



Sample Name: Rein Mine
 FracTAL Sample ID: 8927
 Client Name: Minnesota Sands
 Sample Processing: Washed #200*, dried, cut, analyzed
 * Attrition 70% by weight for four minutes

Particle Size/Gradation Analysis

Date Analysis Performed: 1/15/2020
 Analyst: MNP

| Sieve Size (US Standard) | Sample Retained (%) | Cumulative (%) |
|-----------------------------|------------------------|-------------------|
| 16 | 0.0 | 0.0 |
| 20 | 0.0 | 0.0 |
| 25 | 0.0 | 0.0 |
| 30 | 0.0 | 0.0 |
| 35 | 0.0 | 0.0 |
| 40 | 1.1 | 1.1 |
| 45 | 23.4 | 24.4 |
| 50 | 30.0 | 54.4 |
| 60 | 27.9 | 82.3 |
| 70 | 17.6 | 99.9 |
| 100 | 0.1 | 100.0 |
| 140 | 0.0 | 100.0 |
| 200 | 0.0 | 100.0 |
| Pan | 0.0 | 100.0 |

Total 100.0

| | |
|----------------------|-------|
| In-Size as 40/70= | 98.8% |
|----------------------|-------|

Mean Diameter (mm): 0.31
 Median Diameter (mm): 0.31

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Sample Name: Rein Mine
FracTAL Sample ID: 8927
Client Name: Minnesota Sands

Crush Test

Date Analysis Performed: 1/15/2020
Analyst: JRM
Stress Level (psi) **13K** **14K**
% Loss 9.2% 10.7%
Bulk Density (pcf) 97.0

ISO 13503-2 B.6- Compressive strength of proppant recorded as maximum stress that material can withstand without exceeding 10% loss after crush

