 | 7.51 | 7.51 | 17.96 |
| 0.0029 | 0.074 | 3.75 | 200 | 9.69 | 9.69 | 27.65 |
| 0.0025 | 0.063 | 4.00 | 230 | 10.90 | 10.90 | 38.56 |
| 0.0021 | 0.053 | 4.25 | 270 | 10.80 | 10.80 | 49.36 |
| 0.00174 | 0.0442 | 4.50 | 325 | 9.50 | 9.50 | 58.86 |
| 0.00146 | 0.0372 | 4.75 | 400 | 7.74 | 7.74 | 66.60 |
| 0.00123 | 0.0313 | 5.00 | 450 | 6.13 | 6.13 | 72.73 |
| 0.000986 | 0.0250 | 5.32 | 500 | 5.99 | 5.99 | 78.72 |
| 0.000790 | 0.0201 | 5.64 | 635 | 4.42 | 4.42 | 83.14 |
| 0.000615 | 0.0156 | 6.00 | | 3.66 | 3.66 | 86.80 |
| 0.000435 | 0.0110 | 6.50 | | 3.57 | 3.57 | 90.37 |
| 0.000308 | 0.00781 | 7.00 | | 2.46 | 2.46 | 92.83 |
| 0.000197 | 0.00500 | 7.65 | | 2.16 | 2.16 | 95.00 |
| 0.000077 | 0.00195 | 9.00 | | 2.84 | 2.84 | 97.84 |
| 0.000038 | 0.000977 | 10.00 | | 1.41 | 1.41 | 99.25 |
| 0.000019 | 0.000488 | 11.00 | | 0.69 | 0.69 | 99.94 |
| 0.000015 | 0.000375 | 11.38 | | 0.06 | 0.06 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 2.99 | 0.0050 | 0.126 |
| 10 | 3.23 | 0.0042 | 0.107 |
| 16 | 3.43 | 0.0036 | 0.092 |
| 25 | 3.68 | 0.0031 | 0.078 |
| 40 | 4.03 | 0.0024 | 0.061 |
| 50 | 4.27 | 0.0020 | 0.052 |
| 60 | 4.54 | 0.0017 | 0.043 |
| 75 | 5.12 | 0.0011 | 0.029 |
| 84 | 5.72 | 0.0007 | 0.019 |
| 90 | 6.45 | 0.0005 | 0.011 |
| 95 | 7.65 | 0.0002 | 0.005 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.27 | 4.27 | 4.27 |
| Median, in. | 0.0020 | 0.0020 | 0.0020 |
| Median, mm | 0.052 | 0.052 | 0.052 |
| Mean, phi | 4.23 | 4.58 | 4.48 |
| Mean, in. | 0.0021 | 0.0016 | 0.0018 |
| Mean, mm | 0.053 | 0.042 | 0.045 |
| Sorting | 1.647 | 1.145 | 1.279 |
| Skewness | 0.911 | 0.273 | 0.362 |
| Kurtosis | 0.258 | 1.036 | 1.327 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 27.65 |
| Silt | >0.005 mm | 67.34 |
| Clay | <0.005 mm | 5.00 |
| | **Total** | **100** |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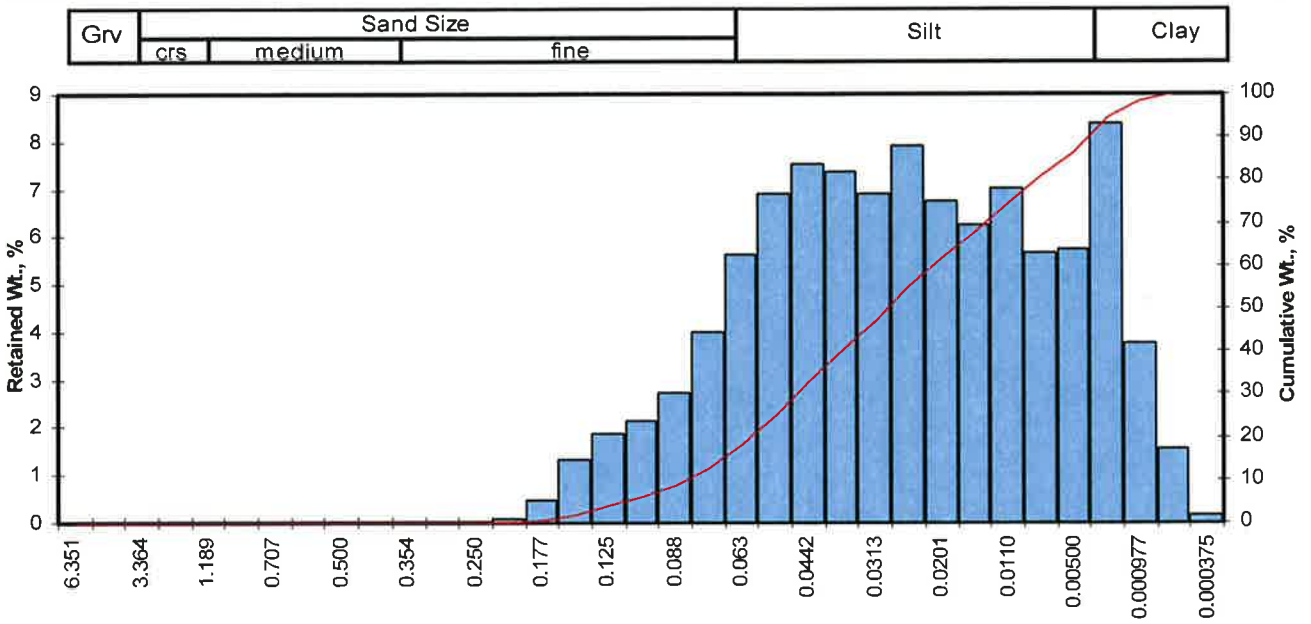
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1956C Run 5, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 425.6-426.2 |




| Opening Inches | Opening Millimeters | Phi of Screen | U.S. No. | Sample Weight, grams | Increment Weight, percent | Cumulative Weight, percent |
|---|---|---|---|---|---|---|
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.07 | 0.07 | 0.07 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.48 | 0.48 | 0.55 |
| 0.0059 | 0.149 | 2.75 | 100 | 1.31 | 1.31 | 1.86 |
| 0.0049 | 0.125 | 3.00 | 120 | 1.85 | 1.85 | 3.71 |
| 0.0041 | 0.105 | 3.25 | 140 | 2.13 | 2.13 | 5.84 |
| 0.0035 | 0.088 | 3.50 | 170 | 2.72 | 2.72 | 8.56 |
| 0.0029 | 0.074 | 3.75 | 200 | 3.98 | 3.98 | 12.54 |
| 0.0025 | 0.063 | 4.00 | 230 | 5.62 | 5.62 | 18.15 |
| 0.0021 | 0.053 | 4.25 | 270 | 6.92 | 6.92 | 25.07 |
| 0.00174 | 0.0442 | 4.50 | 325 | 7.52 | 7.52 | 32.59 |
| 0.00146 | 0.0372 | 4.75 | 400 | 7.36 | 7.36 | 39.95 |
| 0.00123 | 0.0313 | 5.00 | 450 | 6.89 | 6.89 | 46.84 |
| 0.000986 | 0.0250 | 5.32 | 500 | 7.90 | 7.90 | 54.74 |
| 0.000790 | 0.0201 | 5.64 | 635 | 6.75 | 6.75 | 61.49 |
| 0.000615 | 0.0156 | 6.00 | | 6.26 | 6.26 | 67.75 |
| 0.000435 | 0.0110 | 6.50 | | 7.04 | 7.04 | 74.78 |
| 0.000308 | 0.00781 | 7.00 | | 5.65 | 5.65 | 80.43 |
| 0.000197 | 0.00500 | 7.65 | | 5.73 | 5.73 | 86.16 |
| 0.000077 | 0.00195 | 9.00 | | 8.38 | 8.38 | 94.54 |
| 0.000038 | 0.000977 | 10.00 | | 3.76 | 3.76 | 98.30 |
| 0.000019 | 0.000488 | 11.00 | | 1.56 | 1.56 | 99.86 |
| 0.000015 | 0.000375 | 11.38 | | 0.14 | 0.14 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight percent | Phi Value | Particle Size Inches | Particle Size Millimeters |
| 5 | 3.15 | 0.0044 | 0.113 |
| 10 | 3.59 | 0.0033 | 0.083 |
| 16 | 3.90 | 0.0026 | 0.067 |
| 25 | 4.25 | 0.0021 | 0.053 |
| 40 | 4.75 | 0.0015 | 0.037 |
| 50 | 5.13 | 0.0011 | 0.029 |
| 60 | 5.57 | 0.0008 | 0.021 |
| 75 | 6.52 | 0.0004 | 0.011 |
| 84 | 7.40 | 0.0002 | 0.006 |
| 90 | 8.27 | 0.0001 | 0.003 |
| 95 | 9.12 | 0.0001 | 0.002 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 5.13 | 5.13 | 5.13 |
| Median, in. | 0.0011 | 0.0011 | 0.0011 |
| Median, mm | 0.029 | 0.029 | 0.029 |
| Mean, phi | 4.98 | 5.65 | 5.48 |
| Mean, in. | 0.0013 | 0.0008 | 0.0009 |
| Mean, mm | 0.032 | 0.020 | 0.022 |
| Sorting | 2.197 | 1.749 | 1.779 |
| Skewness | 0.838 | 0.300 | 0.319 |
| Kurtosis | 0.262 | 0.707 | 1.077 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 12.54 |
| Silt | >0.005 mm | 73.63 |
| Clay | <0.005 mm | 13.84 |
| | **Total** | **100** |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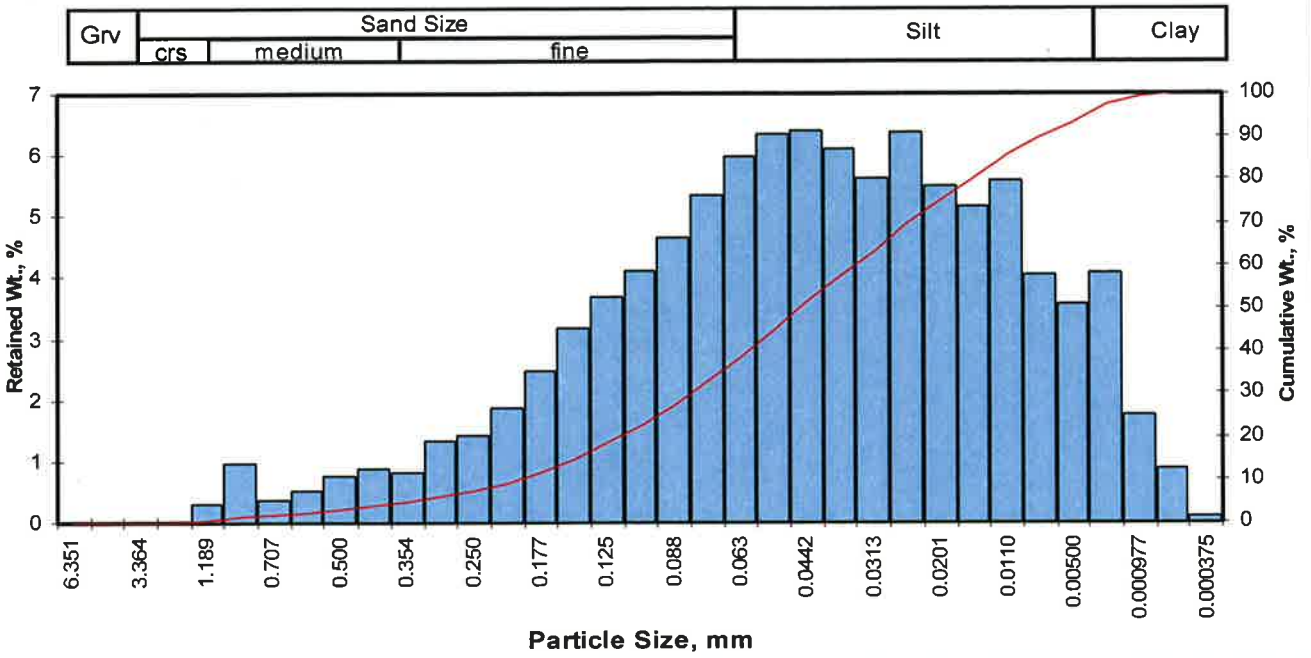
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1956C Run 5, Sample 2 |
| **Project No:** | N/A | **Depth, ft:** | 431.0-431.6 |