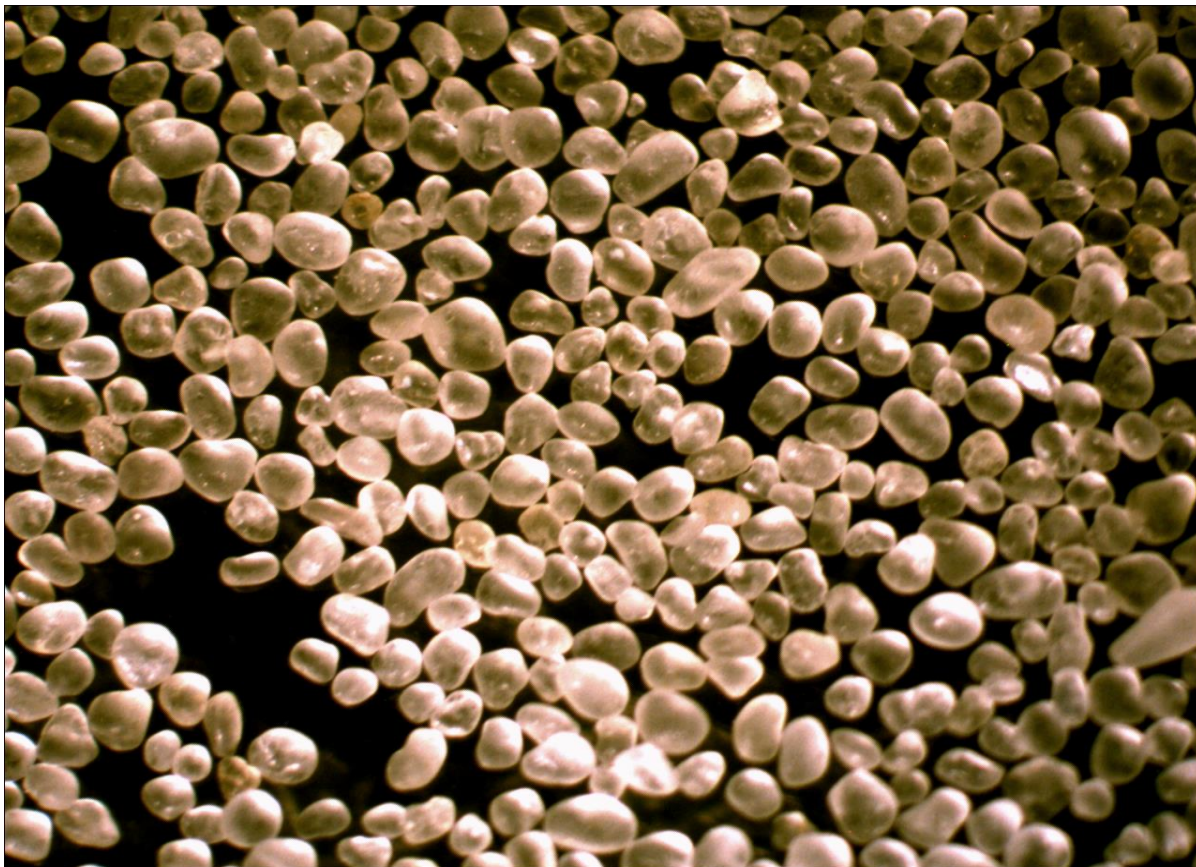
Turbidity

Date Analysis Performed: 1/15/2020
Analyst: JRM
NTU: 36

Sample Name: Rein Mine
Summit Sample ID: 8927
Client Name: Minnesota Sands

Photomicrograph

Date Analysis Performed: 1/15/2020
Analyst: JRM





Sample Name: Rein Mine
 Fractal Sample ID: 8927
 Client Name: Minnesota Sands
 Sample Processing: Washed #200*, dried, cut, analyzed
 * Attrition 70% by weight for four minutes

Particle Size/Gradation Analysis

Date Analysis Performed: 1/15/2020
 Analyst: MNP

| Sieve Size (US Standard) | Sample Retained (%) | Cumulative (%) |
|-----------------------------|------------------------|-------------------|
| 25 | 0.0 | 0.0 |
| 30 | 0.0 | 0.0 |
| 35 | 0.0 | 0.0 |
| 40 | 0.0 | 0.0 |
| 45 | 0.0 | 0.0 |
| 50 | 0.0 | 0.0 |
| 60 | 0.0 | 0.0 |
| 70 | 5.4 | 5.4 |
| 80 | 33.0 | 38.4 |
| 100 | 39.8 | 78.2 |
| 120 | 16.2 | 94.4 |
| 140 | 5.5 | 99.9 |
| 200 | 0.1 | 100.0 |
| Pan | 0.0 | 100.0 |
| Total | 100.0 | |

| | |
|-----------------------|-------|
| In-Size as 70/140= | 94.5% |
|-----------------------|-------|

Mean Diameter (mm): 0.24
 Median Diameter (mm): 0.24



Sample Name: Rein Mine
FracTAL Sample ID: 8927
Client Name: Minnesota Sands

Crush Test

Date Analysis Performed: 1/15/2020
Analyst: JRM
Stress Level (psi) **15K** **16K**
% Loss **9.8%** **14.3%**
Bulk Density (pcf) 94.3

ISO 13503-2 B.6- Compressive strength of proppant recorded as maximum stress that material can withstand without exceeding 10% loss after crush