| Opening Inches | Opening Millimeters | Phi of Screen | U.S. No. | Sample Weight, grams | Increment Weight, percent | Cumulative Weight, percent |
|---|---|---|---|---|---|---|
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.30 | 0.30 | 0.30 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.96 | 0.96 | 1.26 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.36 | 0.36 | 1.62 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.50 | 0.50 | 2.12 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.75 | 0.75 | 2.87 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.89 | 0.89 | 3.76 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.81 | 0.81 | 4.57 |
| 0.0117 | 0.297 | 1.75 | 50 | 1.32 | 1.32 | 5.89 |
| 0.0098 | 0.250 | 2.00 | 60 | 1.42 | 1.42 | 7.31 |
| 0.0083 | 0.210 | 2.25 | 70 | 1.86 | 1.86 | 9.17 |
| 0.0070 | 0.177 | 2.50 | 80 | 2.47 | 2.47 | 11.64 |
| 0.0059 | 0.149 | 2.75 | 100 | 3.17 | 3.17 | 14.81 |
| 0.0049 | 0.125 | 3.00 | 120 | 3.67 | 3.67 | 18.48 |
| 0.0041 | 0.105 | 3.25 | 140 | 4.09 | 4.09 | 22.57 |
| 0.0035 | 0.088 | 3.50 | 170 | 4.65 | 4.65 | 27.22 |
| 0.0029 | 0.074 | 3.75 | 200 | 5.35 | 5.35 | 32.57 |
| 0.0025 | 0.063 | 4.00 | 230 | 5.98 | 5.98 | 38.55 |
| 0.0021 | 0.053 | 4.25 | 270 | 6.34 | 6.34 | 44.89 |
| 0.00174 | 0.0442 | 4.50 | 325 | 6.40 | 6.40 | 51.29 |
| 0.00146 | 0.0372 | 4.75 | 400 | 6.10 | 6.10 | 57.39 |
| 0.00123 | 0.0313 | 5.00 | 450 | 5.62 | 5.62 | 63.01 |
| 0.000986 | 0.0250 | 5.32 | 500 | 6.38 | 6.38 | 69.39 |
| 0.000790 | 0.0201 | 5.64 | 635 | 5.50 | 5.50 | 74.89 |
| 0.000615 | 0.0156 | 6.00 | | 5.15 | 5.15 | 80.04 |
| 0.000435 | 0.0110 | 6.50 | | 5.57 | 5.57 | 85.61 |
| 0.000308 | 0.00781 | 7.00 | | 4.05 | 4.05 | 89.66 |
| 0.000197 | 0.00500 | 7.65 | | 3.55 | 3.55 | 93.21 |
| 0.000077 | 0.00195 | 9.00 | | 4.08 | 4.08 | 97.29 |
| 0.000038 | 0.000977 | 10.00 | | 1.76 | 1.76 | 99.05 |
| 0.000019 | 0.000488 | 11.00 | | 0.87 | 0.87 | 99.92 |
| 0.000015 | 0.000375 | 11.38 | | 0.08 | 0.08 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight percent | Phi Value | Particle Size Inches | Particle Size Millimeters |
| 5 | 1.58 | 0.0132 | 0.334 |
| 10 | 2.33 | 0.0078 | 0.198 |
| 16 | 2.83 | 0.0055 | 0.141 |
| 25 | 3.38 | 0.0038 | 0.096 |
| 40 | 4.06 | 0.0024 | 0.060 |
| 50 | 4.45 | 0.0018 | 0.046 |
| 60 | 4.87 | 0.0013 | 0.034 |
| 75 | 5.65 | 0.0008 | 0.020 |
| 84 | 6.36 | 0.0005 | 0.012 |
| 90 | 7.06 | 0.0003 | 0.007 |
| 95 | 8.24 | 0.0001 | 0.003 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.45 | 4.45 | 4.45 |
| Median, in. | 0.0018 | 0.0018 | 0.0018 |
| Median, mm | 0.046 | 0.046 | 0.046 |
| Mean, phi | 4.11 | 4.59 | 4.55 |
| Mean, in. | 0.0023 | 0.0016 | 0.0017 |
| Mean, mm | 0.058 | 0.041 | 0.043 |
| Sorting | 2.194 | 1.762 | 1.890 |
| Skewness | 0.956 | 0.082 | 0.110 |
| Kurtosis | 0.199 | 0.889 | 1.204 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 3.76 |
| Fine Sand | 200 | 28.81 |
| Silt | >0.005 mm | 60.64 |
| Clay | <0.005 mm | 6.79 |
| | **Total** | **100** |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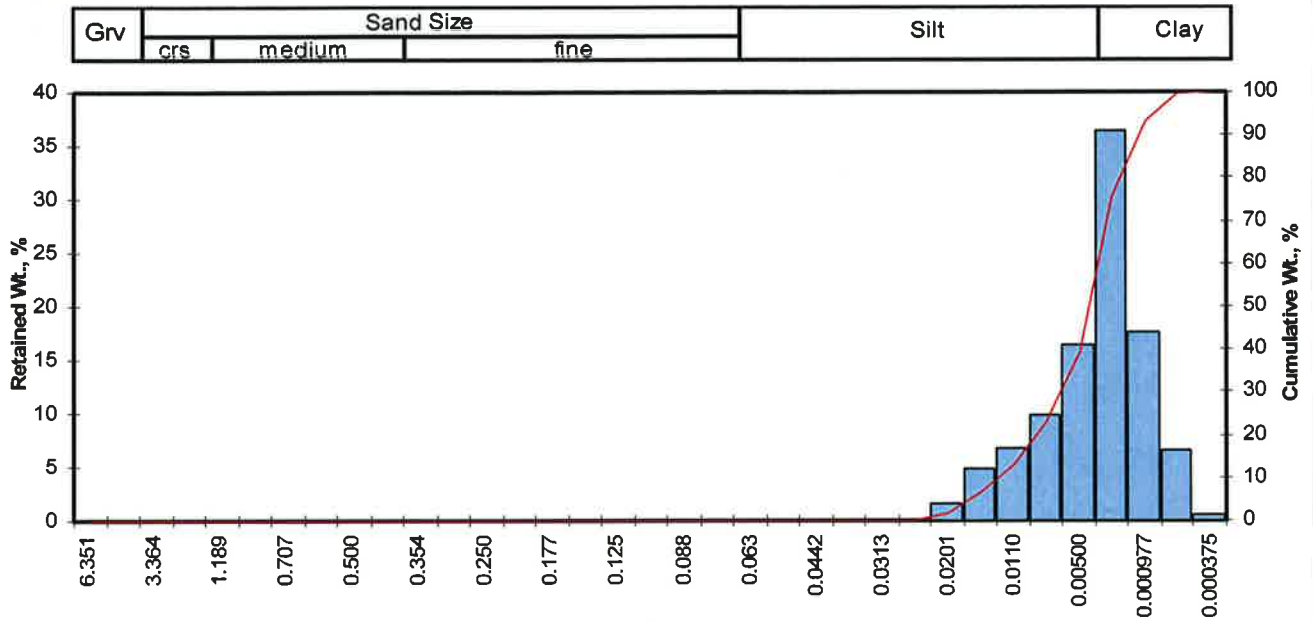
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-1956C Run 6, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 1011.8-1012.4 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.00 | 0.00 | 0.00 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.00 | 0.00 | 0.00 |
| 0.0059 | 0.149 | 2.75 | 100 | 0.00 | 0.00 | 0.00 |
| 0.0049 | 0.125 | 3.00 | 120 | 0.00 | 0.00 | 0.00 |
| 0.0041 | 0.105 | 3.25 | 140 | 0.00 | 0.00 | 0.00 |
| 0.0035 | 0.088 | 3.50 | 170 | 0.00 | 0.00 | 0.00 |
| 0.0029 | 0.074 | 3.75 | 200 | 0.00 | 0.00 | 0.00 |
| 0.0025 | 0.063 | 4.00 | 230 | 0.00 | 0.00 | 0.00 |
| 0.0021 | 0.053 | 4.25 | 270 | 0.00 | 0.00 | 0.00 |
| 0.00174 | 0.0442 | 4.50 | 325 | 0.00 | 0.00 | 0.00 |
| 0.00146 | 0.0372 | 4.75 | 400 | 0.00 | 0.00 | 0.00 |
| 0.00123 | 0.0313 | 5.00 | 450 | 0.00 | 0.00 | 0.00 |
| 0.000986 | 0.0250 | 5.32 | 500 | 0.02 | 0.02 | 0.02 |
| 0.000790 | 0.0201 | 5.64 | 635 | 1.49 | 1.49 | 1.51 |
| 0.000615 | 0.0156 | 6.00 | | 4.74 | 4.74 | 6.25 |
| 0.000435 | 0.0110 | 6.50 | | 6.64 | 6.64 | 12.90 |
| 0.000308 | 0.00781 | 7.00 | | 9.83 | 9.84 | 22.73 |
| 0.000197 | 0.00500 | 7.65 | | 16.40 | 16.41 | 39.14 |
| 0.000077 | 0.00195 | 9.00 | | 36.30 | 36.32 | 75.46 |
| 0.000038 | 0.000977 | 10.00 | | 17.50 | 17.51 | 92.97 |
| 0.000019 | 0.000488 | 11.00 | | 6.51 | 6.51 | 99.48 |
| 0.000015 | 0.000375 | 11.38 | | 0.52 | 0.52 | 100.00 |
| **TOTALS** | | | | **99.90** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 5.90 | 0.0007 | 0.017 |
| 10 | 6.28 | 0.0005 | 0.013 |
| 16 | 6.66 | 0.0004 | 0.010 |
| 25 | 7.09 | 0.0003 | 0.007 |
| 40 | 7.68 | 0.0002 | 0.005 |
| 50 | 8.05 | 0.0001 | 0.004 |
| 60 | 8.42 | 0.0001 | 0.003 |
| 75 | 8.98 | 0.0001 | 0.002 |
| 84 | 9.49 | 0.0001 | 0.001 |
| 90 | 9.83 | 0.0000 | 0.001 |
| 95 | 10.31 | 0.0000 | 0.001 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 8.05 | 8.05 | 8.05 |
| Median, in. | 0.0001 | 0.0001 | 0.0001 |
| Median, mm | 0.004 | 0.004 | 0.004 |
| Mean, phi | 7.75 | 8.07 | 8.07 |
| Mean, in. | 0.0002 | 0.0001 | 0.0001 |
| Mean, mm | 0.005 | 0.004 | 0.004 |
| Sorting | 1.928 | 1.415 | 1.375 |
| Skewness | 1.010 | 0.016 | 0.021 |
| Kurtosis | 0.228 | 0.557 | 0.954 |
| **Grain Size Description** (ASTM-USCS Scale) | | Clay (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 0.00 |
| Silt | >0.005 mm | 39.14 |
| Clay | <0.005 mm | 60.86 |
| | **Total** | **100** |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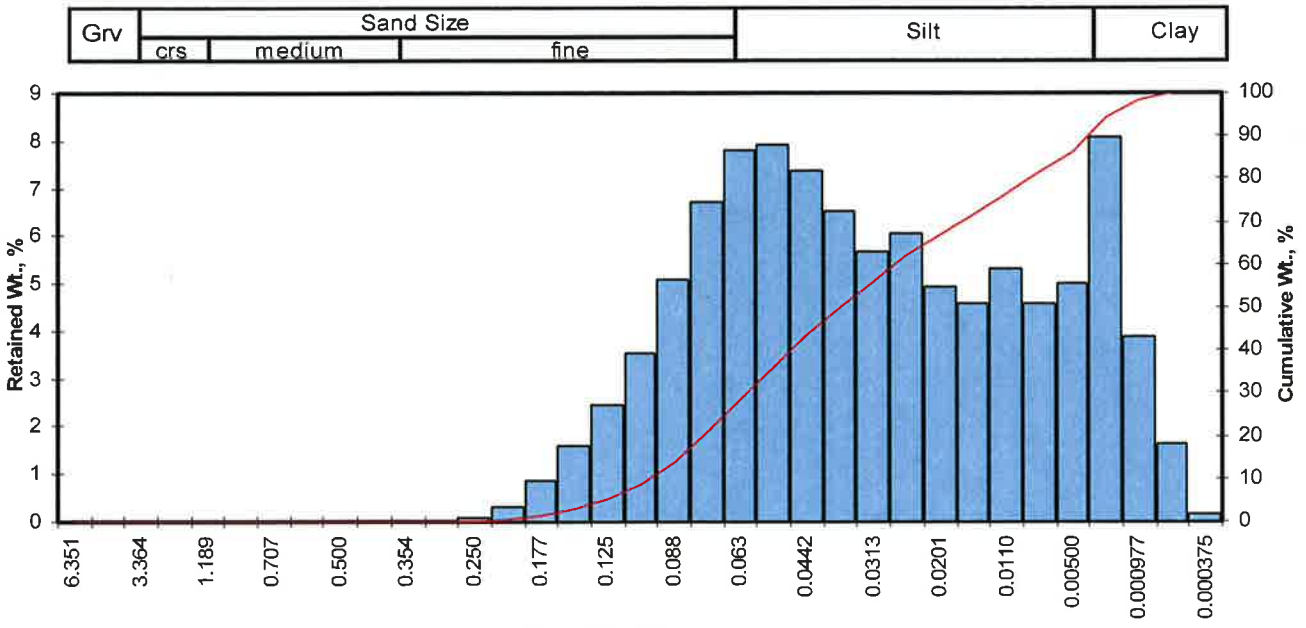
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-2169C Run 1, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 110.0-110.5 |




| Opening (Inches) | Opening (Millimeters) | Phi of Screen | U.S. No. | Sample Weight, grams | Increment Weight, percent | Cumulative Weight, percent |
|---|---|---|---|---|---|---|
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.06 | 0.06 | 0.06 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.32 | 0.32 | 0.38 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.85 | 0.85 | 1.23 |
| 0.0059 | 0.149 | 2.75 | 100 | 1.60 | 1.60 | 2.83 |
| 0.0049 | 0.125 | 3.00 | 120 | 2.43 | 2.43 | 5.26 |
| 0.0041 | 0.105 | 3.25 | 140 | 3.54 | 3.54 | 8.80 |
| 0.0035 | 0.088 | 3.50 | 170 | 5.07 | 5.07 | 13.87 |
| 0.0029 | 0.074 | 3.75 | 200 | 6.71 | 6.71 | 20.58 |
| 0.0025 | 0.063 | 4.00 | 230 | 7.79 | 7.79 | 28.37 |
| 0.0021 | 0.053 | 4.25 | 270 | 7.92 | 7.92 | 36.29 |
| 0.00174 | 0.0442 | 4.50 | 325 | 7.37 | 7.37 | 43.66 |
| 0.00146 | 0.0372 | 4.75 | 400 | 6.51 | 6.51 | 50.17 |
| 0.00123 | 0.0313 | 5.00 | 450 | 5.65 | 5.65 | 55.82 |
| 0.000986 | 0.0250 | 5.32 | 500 | 6.07 | 6.07 | 61.89 |
| 0.000790 | 0.0201 | 5.64 | 635 | 4.94 | 4.94 | 66.83 |
| 0.000615 | 0.0156 | 6.00 | | 4.56 | 4.56 | 71.39 |
| 0.000435 | 0.0110 | 6.50 | | 5.32 | 5.32 | 76.71 |
| 0.000308 | 0.00781 | 7.00 | | 4.59 | 4.59 | 81.30 |
| 0.000197 | 0.00500 | 7.65 | | 5.01 | 5.01 | 86.31 |
| 0.000077 | 0.00195 | 9.00 | | 8.07 | 8.07 | 94.38 |
| 0.000038 | 0.000977 | 10.00 | | 3.87 | 3.87 | 98.25 |
| 0.000019 | 0.000488 | 11.00 | | 1.61 | 1.61 | 99.86 |
| 0.000015 | 0.000375 | 11.38 | | 0.14 | 0.14 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

**Cumulative Weight Percent greater than**

| Weight percent | Phi Value | Particle Size (Inches) | Particle Size (Millimeters) |
|---|---|---|---|
| 5 | 2.97 | 0.0050 | 0.127 |
| 10 | 3.31 | 0.0040 | 0.101 |
| 16 | 3.58 | 0.0033 | 0.084 |
| 25 | 3.89 | 0.0027 | 0.067 |
| 40 | 4.38 | 0.0019 | 0.048 |
| 50 | 4.74 | 0.0015 | 0.037 |
| 60 | 5.22 | 0.0011 | 0.027 |
| 75 | 6.34 | 0.0005 | 0.012 |
| 84 | 7.35 | 0.0002 | 0.006 |
| 90 | 8.26 | 0.0001 | 0.003 |
| 95 | 9.16 | 0.0001 | 0.002 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.74 | 4.74 | 4.74 |
| Median, in. | 0.0015 | 0.0015 | 0.0015 |
| Median, mm | 0.037 | 0.037 | 0.037 |
| Mean, phi | 4.65 | 5.46 | 5.22 |
| Mean, in. | 0.0016 | 0.0009 | 0.0011 |
| Mean, mm | 0.040 | 0.023 | 0.027 |
| Sorting | 2.335 | 1.884 | 1.880 |
| Skewness | 0.773 | 0.382 | 0.405 |
| Kurtosis | 0.282 | 0.642 | 1.036 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 20.58 |
| Silt | >0.005 mm | 65.73 |
| Clay | <0.005 mm | 13.69 |
| | **Total** | **100** |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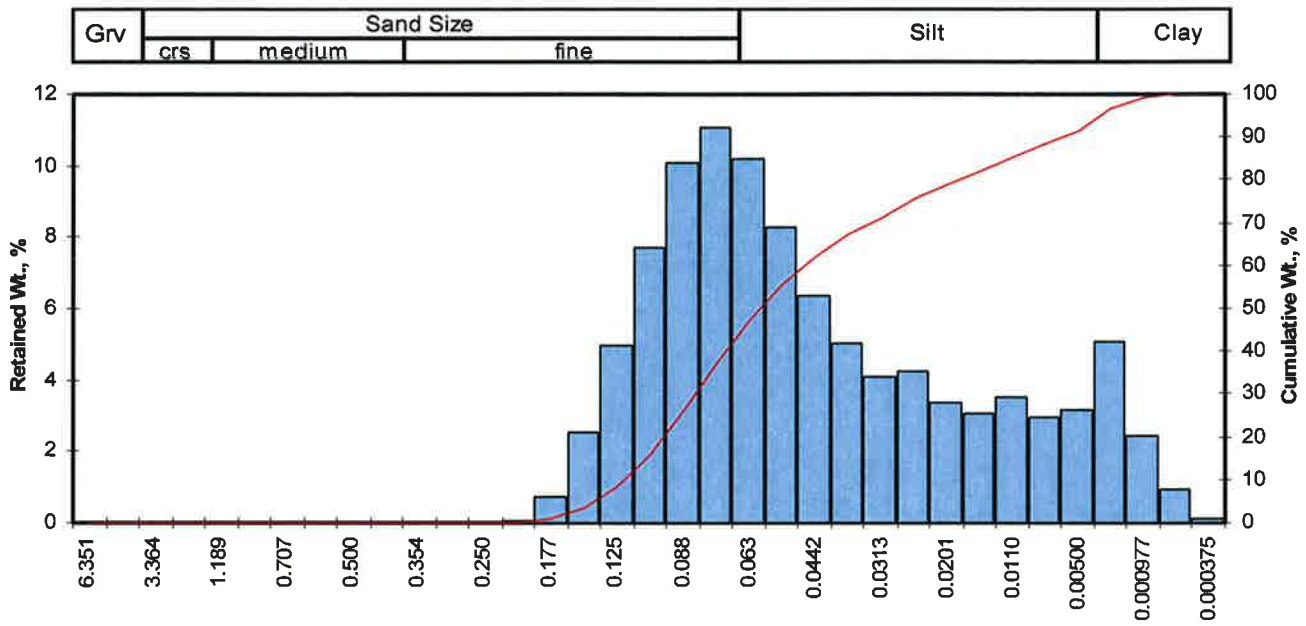
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-2169C Run 2, Sample 3 |
| **Project No:** | N/A | **Depth, ft:** | 156.5-157.2 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.07 | 0.07 | 0.07 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.73 | 0.73 | 0.80 |
| 0.0059 | 0.149 | 2.75 | 100 | 2.55 | 2.55 | 3.35 |
| 0.0049 | 0.125 | 3.00 | 120 | 4.98 | 4.98 | 8.33 |
| 0.0041 | 0.105 | 3.25 | 140 | 7.70 | 7.70 | 16.02 |
| 0.0035 | 0.088 | 3.50 | 170 | 10.10 | 10.09 | 26.12 |
| 0.0029 | 0.074 | 3.75 | 200 | 11.10 | 11.09 | 37.21 |
| 0.0025 | 0.063 | 4.00 | 230 | 10.20 | 10.19 | 47.40 |
| 0.0021 | 0.053 | 4.25 | 270 | 8.30 | 8.29 | 55.70 |
| 0.00174 | 0.0442 | 4.50 | 325 | 6.38 | 6.38 | 62.08 |
| 0.00146 | 0.0372 | 4.75 | 400 | 5.02 | 5.02 | 67.09 |
| 0.00123 | 0.0313 | 5.00 | 450 | 4.11 | 4.11 | 71.20 |
| 0.000986 | 0.0250 | 5.32 | 500 | 4.26 | 4.26 | 75.46 |
| 0.000790 | 0.0201 | 5.64 | 635 | 3.36 | 3.36 | 78.81 |
| 0.000615 | 0.0156 | 6.00 | | 3.06 | 3.06 | 81.87 |
| 0.000435 | 0.0110 | 6.50 | | 3.52 | 3.52 | 85.39 |
| 0.000308 | 0.00781 | 7.00 | | 2.95 | 2.95 | 88.34 |
| 0.000197 | 0.00500 | 7.65 | | 3.15 | 3.15 | 91.49 |
| 0.000077 | 0.00195 | 9.00 | | 5.08 | 5.08 | 96.56 |
| 0.000038 | 0.000977 | 10.00 | | 2.41 | 2.41 | 98.97 |
| 0.000019 | 0.000488 | 11.00 | | 0.95 | 0.95 | 99.92 |
| 0.000015 | 0.000375 | 11.38 | | 0.08 | 0.08 | 100.00 |
| **TOTALS** | | | | **100.10** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 2.83 | 0.0055 | 0.140 |
| 10 | 3.05 | 0.0047 | 0.120 |
| 16 | 3.25 | 0.0041 | 0.105 |
| 25 | 3.47 | 0.0035 | 0.090 |
| 40 | 3.82 | 0.0028 | 0.071 |
| 50 | 4.08 | 0.0023 | 0.059 |
| 60 | 4.42 | 0.0018 | 0.047 |
| 75 | 5.29 | 0.0010 | 0.026 |
| 84 | 6.30 | 0.0005 | 0.013 |
| 90 | 7.34 | 0.0002 | 0.006 |
| 95 | 8.58 | 0.0001 | 0.003 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.08 | 4.08 | 4.08 |
| Median, in. | 0.0023 | 0.0023 | 0.0023 |
| Median, mm | 0.059 | 0.059 | 0.059 |
| Mean, phi | 4.11 | 4.78 | 4.54 |
| Mean, in. | 0.0023 | 0.0014 | 0.0017 |
| Mean, mm | 0.058 | 0.037 | 0.043 |
| Sorting | 1.875 | 1.527 | 1.634 |
| Skewness | 0.812 | 0.457 | 0.512 |
| Kurtosis | 0.282 | 0.883 | 1.300 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 37.21 |
| Silt | >0.005 mm | 54.28 |
| Clay | <0.005 mm | 8.51 |
| | **Total** | **100** |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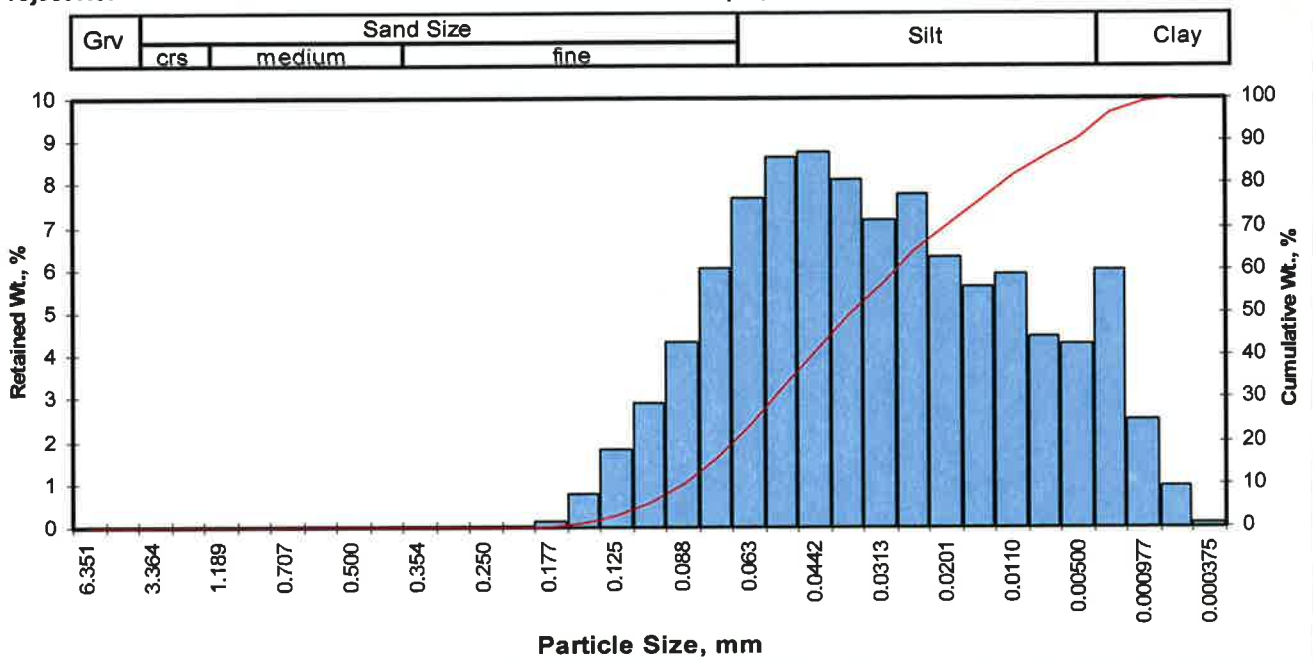
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-2169C Run 3, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 355.0-356.0 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.00 | 0.00 | 0.00 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.13 | 0.13 | 0.13 |
| 0.0059 | 0.149 | 2.75 | 100 | 0.79 | 0.79 | 0.92 |
| 0.0049 | 0.125 | 3.00 | 120 | 1.80 | 1.80 | 2.73 |
| 0.0041 | 0.105 | 3.25 | 140 | 2.90 | 2.90 | 5.63 |
| 0.0035 | 0.088 | 3.50 | 170 | 4.30 | 4.30 | 9.93 |
| 0.0029 | 0.074 | 3.75 | 200 | 6.04 | 6.04 | 15.97 |
| 0.0025 | 0.063 | 4.00 | 230 | 7.67 | 7.67 | 23.64 |
| 0.0021 | 0.053 | 4.25 | 270 | 8.62 | 8.62 | 32.26 |
| 0.00174 | 0.0442 | 4.50 | 325 | 8.74 | 8.74 | 41.00 |
| 0.00146 | 0.0372 | 4.75 | 400 | 8.10 | 8.10 | 49.10 |
| 0.00123 | 0.0313 | 5.00 | 450 | 7.16 | 7.16 | 56.26 |
| 0.000986 | 0.0250 | 5.32 | 500 | 7.75 | 7.75 | 64.01 |
| 0.000790 | 0.0201 | 5.64 | 635 | 6.28 | 6.28 | 70.29 |
| 0.000615 | 0.0156 | 6.00 | | 5.59 | 5.59 | 75.88 |
| 0.000435 | 0.0110 | 6.50 | | 5.90 | 5.90 | 81.78 |
| 0.000308 | 0.00781 | 7.00 | | 4.43 | 4.43 | 86.21 |
| 0.000197 | 0.00500 | 7.65 | | 4.28 | 4.28 | 90.49 |
| 0.000077 | 0.00195 | 9.00 | | 5.97 | 5.97 | 96.46 |
| 0.000038 | 0.000977 | 10.00 | | 2.52 | 2.52 | 98.98 |
| 0.000019 | 0.000488 | 11.00 | | 0.94 | 0.94 | 99.92 |
| 0.000015 | 0.000375 | 11.38 | | 0.08 | 0.08 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