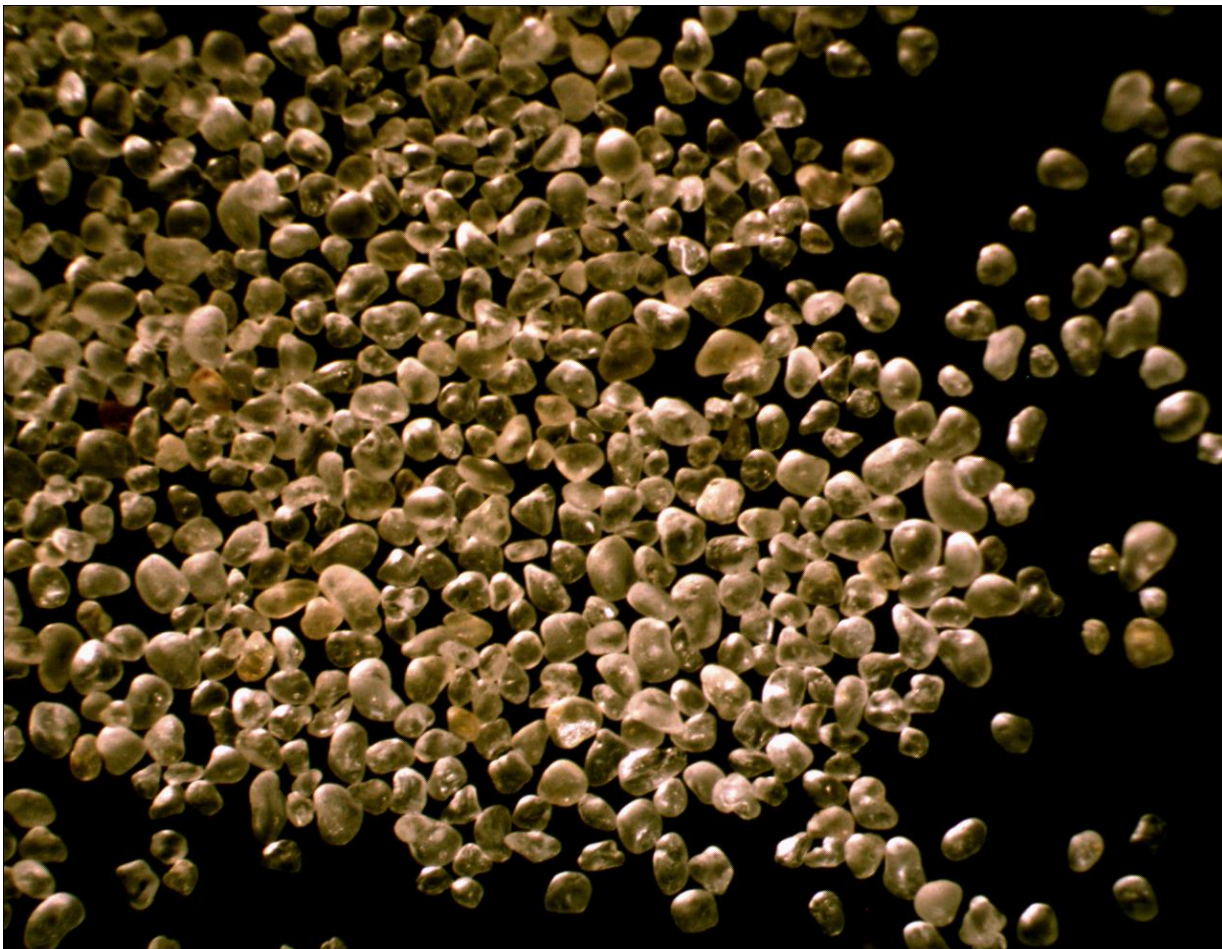
Turbidity

Date Analysis Performed: 1/15/2020
Analyst: JRM
NTU: 62

Sample Name: Rein Mine
Summit Sample ID: 8927
Client Name: Minnesota Sands

Photomicrograph

Date Analysis Performed: 1/15/2020
Analyst: JRM





Sample Name: 1&2_(35') Below Grade

FracTAL Sample ID: 12258

Client Name: Minnesota Sands

Particle Size/Gradation Analysis

Date Analysis Performed: 1/17/2020

Analyst: JRM

Sample Prep: Dried - Washed (#200) - Dried - Analyzed

| Sieve Size (US Standard) | Sample Retained (%) | Cumulative (%) |
|-----------------------------|------------------------|-------------------|
| 16 | 0.0 | 0.0 |
| 18 | 0.0 | 0.0 |
| 20 | 0.0 | 0.0 |
| 25 | 0.0 | 0.0 |
| 30 | 0.1 | 0.1 |
| 35 | 0.9 | 1.0 |
| 40 | 3.7 | 4.7 |
| 45 | 9.5 | 14.2 |
| 50 | 11.7 | 25.9 |
| 60 | 14.5 | 40.4 |
| 70 | 14.6 | 55.0 |
| 100 | 27.6 | 82.6 |
| 140 | 11.1 | 93.7 |
| 200 | 1.0 | 94.7 |
| Pan | 5.3 | 100.0 |

| | |
|-----------------------|-------|
| In-Size as 16/30= | 0.1% |
| In-Size as 20/40= | 4.7% |
| In-Size as 30/50= | 25.8% |
| In-Size as 40/70= | 50.3% |
| In-Size as 70/140= | 38.7% |
| In-Size as 50/140= | 67.8% |