**Cumulative Weight Percent greater than**

| Weight | Phi | Particle Size | |
|---|---|---|---|
| percent | Value | Inches | Millimeters |
| 5 | 3.20 | 0.0043 | 0.109 |
| 10 | 3.50 | 0.0035 | 0.088 |
| 16 | 3.75 | 0.0029 | 0.074 |
| 25 | 4.04 | 0.0024 | 0.061 |
| 40 | 4.47 | 0.0018 | 0.045 |
| 50 | 4.78 | 0.0014 | 0.036 |
| 60 | 5.15 | 0.0011 | 0.028 |
| 75 | 5.94 | 0.0006 | 0.016 |
| 84 | 6.75 | 0.0004 | 0.009 |
| 90 | 7.57 | 0.0002 | 0.005 |
| 95 | 8.67 | 0.0001 | 0.002 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.78 | 4.78 | 4.78 |
| Median, in. | 0.0014 | 0.0014 | 0.0014 |
| Median, mm | 0.036 | 0.036 | 0.036 |
| Mean, phi | 4.70 | 5.25 | 5.09 |
| Mean, in. | 0.0015 | 0.0010 | 0.0012 |
| Mean, mm | 0.039 | 0.026 | 0.029 |
| Sorting | 1.934 | 1.500 | 1.579 |
| Skewness | 0.865 | 0.313 | 0.367 |
| Kurtosis | 0.269 | 0.824 | 1.178 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 15.97 |
| Silt | >0.005 mm | 74.53 |
| Clay | <0.005 mm | 9.51 |
| | **Total** | **100** |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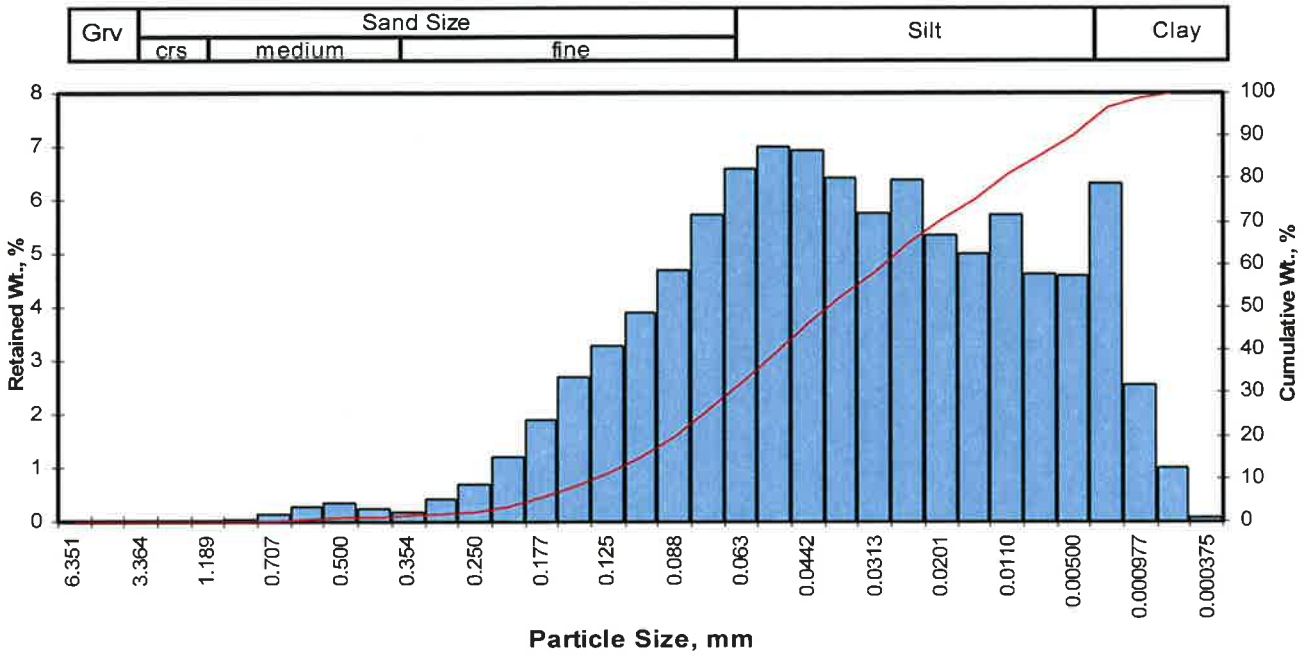
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-2169C Run 4, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 470.0-470.5 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.05 | 0.05 | 0.05 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.15 | 0.15 | 0.20 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.28 | 0.28 | 0.48 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.33 | 0.33 | 0.81 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.24 | 0.24 | 1.05 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.18 | 0.18 | 1.23 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.40 | 0.40 | 1.63 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.69 | 0.69 | 2.32 |
| 0.0083 | 0.210 | 2.25 | 70 | 1.21 | 1.21 | 3.53 |
| 0.0070 | 0.177 | 2.50 | 80 | 1.91 | 1.91 | 5.44 |
| 0.0059 | 0.149 | 2.75 | 100 | 2.69 | 2.69 | 8.13 |
| 0.0049 | 0.125 | 3.00 | 120 | 3.29 | 3.29 | 11.42 |
| 0.0041 | 0.105 | 3.25 | 140 | 3.88 | 3.88 | 15.30 |
| 0.0035 | 0.088 | 3.50 | 170 | 4.70 | 4.70 | 20.00 |
| 0.0029 | 0.074 | 3.75 | 200 | 5.72 | 5.72 | 25.72 |
| 0.0025 | 0.063 | 4.00 | 230 | 6.60 | 6.60 | 32.32 |
| 0.0021 | 0.053 | 4.25 | 270 | 7.00 | 7.00 | 39.32 |
| 0.00174 | 0.0442 | 4.50 | 325 | 6.92 | 6.92 | 46.24 |
| 0.00146 | 0.0372 | 4.75 | 400 | 6.41 | 6.41 | 52.65 |
| 0.00123 | 0.0313 | 5.00 | 450 | 5.75 | 5.75 | 58.40 |
| 0.000986 | 0.0250 | 5.32 | 500 | 6.37 | 6.37 | 64.77 |
| 0.000790 | 0.0201 | 5.64 | 635 | 5.34 | 5.34 | 70.11 |
| 0.000615 | 0.0156 | 6.00 | | 4.99 | 4.99 | 75.10 |
| 0.000435 | 0.0110 | 6.50 | | 5.73 | 5.73 | 80.83 |
| 0.000308 | 0.00781 | 7.00 | | 4.62 | 4.62 | 85.45 |
| 0.000197 | 0.00500 | 7.65 | | 4.60 | 4.60 | 90.05 |
| 0.000077 | 0.00195 | 9.00 | | 6.31 | 6.31 | 96.36 |
| 0.000038 | 0.000977 | 10.00 | | 2.56 | 2.56 | 98.92 |
| 0.000019 | 0.000488 | 11.00 | | 1.00 | 1.00 | 99.92 |
| 0.000015 | 0.000375 | 11.38 | | 0.08 | 0.08 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 2.44 | 0.0072 | 0.184 |
| 10 | 2.89 | 0.0053 | 0.135 |
| 16 | 3.29 | 0.0040 | 0.102 |
| 25 | 3.72 | 0.0030 | 0.076 |
| 40 | 4.27 | 0.0020 | 0.052 |
| 50 | 4.65 | 0.0016 | 0.040 |
| 60 | 5.08 | 0.0012 | 0.030 |
| 75 | 5.99 | 0.0006 | 0.016 |
| 84 | 6.84 | 0.0003 | 0.009 |
| 90 | 7.64 | 0.0002 | 0.005 |
| 95 | 8.71 | 0.0001 | 0.002 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.65 | 4.65 | 4.65 |
| Median, in. | 0.0016 | 0.0016 | 0.0016 |
| Median, mm | 0.040 | 0.040 | 0.040 |
| Mean, phi | 4.45 | 5.07 | 4.93 |
| Mean, in. | 0.0018 | 0.0012 | 0.0013 |
| Mean, mm | 0.046 | 0.030 | 0.033 |
| Sorting | 2.200 | 1.778 | 1.838 |
| Skewness | 0.865 | 0.235 | 0.266 |
| Kurtosis | 0.232 | 0.762 | 1.129 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 1.05 |
| Fine Sand | 200 | 24.67 |
| Silt | >0.005 mm | 64.33 |
| Clay | <0.005 mm | 9.95 |
| | **Total** | **100** |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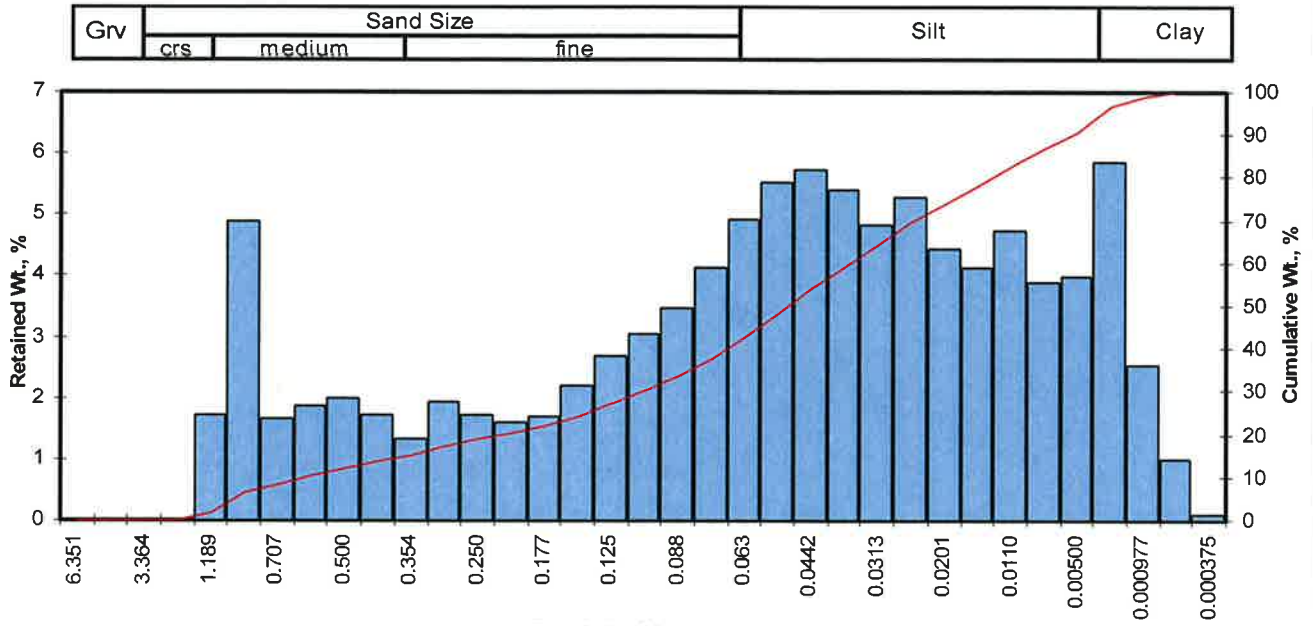
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-2169C Run 5, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 608.9-609.5 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 1.72 | 1.72 | 1.72 |
| 0.0331 | 0.841 | 0.25 | 20 | 4.90 | 4.90 | 6.62 |
| 0.0278 | 0.707 | 0.50 | 25 | 1.67 | 1.67 | 8.29 |
| 0.0234 | 0.595 | 0.75 | 30 | 1.86 | 1.86 | 10.15 |
| 0.0197 | 0.500 | 1.00 | 35 | 1.99 | 1.99 | 12.14 |
| 0.0166 | 0.420 | 1.25 | 40 | 1.73 | 1.73 | 13.87 |
| 0.0139 | 0.354 | 1.50 | 45 | 1.32 | 1.32 | 15.19 |
| 0.0117 | 0.297 | 1.75 | 50 | 1.94 | 1.94 | 17.13 |
| 0.0098 | 0.250 | 2.00 | 60 | 1.71 | 1.71 | 18.84 |
| 0.0083 | 0.210 | 2.25 | 70 | 1.60 | 1.60 | 20.44 |
| 0.0070 | 0.177 | 2.50 | 80 | 1.70 | 1.70 | 22.14 |
| 0.0059 | 0.149 | 2.75 | 100 | 2.19 | 2.19 | 24.33 |
| 0.0049 | 0.125 | 3.00 | 120 | 2.70 | 2.70 | 27.03 |
| 0.0041 | 0.105 | 3.25 | 140 | 3.05 | 3.05 | 30.08 |
| 0.0035 | 0.088 | 3.50 | 170 | 3.46 | 3.46 | 33.54 |
| 0.0029 | 0.074 | 3.75 | 200 | 4.13 | 4.13 | 37.67 |
| 0.0025 | 0.063 | 4.00 | 230 | 4.92 | 4.92 | 42.59 |
| 0.0021 | 0.053 | 4.25 | 270 | 5.52 | 5.52 | 48.11 |
| 0.00174 | 0.0442 | 4.50 | 325 | 5.73 | 5.73 | 53.84 |
| 0.00146 | 0.0372 | 4.75 | 400 | 5.41 | 5.41 | 59.25 |
| 0.00123 | 0.0313 | 5.00 | 450 | 4.83 | 4.83 | 64.08 |
| 0.000986 | 0.0250 | 5.32 | 500 | 5.28 | 5.28 | 69.36 |
| 0.000790 | 0.0201 | 5.64 | 635 | 4.42 | 4.42 | 73.78 |
| 0.000615 | 0.0156 | 6.00 | | 4.14 | 4.14 | 77.92 |
| 0.000435 | 0.0110 | 6.50 | | 4.75 | 4.75 | 82.67 |
| 0.000308 | 0.00781 | 7.00 | | 3.88 | 3.88 | 86.56 |
| 0.000197 | 0.00500 | 7.65 | | 3.98 | 3.98 | 90.54 |
| 0.000077 | 0.00195 | 9.00 | | 5.84 | 5.84 | 96.38 |
| 0.000038 | 0.000977 | 10.00 | | 2.54 | 2.54 | 98.92 |
| 0.000019 | 0.000488 | 11.00 | | 1.00 | 1.00 | 99.92 |
| 0.000015 | 0.000375 | 11.38 | | 0.08 | 0.08 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 0.08 | 0.0371 | 0.943 |
| 10 | 0.73 | 0.0237 | 0.603 |
| 16 | 1.60 | 0.0129 | 0.329 |
| 25 | 2.81 | 0.0056 | 0.142 |
| 40 | 3.87 | 0.0027 | 0.068 |
| 50 | 4.33 | 0.0020 | 0.050 |
| 60 | 4.79 | 0.0014 | 0.036 |
| 75 | 5.75 | 0.0007 | 0.019 |
| 84 | 6.67 | 0.0004 | 0.010 |
| 90 | 7.56 | 0.0002 | 0.005 |
| 95 | 8.68 | 0.0001 | 0.002 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 4.33 | 4.33 | 4.33 |
| Median, in. | 0.0020 | 0.0020 | 0.0020 |
| Median, mm | 0.050 | 0.050 | 0.050 |
| Mean, phi | 3.63 | 4.14 | 4.20 |
| Mean, in. | 0.0032 | 0.0022 | 0.0021 |
| Mean, mm | 0.081 | 0.057 | 0.054 |
| Sorting | 2.764 | 2.533 | 2.569 |
| Skewness | 1.038 | -0.077 | -0.033 |
| Kurtosis | 0.104 | 0.697 | 1.201 |
| **Grain Size Description** (ASTM-USCS Scale) | | Fine sand (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 13.87 |
| Fine Sand | 200 | 23.80 |
| Silt | >0.005 mm | 52.86 |
| Clay | <0.005 mm | 9.46 |
| | **Total** | **100** |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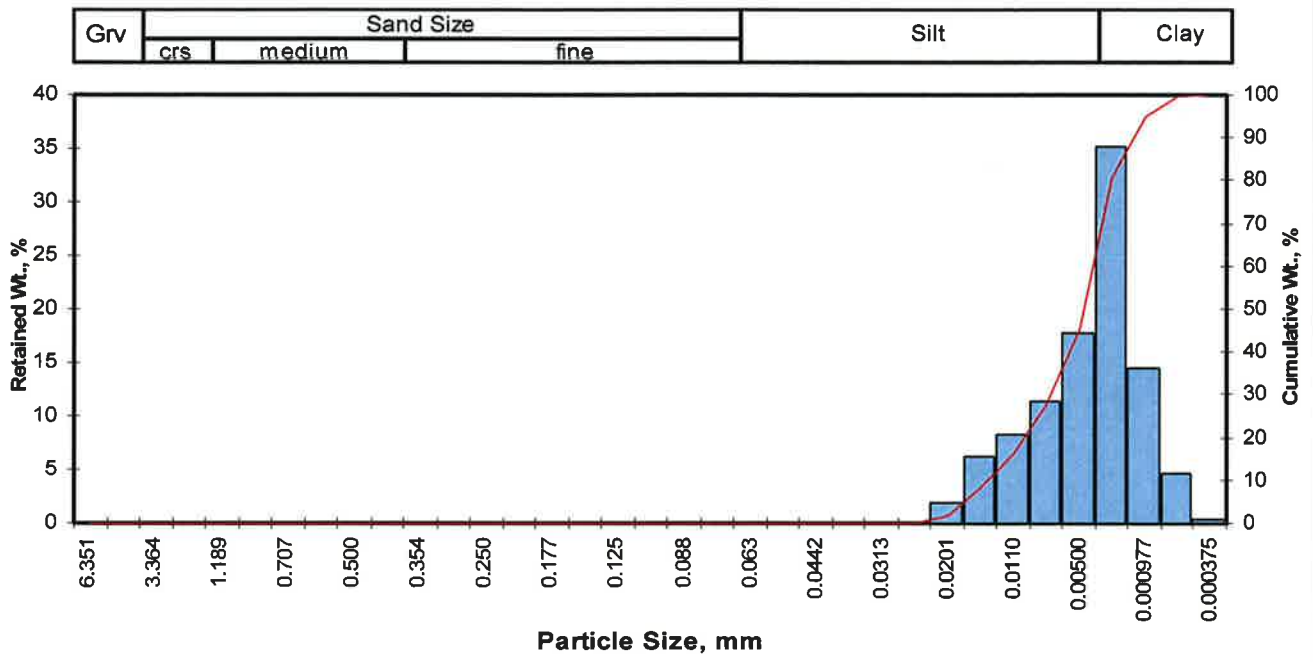
# PTS Laboratories, Inc.