Mean Diameter (mm): 0.25

Median Diameter (mm): 0.22

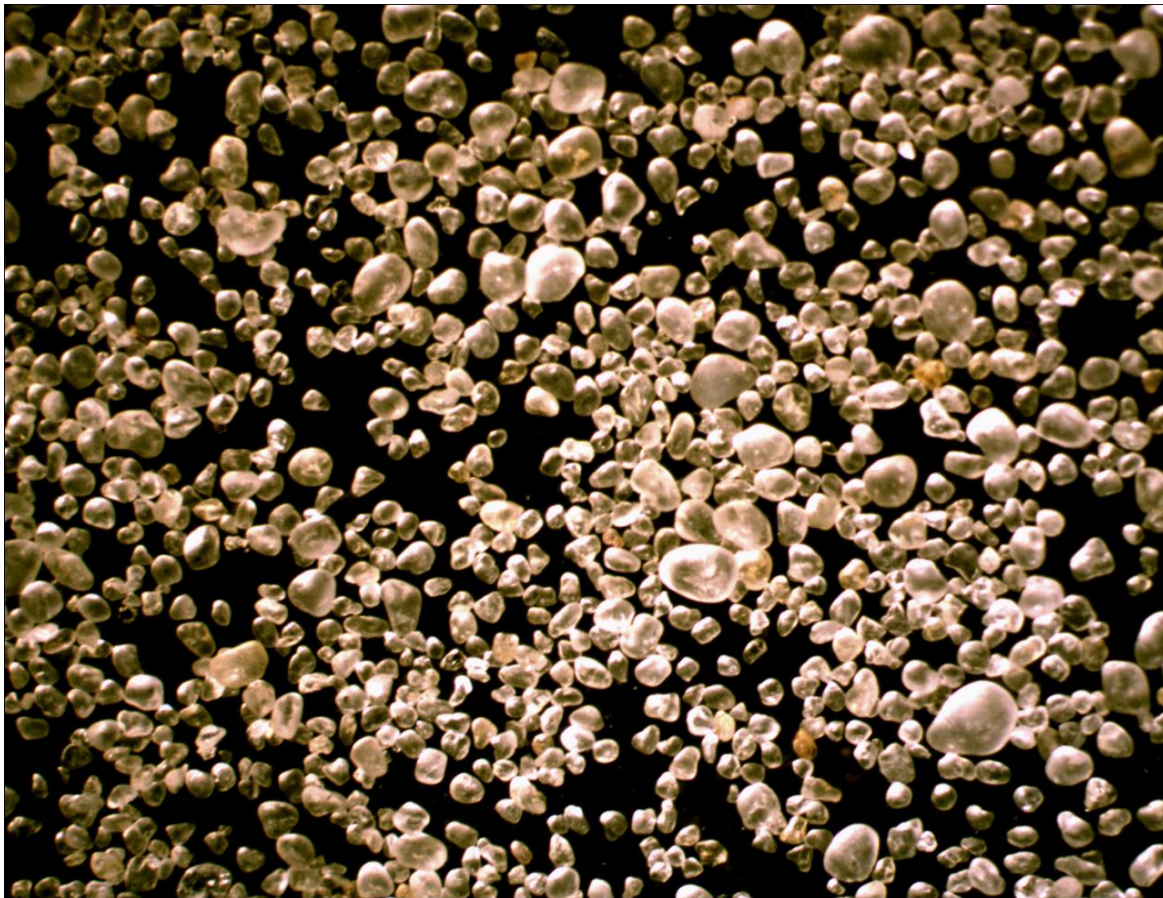
*Material retained on pan includes material washed through Sieve #200

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Sample Name: 1&2_(35') Below Grade
FracTAL Sample ID: 12258
Client Name: Minnesota Sands

Photomicrograph

Date Analysis Performed: 1/17/2020
Analyst: JRM
Sample Processing: Dried - Washed (#200) - Dried - Analyzed