**Particle Size Analysis - ASTM D4464M**

| | | | |
|---|---|---|---|
| **Client:** | Crow Butte Resources, Inc. | **PTS File No:** | 43570 |
| **Project:** | Marsland Core | **Sample ID:** | M-2169C Run 7, Sample 1 |
| **Project No:** | N/A | **Depth, ft:** | 1135.5-1136.0 |




| Opening | | Phi of | U.S. | Sample Weight, | Increment Weight, | Cumulative Weight, |
|---|---|---|---|---|---|---|
| Inches | Millimeters | Screen | No. | grams | percent | percent |
| 0.2500 | 6.351 | -2.67 | 1/4 | 0.00 | 0.00 | 0.00 |
| 0.1873 | 4.757 | -2.25 | 4 | 0.00 | 0.00 | 0.00 |
| 0.1324 | 3.364 | -1.75 | 6 | 0.00 | 0.00 | 0.00 |
| 0.0787 | 2.000 | -1.00 | 10 | 0.00 | 0.00 | 0.00 |
| 0.0468 | 1.189 | -0.25 | 16 | 0.00 | 0.00 | 0.00 |
| 0.0331 | 0.841 | 0.25 | 20 | 0.00 | 0.00 | 0.00 |
| 0.0278 | 0.707 | 0.50 | 25 | 0.00 | 0.00 | 0.00 |
| 0.0234 | 0.595 | 0.75 | 30 | 0.00 | 0.00 | 0.00 |
| 0.0197 | 0.500 | 1.00 | 35 | 0.00 | 0.00 | 0.00 |
| 0.0166 | 0.420 | 1.25 | 40 | 0.00 | 0.00 | 0.00 |
| 0.0139 | 0.354 | 1.50 | 45 | 0.00 | 0.00 | 0.00 |
| 0.0117 | 0.297 | 1.75 | 50 | 0.00 | 0.00 | 0.00 |
| 0.0098 | 0.250 | 2.00 | 60 | 0.00 | 0.00 | 0.00 |
| 0.0083 | 0.210 | 2.25 | 70 | 0.00 | 0.00 | 0.00 |
| 0.0070 | 0.177 | 2.50 | 80 | 0.00 | 0.00 | 0.00 |
| 0.0059 | 0.149 | 2.75 | 100 | 0.00 | 0.00 | 0.00 |
| 0.0049 | 0.125 | 3.00 | 120 | 0.00 | 0.00 | 0.00 |
| 0.0041 | 0.105 | 3.25 | 140 | 0.00 | 0.00 | 0.00 |
| 0.0035 | 0.088 | 3.50 | 170 | 0.00 | 0.00 | 0.00 |
| 0.0029 | 0.074 | 3.75 | 200 | 0.00 | 0.00 | 0.00 |
| 0.0025 | 0.063 | 4.00 | 230 | 0.00 | 0.00 | 0.00 |
| 0.0021 | 0.053 | 4.25 | 270 | 0.00 | 0.00 | 0.00 |
| 0.00174 | 0.0442 | 4.50 | 325 | 0.00 | 0.00 | 0.00 |
| 0.00146 | 0.0372 | 4.75 | 400 | 0.00 | 0.00 | 0.00 |
| 0.00123 | 0.0313 | 5.00 | 450 | 0.00 | 0.00 | 0.00 |
| 0.000986 | 0.0250 | 5.32 | 500 | 0.02 | 0.02 | 0.02 |
| 0.000790 | 0.0201 | 5.64 | 635 | 1.86 | 1.86 | 1.88 |
| 0.000615 | 0.0156 | 6.00 | | 6.16 | 6.16 | 8.05 |
| 0.000435 | 0.0110 | 6.50 | | 8.34 | 8.34 | 16.39 |
| 0.000308 | 0.00781 | 7.00 | | 11.30 | 11.30 | 27.69 |
| 0.000197 | 0.00500 | 7.65 | | 17.70 | 17.70 | 45.40 |
| 0.000077 | 0.00195 | 9.00 | | 35.10 | 35.11 | 80.50 |
| 0.000038 | 0.000977 | 10.00 | | 14.40 | 14.40 | 94.91 |
| 0.000019 | 0.000488 | 11.00 | | 4.73 | 4.73 | 99.64 |
| 0.000015 | 0.000375 | 11.38 | | 0.36 | 0.36 | 100.00 |
| **TOTALS** | | | | **100.00** | **100.00** | **100.00** |

| Cumulative Weight Percent greater than | | | |
|---|---|---|---|
| Weight | Phi | Particle Size | |
| percent | Value | Inches | Millimeters |
| 5 | 5.82 | 0.0007 | 0.018 |
| 10 | 6.12 | 0.0006 | 0.014 |
| 16 | 6.48 | 0.0004 | 0.011 |
| 25 | 6.88 | 0.0003 | 0.008 |
| 40 | 7.45 | 0.0002 | 0.006 |
| 50 | 7.82 | 0.0002 | 0.004 |
| 60 | 8.21 | 0.0001 | 0.003 |
| 75 | 8.79 | 0.0001 | 0.002 |
| 84 | 9.24 | 0.0001 | 0.002 |
| 90 | 9.66 | 0.0000 | 0.001 |
| 95 | 10.02 | 0.0000 | 0.001 |

| Measure | Trask | Inman | Folk-Ward |
|---|---|---|---|
| Median, phi | 7.82 | 7.82 | 7.82 |
| Median, in. | 0.0002 | 0.0002 | 0.0002 |
| Median, mm | 0.004 | 0.004 | 0.004 |
| Mean, phi | 7.54 | 7.86 | 7.85 |
| Mean, in. | 0.0002 | 0.0002 | 0.0002 |
| Mean, mm | 0.005 | 0.004 | 0.004 |
| Sorting | 1.936 | 1.383 | 1.327 |
| Skewness | 0.992 | 0.027 | 0.037 |
| Kurtosis | 0.236 | 0.518 | 0.902 |
| **Grain Size Description** (ASTM-USCS Scale) | | Silt (based on Mean from Trask) | |

| Description | Retained on Sieve # | Weight Percent |
|---|---|---|
| Gravel | 4 | 0.00 |
| Coarse Sand | 10 | 0.00 |
| Medium Sand | 40 | 0.00 |
| Fine Sand | 200 | 0.00 |
| Silt | >0.005 mm | 45.40 |
| Clay | <0.005 mm | 54.60 |
| | **Total** | **100** |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MINERALOGY, INC.

# Final Test Report

| | | | |
|---|---|---|---|
| Client: | PTS Laboratories, Inc. | MI#: | 13383 |
| Project: | Marsland Core / PTS# 43570 | Sample Type: | Conventional Core |
| PO#: | 13-349 | Date: | 10.03.13 |

| | |
|---|---|
| Contact | Rachel Spitz |
| Address | PTS Laboratories, Inc. |
| | 8100 Secura Way |
| | Santa Fe Springs, CA 90670 |
| E-mail | rspitz@ptslabs.com |
| Phone | 562.347.2500 |
| | |
| | |
| Project ID: | Marsland Core / PTS# 43570 / PO# 13-349 |
| Test Methods | XRD (B&C) (x30) |
| Calibration Date | 10.03.13 |
| | |
| MI Lab Supervisor |  |
| | Timothy B. Murphy |

# ***CONDITIONS AND QUALIFICATIONS***

***Mineralogy, Inc. will endeavor to provide accurate and reliable laboratory measurements of the samples provided by the client. The results of any x-ray diffraction, petrographic or core analysis test are necessarily influenced by the condition and selection of the samples to be analyzed. It should be recognized that geological samples are commonly heterogeneous and lack uniform properties. Mineralogical, geochemical and/or petrographic data obtained for a specific sample provides compositional data pertinent to that specific sampling location. Such "site-specific data" may fail to provide adequate characterization of the range of compositional variability possible within a given project area, thus the "projection" of these laboratory findings and values to adjoining, "untested" areas of the formation or project area is inherently risky, and exceeds the scope of the laboratory work request. Hence, Mineralogy, Inc. shall not assume any liability risk or responsibility for any loss or potential failure associated with the application of "site or sample-specific laboratory data" to "untested" areas of the formation or project area. Unless otherwise directed, the samples selected for analysis will be chosen to reflect a visually representative portion of the bulk sample submitted for analysis. Where provided, the interpretation of x-ray diffraction, petrographic or core analysis results constitutes the best geological judgment of Mineralogy, Inc., and is subject to the sampling limitations described above, and the detection limits inherent to semi-quantitative and/or qualitative mineralogical and microscopic analysis. Mineralogy, Inc. assumes no responsibility nor offers any guarantee of the productivity, suitability or performance of any oil or gas well, hydrocarbon recovery process, dimension stone, and/or ore material based upon the data or conclusions presented in this report.***

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# TABLE I-1

## X-RAY DIFFRACTION ANALYSIS

Client: PTS Laboratories, Inc.
MI#: 13383
Project ID: Marsland Core / PTS# 43570 / PO# 13-349
Sample Type: Conventional Core

**X-Ray Diffraction Results**

| | Sample ID | M-533C.Run 1.S1 | M-533C.Run 1.S2 | M-533C.Run 3.S1 | M-533C.Run 3.S2 | M-533C.Run 5.S1 |
|---|---|---|---|---|---|---|
| | Lab ID | 13383-01 | 13383-02 | 13383-03 | 13383-04 | 13383-05 |
| Mineral Constituents | Chemical Formula | Relative Abundance (%) | | | | |
| Quartz | $SiO_2$ | 63 | 17 | 4 | 9 | 29 |
| Plagioclase Feldspar | $(Na_{0.26}Ca_{0.24})Al_{0.735}Si_{1.266}O_4$ | 27 | 12 | 4 | 11 | 6 |
| K-Feldspar - Microcline | $KAlSi_3O_8$ | 7 | 5 | 1 | 2 | 4 |
| Calcite | $CaCO_3$ | | | | 6 | |
| Ferroan Dolomite | $Ca(Mg_{0.67}Fe_{0.33})(CO_3)_2$ | trc | | | | |
| Siderite | $FeCO_3$ | | | | | |
| Halite | NaCl | | | trc | | |
| Fluorapatite | $Ca_5F(PO_4)_3$ | | 1 | | 1 | 1 |
| Augite | $Ca(Fe,Mg)Si_2O_6$ | trc | | trc | | 1 |
| Hornblende | $Ca_2(Mg,Fe)_5(Si,Al)_8O_{22}(OH)_6$ | trc | | | | trc |
| Gypsum | $CaSO_4 \cdot 2H_2O$ | | | | | |
| Goethite | alpha-FeOOH | trc | | | | |
| Clinoptilolite | $(Na,K,Ca)_6(Si,Al)_{36}O_{72} \cdot 20H_2O$ | | trc | | | 1 |
| Kaolinite | $Al_2Si_2O_5(OH)_4$ | | | | | 1 |
| Chlorite | $(Mg,Al)_6(Si,Al)_4O_{10}(OH)_8$ | trc | trc | | | 2 |
| Illite/Mica | $KAl_2(Si_3AlO_{10})(OH)_2$ | trc | 5 | 1 | 1 | 4 |
| Montmorillonite | $(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot xH_2O$ | | | | 7 | |
| Mixed-Layered Illite/Smectite | $K_{0.5}Al_2(Si,Al)_4O_{10}(OH)_2 \cdot 2H_2O$ | 3 | 30 | 8 | | 33 |
| Amorphous | | | 30 | 82 | 63 | 18 |
| | | | | | | |
| TOTAL | | 100 | 100 | 100 | 100 | 100 |
| % Illite Layers in ML Illite/Smectite | +/- 5% | 10% | 10% | 10% | | 10% |

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# TABLE I-2
## X-RAY DIFFRACTION ANALYSIS

Client: PTS Laboratories, Inc. MI#: 13383
Project ID: Marsland Core / PTS# 43570 / PO# 13-349 Sample Type: Conventional Core

**X-Ray Diffraction Results**

| | Sample ID | M-1635C.Run 1.S1 | M-1635C.Run 1.S2 | M-1635C.Run 2.S1 | M-1635C.Run 2.S2 | M-1635C.Run 3.S1 |
|---|---|---|---|---|---|---|
| | Lab ID | 13383-06 | 13383-07 | 13383-08 | 13383-09 | 13383-10 |
| Mineral Constituents | Chemical Formula | Relative Abundance (%) | | | | |
| Quartz | $SiO_2$ | 12 | 15 | 4 | 9 | 9 |
| Plagioclase Feldspar | $(Na_{0.26}Ca_{0.24})Al_{0.735}Si_{1.266}O_4$ | 9 | 13 | 3 | 11 | 9 |
| K-Feldspar - Microcline | $KAlSi_3O_8$ | 3 | 3 | 1 | 3 | 2 |
| Calcite | $CaCO_3$ | 50 | 46 | | | 15 |
| Ferroan Dolomite | $Ca(Mg_{0.67}Fe_{0.33})(CO_3)_2$ | | | | | trc |
| Siderite | $FeCO_3$ | | | | | |
| Halite | NaCl | | | | | |
| Fluorapatite | $Ca_5F(PO_4)_3$ | | | | | |
| Augite | $Ca(Fe,Mg)Si_2O_6$ | | | | | |
| Hornblende | $Ca_2(Mg,Fe)_5(Si,Al)_8O_{22}(OH)_6$ | | | | | |
| Gypsum | $CaSO_4 \cdot 2H_2O$ | | | | | |
| Goethite | alpha-FeOOH | | | | | |
| Clinoptilolite | $(Na,K,Ca)_6(Si,Al)_{36}O_{72} \cdot 20H_2O$ | | | | | |
| Kaolinite | $Al_2Si_2O_5(OH)_4$ | | | | | |
| Chlorite | $(Mg,Al)_6(Si,Al)_4O_{10}(OH)_8$ | 1 | | 1 | | trc |
| Illite/Mica | $KAl_2(Si_3AlO_{10})(OH)_2$ | 1 | 1 | 1 | 1 | 3 |
| Montmorillonite | $(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot xH_2O$ | | | 6 | 9 | 34 |
| Mixed-Layered Illite/Smectite | $K_{0.5}Al_2(Si,Al)_4O_{10}(OH)_2 \cdot 2H_2O$ | 8 | 5 | | | |
| Amorphous | | 16 | 17 | 84 | 67 | 28 |
| | | | | | | |
| TOTAL | | 100 | 100 | 100 | 100 | 100 |
| % Illite Layers in ML Illite/Smectite | +/- 5% | 5% | 10% | | | |

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# TABLE I-3

## X-RAY DIFFRACTION ANALYSIS

Client: PTS Laboratories, Inc.
Project ID: Marsland Core / PTS# 43570 / PO# 13-349

MI#: 13383
Sample Type: Conventional Core

**X-Ray Diffraction Results**

| | Sample ID | M-1635C.Run 6.S1 | M-1912C.Run 1.S1 | M-1912C.Run 2.S1 | M-1912C.Run 3.S1 | M-1912C.Run 3.S2 |
|---|---|---|---|---|---|---|
| | Lab ID | 13383-11 | 13383-12 | 13383-13 | 13383-14 | 13383-15 |
| Mineral Constituents | Chemical Formula | Relative Abundance (%) | | | | |
| Quartz | $SiO_2$ | 21 | 50 | 40 | 17 | 16 |
| Plagioclase Feldspar | $(Na_{0.26}Ca_{0.24})Al_{0.735}Si_{1.266}O_4$ | 5 | 22 | 27 | 17 | 14 |
| K-Feldspar - Microcline | $KAlSi_3O_8$ | 2 | 9 | 7 | 5 | 5 |
| Calcite | $CaCO_3$ | | | | | 9 |
| Ferroan Dolomite | $Ca(Mg_{0.67}Fe_{0.33})(CO_3)_2$ | 1 | 1 | | | |
| Siderite | $FeCO_3$ | | | | | |
| Pyrite | $FeS_2$ | | | | | 1 |
| Fluorapatite | $Ca_5F(PO_4)_3$ | trc | | | | |
| Augite | $Ca(Fe,Mg)Si_2O_6$ | | | | | |
| Hornblende | $Ca_2(Mg,Fe)_5(Si,Al)_8O_{22}(OH)_6$ | | 1 | | 1 | |
| Gypsum | $CaSO_4 \cdot 2H_2O$ | | | | | |
| Goethite | alpha-FeOOH | | | | | |
| Clinoptilolite | $(Na,K,Ca)_6(Si,Al)_{36}O_{72} \cdot 20H_2O$ | | | | | |
| Kaolinite | $Al_2Si_2O_5(OH)_4$ | | | | | |
| Chlorite | $(Mg,Al)_6(Si,Al)_4O_{10}(OH)_8$ | 5 | | | trc | |
| Illite/Mica | $KAl_2(Si_3AlO_{10})(OH)_2$ | 4 | trc | 1 | 1 | 1 |
| Montmorillonite | $(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot xH_2O$ | | | | | |
| Mixed-Layered Illite/Smectite | $K_{0.5}Al_2(Si,Al)_4O_{10}(OH)_2 \cdot 2H_2O$ | 42 | 5 | 7 | 27 | 20 |
| Amorphous | | 20 | 12 | 18 | 32 | 34 |
| | | | | | | |
| TOTAL | | 100 | 100 | 100 | 100 | 100 |
| % Illite Layers in ML Illite/Smectite | +/- 5% | 20% | 20% | 20% | 20% | 20% |

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# TABLE I-4

## X-RAY DIFFRACTION ANALYSIS

Client: PTS Laboratories, Inc.
Project ID: Marsland Core / PTS# 43570 / PO# 13-349

MI#: 13383
Sample Type: Conventional Core

**X-Ray Diffraction Results**

| | Sample ID | M-1912C.Run 4.S1 | M-1912C.Run 4.S2 | M-1956C.Run 1.S1 | M-1956C.Run 3.S1 | M-1956C.Run 4.S1 |
|---|---|---|---|---|---|---|
| | Lab ID | 13383-16 | 13383-17 | 13383-18 | 13383-19 | 13383-20 |
| Mineral Constituents | Chemical Formula | Relative Abundance (%) | | | | |
| Quartz | $SiO_2$ | 22 | 38 | 64 | 13 | 13 |
| Plagioclase Feldspar | $(Na_{0.26}Ca_{0.24})Al_{0.735}Si_{1.266}O_4$ | 4 | 8 | 22 | 13 | 14 |
| K-Feldspar - Microcline | $KAlSi_3O_8$ | 3 | 10 | 9 | 5 | 1 |
| Calcite | $CaCO_3$ | | 1 | 1 | 1 | 9 |
| Ferroan Dolomite | $Ca(Mg_{0.67}Fe_{0.33})(CO_3)_2$ | 1 | trc | 1 | | |
| Siderite | $FeCO_3$ | | | | | |
| Pyrite | $FeS_2$ | | | | | |
| Fluorapatite | $Ca_5F(PO_4)_3$ | | | | | |
| Augite | $Ca(Fe,Mg)Si_2O_6$ | | | | | |
| Hornblende | $Ca_2(Mg,Fe)_5(Si,Al)_8O_{22}(OH)_6$ | | | trc | trc | |
| Gypsum | $CaSO_4 \cdot 2H_2O$ | | | | | |
| Goethite | alpha-FeOOH | | | trc | | |
| Clinoptilolite | $(Na,K,Ca)_6(Si,Al)_{36}O_{72} \cdot 20H_2O$ | | | | | |
| Kaolinite | $Al_2Si_2O_5(OH)_4$ | | | | | |
| Chlorite | $(Mg,Al)_6(Si,Al)_4O_{10}(OH)_8$ | 1 | | | | |
| Illite/Mica | $KAl_2(Si_3AlO_{10})(OH)_2$ | 4 | 3 | trc | 5 | 1 |
| Montmorillonite | $(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot xH_2O$ | | | | | 22 |
| Mixed-Layered Illite/Smectite | $K_{0.5}Al_2(Si,Al)_4O_{10}(OH)_2 \cdot 2H_2O$ | 45 | 25 | 3 | 21 | |
| Amorphous | | 20 | 15 | | 42 | 40 |
| | | | | | | |
| TOTAL | | 100 | 100 | 100 | 100 | 100 |
| % Illite Layers in ML Illite/Smectite | +/- 5% | 10% | 10% | 10% | 15% | |

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# TABLE I-5

## X-RAY DIFFRACTION ANALYSIS

Client: PTS Laboratories, Inc.
Project ID: Marsland Core / PTS# 43570 / PO# 13-349