Sample Name: 1&2_(40') Below Grade

FracTAL Sample ID: 12259

Client Name: Minnesota Sands

Particle Size/Gradation Analysis

Date Analysis Performed: 1/17/2020

Analyst: JRM

Sample Prep: Dried - Washed (#200) - Dried - Analyzed

| Sieve Size (US Standard) | Sample Retained (%) | Cumulative (%) |
|-----------------------------|------------------------|-------------------|
| 16 | 0.0 | 0.0 |
| 18 | 0.1 | 0.1 |
| 20 | 0.0 | 0.1 |
| 25 | 0.1 | 0.2 |
| 30 | 0.0 | 0.2 |
| 35 | 0.7 | 0.9 |
| 40 | 3.7 | 4.5 |
| 45 | 11.6 | 16.2 |
| 50 | 14.7 | 30.9 |
| 60 | 15.3 | 46.2 |
| 70 | 12.6 | 58.8 |
| 100 | 20.4 | 79.2 |
| 140 | 12.7 | 91.9 |
| 200 | 2.5 | 94.3 |
| Pan | 5.7 | 100.0 |

| | |
|-----------------------|-------|
| In-Size as 16/30= | 0.2% |
| In-Size as 20/40= | 4.4% |
| In-Size as 30/50= | 30.7% |
| In-Size as 40/70= | 54.3% |
| In-Size as 70/140= | 33.1% |
| In-Size as 50/140= | 61% |

Mean Diameter (mm): 0.26

Median Diameter (mm): 0.24

*Material retained on pan includes material washed through Sieve #200

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Sample Name: 1&2_(40') Below Grade
Fractal Sample ID: 12259
Client Name: Minnesota Sands

Photomicrograph

Date Analysis Performed: 1/17/2020
Analyst: JRM
Sample Processing: Dried - Washed (#200) - Dried - Analyzed





Sample Name: 3_(15-20') Below Grade

FracTAL Sample ID: 12260
 Client Name: Minnesota Sands

Particle Size/Gradation Analysis

Date Analysis Performed: 1/17/2020
 Analyst: JRM
 Sample Prep: Dried - Washed (#200) - Dried - Analyzed

| Sieve Size (US Standard) | Sample Retained (%) | Cumulative (%) |
|-----------------------------|------------------------|-------------------|
| 16 | 0.0 | 0.0 |
| 18 | 0.0 | 0.0 |
| 20 | 0.0 | 0.0 |
| 25 | 0.0 | 0.0 |
| 30 | 0.5 | 0.5 |
| 35 | 3.6 | 4.1 |
| 40 | 7.5 | 11.5 |
| 45 | 11.7 | 23.2 |
| 50 | 12.9 | 36.1 |
| 60 | 13.5 | 49.6 |
| 70 | 12.1 | 61.7 |
| 100 | 19.6 | 81.2 |
| 140 | 12.2 | 93.4 |
| 200 | 3.2 | 96.6 |
| Pan | 3.4 | 100.0 |

| | |
|-----------------------|-------|
| In-Size as 16/30= | 0.5% |
| In-Size as 20/40= | 11.5% |
| In-Size as 30/50= | 35.6% |
| In-Size as 40/70= | 50.1% |
| In-Size as 70/140= | 31.8% |
| In-Size as 50/140= | 57.3% |