MI#: 13383
Sample Type: Conventional Core

**X-Ray Diffraction Results**

| | Sample ID | M-1956C.Run 4.S2 | M-1956C.Run 5.S1 | M-1956C.Run 5.S2 | M-1956C.Run 6.S1 | M-2169C.Run 1.S1 |
|---|---|---|---|---|---|---|
| | Lab ID | 13383-21 | 13383-22 | 13383-23 | 13383-24 | 13383-25 |
| Mineral Constituents | Chemical Formula | Relative Abundance (%) | | | | |
| Quartz | $SiO_2$ | 12 | 12 | 4 | 22 | 7 |
| Plagioclase Feldspar | $(Na_{0.26}Ca_{0.24})Al_{0.735}Si_{1.266}O_4$ | 15 | 12 | 5 | 4 | 8 |
| K-Feldspar - Microcline | $KAlSi_3O_8$ | 1 | 3 | 1 | 1 | 2 |
| Calcite | $CaCO_3$ | | 10 | 58 | trc | 56 |
| Ferroan Dolomite | $Ca(Mg_{0.67}Fe_{0.33})(CO_3)_2$ | | | | | 1 |
| Siderite | $FeCO_3$ | | | | | |
| Halite | NaCl | | | | | |
| Fluorapatite | $Ca_5F(PO_4)_3$ | | | | | |
| Augite | $Ca(Fe,Mg)Si_2O_6$ | | | | | |
| Hornblende | $Ca_2(Mg,Fe)_5(Si,Al)_8O_{22}(OH)_6$ | 1 | | | | |
| Gypsum | $CaSO_4 \cdot 2H_2O$ | | | | | |
| Goethite | alpha-FeOOH | | | | | |
| Clinoptilolite | $(Na,K,Ca)_6(Si,Al)_{36}O_{72} \cdot 20H_2O$ | | | | | |
| Kaolinite | $Al_2Si_2O_5(OH)_4$ | | | | 2 | |
| Chlorite | $(Mg,Al)_6(Si,Al)_4O_{10}(OH)_8$ | | | | 2 | |
| Illite/Mica | $KAl_2(Si_3AlO_{10})(OH)_2$ | 1 | 2 | 1 | 10 | 1 |
| Montmorillonite | $(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot xH_2O$ | | 29 | | | |
| Mixed-Layered Illite/Smectite | $K_{0.5}Al_2(Si,Al)_4O_{10}(OH)_2 \cdot 2H_2O$ | 25 | | 9 | 37 | 10 |
| Amorphous | | 45 | 32 | 22 | 22 | 15 |
| | | | | | | |
| TOTAL | | 100 | 100 | 100 | 100 | 100 |
| % Illite Layers in ML Illite/Smectite | +/- 5% | 20% | | 10% | 30% | 15% |

3321 EAST 27TH STREET * TULSA, OKLAHOMA 74114 * 918 744 8284 (O) * 918 743 7460 (F) * www.mineralogy-inc.com

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# TABLE I-6

## X-RAY DIFFRACTION ANALYSIS

Client: PTS Laboratories, Inc.
Project ID: Marsland Core / PTS# 43570 / PO# 13-349

MI#: 13383
Sample Type: Conventional Core

**X-Ray Diffraction Results**

| | Sample ID | M-2169C.Run 2.S3 | M-2169C.Run 3.S1 | M-2169C.Run 4.S1 | M-2169C.Run 5.S1 | M-2169C.Run 7.S1 |
|---|---|---|---|---|---|---|
| | Lab ID | 13383-26 | 13383-27 | 13383-28 | 13383-29 | 13383-30 |
| Mineral Constituents | Chemical Formula | Relative Abundance (%) | | | | |
| Quartz | $SiO_2$ | 21 | 5 | 12 | 13 | 24 |
| Plagioclase Feldspar | $(Na_{0.26}Ca_{0.24})Al_{0.735}Si_{1.266}O_4$ | 16 | 7 | 11 | 13 | 4 |
| K-Feldspar - Microcline | $KAlSi_3O_8$ | 3 | 1 | 2 | 2 | 4 |
| Calcite | $CaCO_3$ | trc | 2 | 6 | 11 | trc |
| Ferroan Dolomite | $Ca(Mg_{0.67}Fe_{0.33})(CO_3)_2$ | | | | | 2 |
| Siderite | $FeCO_3$ | | | | | |
| Halite | NaCl | | trc | | | |
| Fluorapatite | $Ca_5F(PO_4)_3$ | | | | | |
| Augite | $Ca(Fe,Mg)Si_2O_6$ | | | | | |
| Hornblende | $Ca_2(Mg,Fe)_5(Si,Al)_8O_{22}(OH)_6$ | trc | trc | | | |
| Gypsum | $CaSO_4 \cdot 2H_2O$ | | trc | | | |
| Goethite | alpha-FeOOH | | | | | |
| Clinoptilolite | $(Na,K,Ca)_6(Si,Al)_{36}O_{72} \cdot 20H_2O$ | | | | | |
| Kaolinite | $Al_2Si_2O_5(OH)_4$ | | | | | 2 |
| Chlorite | $(Mg,Al)_6(Si,Al)_4O_{10}(OH)_8$ | | | | | 2 |
| Illite/Mica | $KAl_2(Si_3AlO_{10})(OH)_2$ | 2 | 1 | 1 | 1 | 4 |
| Montmorillonite | $(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot xH_2O$ | | 19 | 28 | 25 | |
| Mixed-Layered Illite/Smectite | $K_{0.5}Al_2(Si,Al)_4O_{10}(OH)_2 \cdot 2H_2O$ | 13 | | | | 30 |
| Amorphous | | 45 | 65 | 40 | 35 | 28 |
| | | | | | | |
| TOTAL | | 100 | 100 | 100 | 100 | 100 |
| % Illite Layers in ML Illite/Smectite | +/- 5% | 10% | | | | 10% |

3321 EAST 27TH STREET * TULSA, OKLAHOMA 74114 * 918 744 8284 (O) * 918 743 7460 (F) * www.mineralogy-inc.com

# PTS Laboratories, Inc. CHAIN OF CUSTODY RECORD PAGE 1 OF 3

COMPANY
PTS Laboratories, Inc.

ADDRESS CITY ZIP CODE
8100 Secura Way, Santa Fe Springs, CA 90670

PROJECT MANAGER
Rachel Spitz

PROJECT NAME
Marsland Core PHONE NUMBER 562-347-2500

PROJECT NUMBER
N/A FAX NUMBER 562-279-1150

SITE LOCATION
N/A

SAMPLER SIGNATURE

ANALYSIS REQUEST

PO# 13-349

TURNAROUND TIME
24 HOURS 5 DAYS
48 HOURS **NORMAL**
72 HOURS
OTHER:

SAMPLE INTEGRITY (CHECK):
INTACT ON ICE

PTS QUOTE NO.

PTS FILE:
43570

| SAMPLE ID NUMBER | DATE | TIME | DEPTH, FT | NUMBER OF SAMPLES | XRD | COMMENTS |
|---|---|---|---|---|---|---|
| M-533C Run 1, Sample 1 | 20130812 | N/A | 63.9-64.9 | 1 | X | |
| M-533C Run 1, Sample 2 | 20130812 | N/A | 68.8-69.8 | 1 | X | |
| M-533C Run 3, Sample 1 | 20130812 | N/A | 299.0-300.0 | 1 | X | |
| M-533C Run 3, Sample 2 | 20130812 | N/A | 306.0-307.0 | 1 | X | |
| M-533C Run 5, Sample 1 | 20130812 | N/A | 1052.5-1053.0 | 1 | X | |
| M-1635C Run 1, Sample 1 | 20130822 | N/A | 70.0-70.5 | 1 | X | |
| M-1635C Run 1, Sample 2 | 20130822 | N/A | 79.5-80.0 | 1 | X | |
| M-1635C Run 2, Sample 1 | 20130822 | N/A | 197.0-197.5 | 1 | X | |
| M-1635C Run 2, Sample 2 | 20130822 | N/A | 206.5-207.0 | 1 | X | |
| M-1635C Run 3, Sample 1 | 20130822 | N/A | 530.0-530.5 | 1 | X | |
| M-1635C Run 6, Sample 1 | 20130822 | N/A | 993.0-994.0 | 1 | X | |

| 1. RELINQUISHED BY | 2. RECEIVED BY | 3. RELINQUISHED BY | 4. RECEIVED BY |
|---|---|---|---|
| COMPANY PTS CAES | COMPANY | COMPANY | COMPANY |
| DATE TIME 9/9/13 16:30 | DATE TIME | DATE TIME | DATE TIME |

# PTS Laboratories, Inc.

## CHAIN OF CUSTODY RECORD PAGE 2 OF 3

COMPANY
PTS Laboratories, Inc.

ADDRESS CITY ZIP CODE
8100 Secura Way, Santa Fe Springs, CA 90670

PROJECT MANAGER
Rachel Spitz

PROJECT NAME
Marsland Core — PHONE NUMBER 562-347-2500

PROJECT NUMBER
N/A — FAX NUMBER 562-279-1150

SITE LOCATION
N/A

SAMPLER SIGNATURE

ANALYSIS REQUEST

PO# 13-349

TURNAROUND TIME
24 HOURS 5 DAYS
48 HOURS **NORMAL**
72 HOURS
OTHER:

SAMPLE INTEGRITY (CHECK):
INTACT ON ICE

PTS QUOTE NO.

PTS FILE:
43570

| SAMPLE ID NUMBER | DATE | TIME | DEPTH, FT | NUMBER OF SAMPLES | XRD | COMMENTS |
|---|---|---|---|---|---|---|
| M-1912C Run 1, Sample 1 | 20130814 | N/A | 63.0-64.0 | 1 | X | |
| M-1912C Run 2, Sample 1 | 20130814 | N/A | 130.7-131.7 | 1 | X | |
| M-1912C Run 3, Sample 1 | 20130814 | N/A | 255.0-255.5 | 1 | X | |
| M-1912C Run 3, Sample 2 | 20130814 | N/A | 260.4-260.9 | 1 | X | |
| M-1912C Run 4, Sample 1 | 20130814 | N/A | 974.5-975.0 | 1 | X | |
| M-1912C Run 4, Sample 2 | 20130814 | N/A | 968.7-969.7 | 1 | X | |
| M-1956C Run 1, Sample 1 | 20130819 | N/A | 42.0-43.0 | 1 | X | |
| M-1956C Run 3, Sample 1 | 20130819 | N/A | 78.0-79.0 | 1 | X | |
| M-1956C Run 4, Sample 1 | 20130819 | N/A | 196.5-197.1 | 1 | X | |
| M-1956C Run 4, Sample 2 | 20130819 | N/A | 202.0-202.5 | 1 | X | |
| M-1956C Run 5, Sample 1 | 20130819 | N/A | 425.6-426.2 | 1 | X | |

| 1. RELINQUISHED BY | 2. RECEIVED BY | 3. RELINQUISHED BY | 4. RECEIVED BY |
|---|---|---|---|
| COMPANY PTS CMBS | COMPANY | COMPANY | COMPANY |
| DATE TIME 9/9/13 16:30 | DATE TIME | DATE TIME | DATE TIME |

# PTS Laboratories, Inc.

## CHAIN OF CUSTODY RECORD PAGE 3 OF 3

COMPANY
PTS Laboratories, Inc.

ADDRESS CITY ZIP CODE
8100 Secura Way, Santa Fe Springs, CA 90670

PROJECT MANAGER
Rachel Spitz

PROJECT NAME
Marsland Core PHONE NUMBER 562-347-2500

PROJECT NUMBER
N/A FAX NUMBER 562-279-1150

SITE LOCATION
N/A

SAMPLER SIGNATURE

ANALYSIS REQUEST

PO# 13-349

TURNAROUND TIME
24 HOURS 5 DAYS
48 HOURS **NORMAL**
72 HOURS
OTHER:

SAMPLE INTEGRITY (CHECK):
INTACT ON ICE

PTS QUOTE NO.

PTS FILE:
43570

| SAMPLE ID NUMBER | DATE | TIME | DEPTH, FT | NUMBER OF SAMPLES | XRD | | | | | | | | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M-1956C Run 5, Sample 2 | 20130819 | N/A | 431.0-431.6 | 1 | X | | | | | | | | | | | | | |
| M-1956C Run 6, Sample 1 | 20130819 | N/A | 1011.8-1012.4 | 1 | X | | | | | | | | | | | | | |
| M-2169C Run 1, Sample 1 | 20130806 | N/A | 110.0-110.5 | 1 | X | | | | | | | | | | | | | |
| M-2169C Run 2, Sample 3 | 20130806 | N/A | 156.5-157.2 | 1 | X | | | | | | | | | | | | | |
| M-2169C Run 3, Sample 1 | 20130806 | N/A | 355.0-356.0 | 1 | X | | | | | | | | | | | | | |
| M-2169C Run 4, Sample 1 | 20130806 | N/A | 470.0-470.5 | 1 | X | | | | | | | | | | | | | |
| M-2169C Run 5, Sample 1 | 20130806 | N/A | 608.9-609.5 | 1 | X | | | | | | | | | | | | | |
| M-2169C Run 7, Sample 1 | 20130806 | N/A | 1135.5-1136.0 | 1 | X | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| 1. RELINQUISHED BY | 2. RECEIVED BY | 3. RELINQUISHED BY | 4. RECEIVED BY |
|---|---|---|---|
| COMPANY PTS CATS | COMPANY | COMPANY | COMPANY |
| DATE TIME 9/9/13 16:30 | DATE TIME | DATE TIME | DATE TIME |

# PTS Laboratories, Inc.

## CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

| | |
|---|---|
| COMPANY | Crow Butte Resources, |
| ADDRESS | 86 Crow Butte Rd |
| CITY | Crawford, NE |
| ZIP CODE | 69339 |
| PROJECT MANAGER | Wade Beins |
| PHONE NUMBER | (308) 665-2215 x113 |
| PROJECT NAME | Marsland |
| FAX NUMBER | (308) 665-2341 |
| PROJECT NUMBER | |
| SITE LOCATION | M-533C |
| SAMPLER SIGNATURE | Wade Beins |

PO#

TURNAROUND TIME
24 HOURS ☐ 5 DAYS ☐
48 HOURS ☐ NORMAL ☑
72 HOURS ☐
OTHER: _____

SAMPLE INTEGRITY (CHECK):
INTACT X ON ICE ____

PTS QUOTE NO.