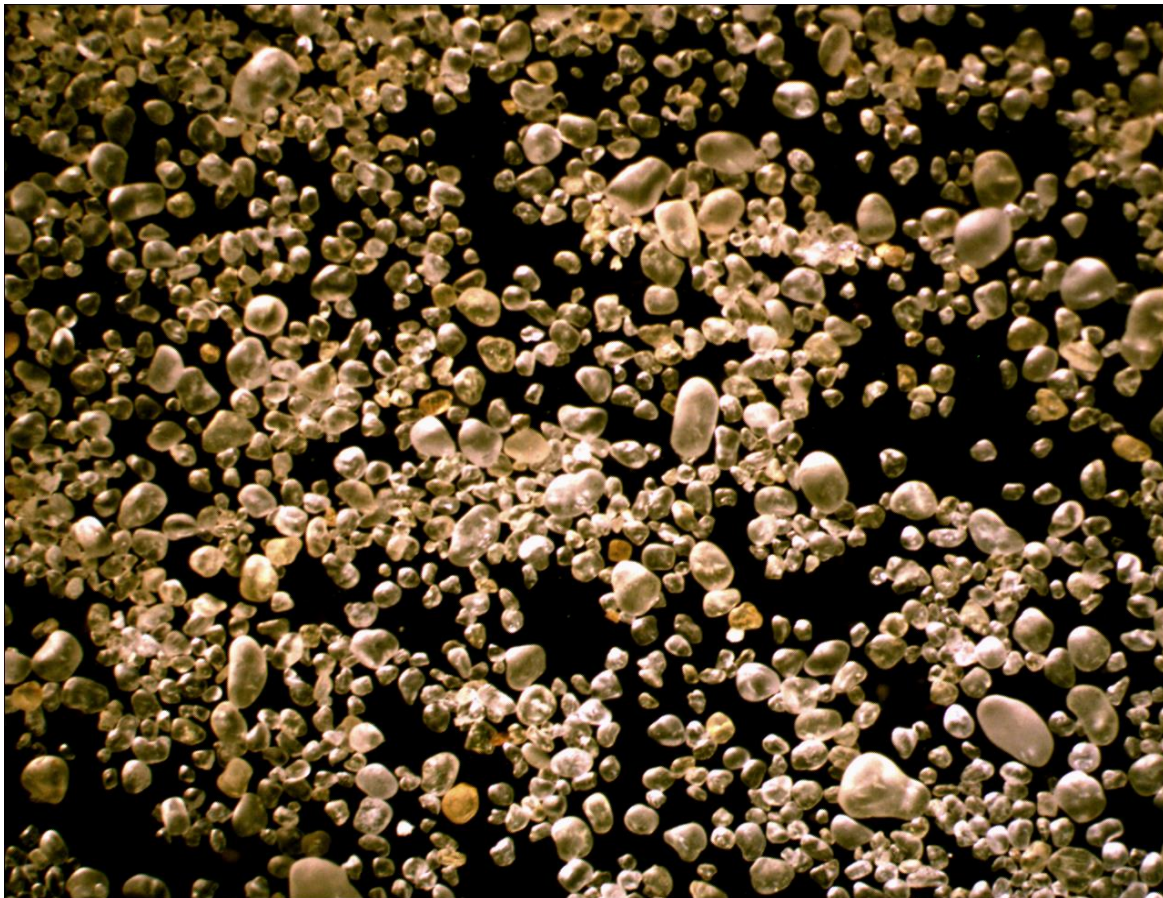
Mean Diameter (mm): 0.27
 Median Diameter (mm): 0.25

*Material retained on pan includes material washed through Sieve #200

Sample Name: 3_(15-20') Below Grade
Fractal Sample ID: 12260
Client Name: Minnesota Sands

Photomicrograph

Date Analysis Performed: 1/17/2020
Analyst: JRM
Sample Processing: Dried - Washed (#200) - Dried - Analyzed



Mn Sands Rein Mine

| Lab # | Bore | Depth 1 | Depth 2 | Top Elevation (FT ASL) | Bottom Elevation (FT ASL) | %ret 20 | %ret 30 | %ret 40 | %ret 50 | %ret 70 | %ret 140 | % 16-30 | % 20-40 | % 30-50 | % 40-70 | %50-140 | % 70-140 | % <200 | Mean | Median |
|---------|------------------------|---------|---------|------------------------|---------------------------|---------|---------|---------|---------|---------|----------|---------|---------|---------|---------|---------|----------|--------|------|--------|
| 12258 | 1&2_(35') Below Grade | | | | | 0.0 | 0.1 | 4.7 | 25.9 | 55.0 | 93.7 | 0.1 | 4.7 | 25.8 | 50.3 | 67.8 | 38.7 | 5.3 | 0.2 | 0.2 |
| 12259 | 1&2_(40') Below Grade | | | | | 0.1 | 0.2 | 4.5 | 30.9 | 58.8 | 91.9 | 0.2 | 4.4 | 30.7 | 54.3 | 61.0 | 33.1 | 5.7 | 0.3 | 0.2 |
| 12260 | 3_(15-20') Below Grade | | | | | 0.0 | 0.5 | 11.5 | 36.1 | 61.7 | 93.4 | 0.5 | 11.5 | 35.6 | 50.1 | 57.3 | 31.8 | 3.4 | 0.3 | 0.2 |
| AVERAGE | | | | | | 0.0 | 0.3 | 6.9 | 31.0 | 58.5 | 93.0 | 0.3 | 6.9 | 30.7 | 51.6 | 62.0 | 34.5 | 4.8 | 0.3 | 0.2 |

|



Turbidity Testing

| | |
|--------------------------|-----------|
| Date Analysis Performed: | 3/13/2020 |
| Analyst: | JRM |
| NTU: | 614 |