PTS FILE: 43570

ANALYSIS REQUEST

| SAMPLE ID NUMBER | DATE | TIME | DEPTH, FT | NUMBER OF SAMPLES | SOIL PROPERTIES PACKAGE | HYDRAULIC CONDUCTIVITY PACKAGE | PORE FLUID SATURATIONS PACKAGE | TCEQ/TNRCC PROPERTIES PACKAGE | CAPILLARITY PACKAGE | FLUID PROPERTIES PACKAGE | PHOTOLOG: CORE PHOTOGRAPHY | MOISTURE CONTENT, ASTM D2216 | POROSITY: TOTAL, API RP40 | POROSITY: EFFECTIVE, ASTM D425M | SPECIFIC GRAVITY, ASTM D854 | BULK DENSITY (DRY), API RP40 or ASTM D2937 | AIR PERMEABILITY, API RP40 | HYDRAULIC CONDUCTIVITY, EPA9100, API RP40, D5084 | GRAIN SIZE DISTRIBUTION, ASTM ~~D422~~ 4464M | TOC: WALKLEY-BLACK | ATTERBERG LIMITS, ASTM D4318 | XRD | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M-533C Run 1, Sample 1 | 8-12-13 | — | 63.9'-64.9' | 1 | | | | | | | | | | | | | | | √ | | | √ | | | | |
| M-533C Run 1, Sample 2 | 8-12-13 | — | 68.8'-69.8' | 1 | | | | | | | | | | | | | | | √ | | | √ | | | | |
| M-533C Run 3, Sample 1 | 8-12-13 | — | 299.0'-300.0' | 1 | | | | | | | | | | | | | | | √ | | | √ | | | | |
| M-533C Run 3, Sample 2 | 8-12-13 | — | 306.0'-307.0' | 1 | | | | | | | | | | | | | | | √ | | | √ | | | | |
| M-533C Run 5, Sample 1 | 8-12-13 | — | 1052.5'-1053.0' | 1 | | | | | | | | | | | | | | | √ | | | √ | | | | |

| 1. RELINQUISHED BY | 2. RECEIVED BY | 3. RELINQUISHED BY | 4. RECEIVED BY |
|---|---|---|---|
| Wade Beins | | | |
| COMPANY: Crow Butte Resources | COMPANY: PTS LABS | COMPANY | COMPANY |
| DATE: 8/23/13 TIME: 11:30 AM | DATE: 8/29/13 TIME: 16:35 | DATE TIME | DATE TIME |

# PTS Laboratories, Inc.

## CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

COMPANY: Crow Butte Resources,
ADDRESS: 86 Crow Butte Rd CITY: Crawford, NE ZIP CODE: 69339
PROJECT MANAGER: Wade Beins (308) 665-2215 x113
PROJECT NAME: Marsland PHONE NUMBER: (308) 665-2341
PROJECT NUMBER: FAX NUMBER:
SITE LOCATION: M-1635C
SAMPLER SIGNATURE: Wade Beins

PO#:

TURNAROUND TIME
24 HOURS ☐ 5 DAYS ☐
48 HOURS ☐ NORMAL ☑
72 HOURS ☐
OTHER: _____

SAMPLE INTEGRITY (CHECK):
INTACT X ON ICE ____ 7.9

PTS QUOTE NO.:

PTS FILE: 43570

ANALYSIS REQUEST

| SAMPLE ID NUMBER | DATE | TIME | DEPTH, FT | NUMBER OF SAMPLES | GRAIN SIZE DISTRIBUTION, ASTM D422/4464M | XRD | COMMENTS |
|---|---|---|---|---|---|---|---|
| M-1635C Run 1, Sample 1 | 8-22-13 | — | 70.0' - 70.5 | 1 | ✓ | ✓ | |
| M-1635C Run 1, Sample 2 | 8-22-13 | — | 79.5' - 80.0 | 1 | ✓ | ✓ | |
| M-1635C Run 2, Sample 1 | 8-22-13 | — | 197.0 - 197.5 | 1 | ✓ | ✓ | |
| M-1635C Run 2, Sample 2 | 8-22-13 | — | 206.5 - 207.0 | 1 | ✓ | ✓ | |
| M-1635C Run 3, Sample 1 | 8-22-13 | — | 530.0 - 530.5 | 1 | ✓ | ✓ | |
| M-1635C Run 6, Sample 1 | 8-22-13 | — | 993.0' - 994.0' | 1 | ✓ | ✓ | |

SOIL PROPERTIES PACKAGE
HYDRAULIC CONDUCTIVITY PACKAGE
PORE FLUID SATURATIONS PACKAGE
TCEQ/TNRCC PROPERTIES PACKAGE
CAPILLARITY PACKAGE
FLUID PROPERTIES PACKAGE
PHOTOLOG: CORE PHOTOGRAPHY
MOISTURE CONTENT, ASTM D2216
POROSITY: TOTAL, API RP40
POROSITY: EFFECTIVE, ASTM D425M
SPECIFIC GRAVITY, ASTM D854
BULK DENSITY (DRY), API RP40 or ASTM D2937
AIR PERMEABILITY, API RP40
HYDRAULIC CONDUCTIVITY, EPA9100, API RP40, D5084
TOC: WALKLEY-BLACK
ATTERBERG LIMITS, ASTM D4318

| 1. RELINQUISHED BY | 2. RECEIVED BY | 3. RELINQUISHED BY | 4. RECEIVED BY |
|---|---|---|---|
| Wade Beins | | | |
| COMPANY: Crow Butte Resources | COMPANY: PTS CABS | COMPANY: | COMPANY: |
| DATE: 8/23/13 TIME: 11:30 AM | DATE: 8/29/13 TIME: 16:35 | DATE: TIME: | DATE: TIME: |

# PTS Laboratories, Inc.

## CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

| | |
|---|---|
| COMPANY | Crow Butte Resources, |
| ADDRESS | 86 Crow Butte Rd |
| CITY | Crawford, NE |
| ZIP CODE | 69339 |
| PROJECT MANAGER | Wade Beins |
| PHONE NUMBER | (308) 665-2215 x 113 |
| PROJECT NAME | Marsland |
| PHONE NUMBER | (308) 665-2341 |
| PROJECT NUMBER | |
| FAX NUMBER | |
| SITE LOCATION | M-1912c |
| SAMPLER SIGNATURE | Wade Beins |

ANALYSIS REQUEST

PO#

TURNAROUND TIME
24 HOURS ☐ 5 DAYS ☐
48 HOURS ☐ NORMAL ☑
72 HOURS ☐
OTHER: _____

SAMPLE INTEGRITY (CHECK):
INTACT X ON ICE ____ 74°

PTS QUOTE NO.

PTS FILE: 43570

| SAMPLE ID NUMBER | DATE | TIME | DEPTH, FT | NUMBER OF SAMPLES | GRAIN SIZE DISTRIBUTION, ASTM ~~D422~~/4464M | ATTERBERG LIMITS, ASTM D4318 | XRD | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| M-1912c Run 1, Sample 1 | 8-14-13 | — | 63.0' to 64.0' | 1 | ✓ | ✓ | ✓ | |
| M-1912c Run 2, Sample 1 | 8-14-13 | — | 130.7' - 131.7' | 1 | ✓ | ✓ | ✓ | |
| M-1912c Run 3, Sample 1 | 8-14-13 | — | 255.0' - 255.5' | 1 | ✓ | ✓ | ✓ | |
| M-1912c Run 3, Sample 2 | 8-14-13 | — | 260.4' - 260.9' | 1 | ✓ | ✓ | ✓ | |
| M-1912c Run 4, Sample 1 | 8-14-13 | — | 974.5' - 975.0' | 1 | ✓ | ✓ | ✓ | |
| M-1912c Run 4, Sample 2 | 8-14-13 | — | 968.7' - 969.7' | 1 | ✓ | ✓ | ✓ | |

| 1. RELINQUISHED BY | 2. RECEIVED BY | 3. RELINQUISHED BY | 4. RECEIVED BY |
|---|---|---|---|
| Wade Beins | | | |
| COMPANY: Crow Butte Resources | COMPANY: PTS LABS | COMPANY | COMPANY |
| DATE: 8/23/13 TIME: 11:30 AM | DATE: 8/29/13 TIME: 16:35 | DATE TIME | DATE TIME |

# PTS Laboratories, Inc.

## CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

COMPANY: Crow Butte Resources,
ADDRESS: 86 Crow Butte Rd CITY: Crawford, NE ZIP CODE: 69339
PROJECT MANAGER: Wade Beins (308) 665-2215 x113
PROJECT NAME: Marsland PHONE NUMBER: (308) 665-2341
PROJECT NUMBER: FAX NUMBER:
SITE LOCATION: M-1956C
SAMPLER SIGNATURE: Wade Beins

PO#:

TURNAROUND TIME
24 HOURS ☐ 5 DAYS ☐
48 HOURS ☐ NORMAL ☑
72 HOURS ☐
OTHER: _____

SAMPLE INTEGRITY (CHECK):
INTACT X ON ICE ____ 74°

PTS QUOTE NO.:

PTS FILE: 4357D

ANALYSIS REQUEST

| SAMPLE ID NUMBER | DATE | TIME | DEPTH, FT | NUMBER OF SAMPLES | GRAIN SIZE DISTRIBUTION, ASTM D422/4464M | ATTERBERG LIMITS, ASTM D4318 | XRD | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| M-1956C Run 1, Sample 1 | 8-19-13 | – | 42.0' - 43.0' | 1 | ✓ | | ✓ | |
| M-1956C Run 3, Sample 1 | 8-19-13 | – | 78.0' - 79.0' | 1 | ✓ | | ✓ | |
| M-1956C Run 4, Sample 1 | 8-19-13 | – | 196.5' - 197.1' | 1 | ✓ | | ✓ | |
| M-1956C Run 4, Sample 2 | 8-19-13 | – | 202.0' - 202.5' | 1 | ✓ | | ✓ | |
| M-1956C Run 5, Sample 1 | 8-19-13 | – | 425.6' - 426.2' | 1 | ✓ | | ✓ | |
| M-1956C Run 5, Sample 2 | 8-19-13 | – | 431.0' - 431.6' | 1 | ✓ | | ✓ | |
| M-1956C Run 6, Sample 1 | 8-19-13 | – | 1011.8' - 1012.4' | 1 | ✓ | | ✓ | |

| 1. RELINQUISHED BY | 2. RECEIVED BY | 3. RELINQUISHED BY | 4. RECEIVED BY |
|---|---|---|---|
| Wade Beins | | | |
| COMPANY: Crow Butte Resources | COMPANY: PTS LABS | COMPANY: | COMPANY: |
| DATE: 8/23/13 TIME: 11:30 AM | DATE: 8/29/13 TIME: 16:35 | DATE: TIME: | DATE: TIME: |

# PTS Laboratories, Inc.

## CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

COMPANY: Crow Butte Resources,
ADDRESS: 86 Crow Butte Rd CITY: Crawford, NE ZIP CODE: 69339
PROJECT MANAGER: Wade Beins (308) 665-2215x113
PROJECT NAME: Marsland PHONE NUMBER: (308) 665-2341
PROJECT NUMBER: FAX NUMBER:
SITE LOCATION: M-2169c
SAMPLER SIGNATURE: Wade Beins

PO#:

TURNAROUND TIME
24 HOURS ☐ 5 DAYS ☐
48 HOURS ☐ NORMAL ☑
72 HOURS ☐
OTHER: _____

SAMPLE INTEGRITY (CHECK):
INTACT X ON ICE ____ 74°

PTS QUOTE NO.:

PTS FILE: 43570

ANALYSIS REQUEST

| SAMPLE ID NUMBER | DATE | TIME | DEPTH, FT | NUMBER OF SAMPLES | GRAIN SIZE DISTRIBUTION, ASTM D422/4464M | ATTERBERG LIMITS, ASTM D4318 | XRD | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| Run #1, Sample 1 | 8/6/13 | — | 110.0' – 110.5' | 1 | ✓ | ✓ | ✓ | |
| Run #2, Sample 3 | 8/6/13 | — | 156.5' – 157.2' | 1 | ✓ | ✓ | ✓ | |
| Run #3, Sample 1 | 8/6/13 | — | 355.0' – 356.0' | 1 | ✓ | ✓ | ✓ | |
| Run #4, Sample 1 | 8/6/13 | — | 470.0' – 470.5' | 1 | ✓ | ✓ | ✓ | |
| Run #5, Sample 1 | 8/6/13 | — | 608.9' – 609.5' | 1 | ✓ | ✓ | ✓ | |
| Run #7, Sample 1 | 8/6/13 | — | 1135.5' – 1136.0' | 1 | ✓ | ✓ | ✓ | |

| 1. RELINQUISHED BY | 2. RECEIVED BY | 3. RELINQUISHED BY | 4. RECEIVED BY |
|---|---|---|---|
| Wade Beins | | | |
| COMPANY: Crow Butte Resources | COMPANY: PTS LABS | COMPANY: | COMPANY: |
| DATE: 8/23/13 TIME: 11:30 AM | DATE: 8/29/13 TIME: 16:35 | DATE: TIME: | DATE: TIME: |

PTS Laboratories, Inc. • 8100 Secura Way • Santa Fe Springs, CA 90670 • Phone (562) 347-2500 • Fax (562) 907-3610
PTS Laboratories, Inc. • 4342 W. 12th St. • Houston, TX 77055 • Phone (713) 316-1800 • Fax (713) 316-1882