MINERAL HOLDINGS AUSTRALIA PTY LTD

EXPLORATION LICENCE EL47/2011
DIP RANGE, NW TASMANIA

ANNUAL REPORT ON EXPLORATION
TO AUGUST 2016

Compiled by
T W Dickson
5 Crouch Court
Doncaster VIC 3108

For
Mineral Holdings Australia Pty Ltd
11 Kent Court
Toorak VIC 3142

28 August 2016

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EL47/2011 DIP RANGE, NW TASMANIA - ANNUAL REPORT 2016

ABSTRACT

This report gives a review of the exploration work carried out by Mineral Holdings Australia Pty. Ltd. (MHA) over the past 12 months on EL47/2011. The Licence originally covered 186km² but this was reduced to 38km² in September 2013. The Licence is located in the Dip Ranges and surrounds the Thomas Mountain silica mine within 23M/2009 and RL1/2005.

The Licence covers outcrops of the Detention Quartzite and the Jacobs Quartzite of the Rocky Cape Group and the target of the exploration program is silica, silica sand and quartzite for the chemical, metallurgical, glass and coal seam gas industries.

Previous exploration by MHA and its joint venture partners has outlined a substantial inventory of potential silica products in retention licence RL1/2005 and the intention was to explore the adjacent areas for any further frac sand deposits.

Two new deposits have been located within EL47/2011, one in the Shakespeare Hills, in the north-west of the licence, and a second and larger deposit at Alarm River to the south-west of the frac sand deposits in RL1/2005. A detailed programme of foot traversing was carried out to locate any extension to the two known deposits and to locate any additional deposits of frac sand. No new significant bodies were located.

Four 8kg samples were taken - three from Alarm River and one from Shakespeare Hills - and submitted to Stim-Lab for size analysis and crush testing. The report is included as Appendix 1.

Access tracks to the Alarm River site are being cleared and resource drilling of the area will be carried out in 2017.

EL47/2011 DIP RANGE, NW TASMANIA - ANNUAL REPORT 2016

1.0 INTRODUCTION

EL47/2011 was granted to Mineral Holdings Australia Pty. Ltd. (MHA) on 16 September 2012 for a period of 5 years. The Licence originally covered 186km^2 in the Dip Ranges, surrounding the Thomas Mountain silica mine within 23M/2009 and RL1/2005. The Licence was reduced to 38km² on the first renewal in September 2013.

The Thomas Mountain mine contains significant resources of high-quality quartzite and frac sand located in the northern Dip Range about 25km south-west of Wynyard and 20km south-east of a deep water harbour at Port Latta. Access is via the township of Montumana on the Bass Highway, 25km west of Wynyard, thence 6 km south along Montumana and Newhaven roads to a turn-off just east of Hogarths Creek.

Exploration licence EL47/2011 covers outcrops of the Detention Quartzite and the Jacobs Quartzite of the Rocky Cape Group surrounding the Thomas Mountain mine and the target of the exploration program is for any additional resources of silica, silica sand and quartzite for the chemical, metallurgical, glass and coal seam methane industries.

Initial exploration during 2013 located an area of silica sand in the Alarm River area. Follow-up mapping and auger sampling from 2014 to 2016 indicated the sand extended over a length of at least 800 metres and a width of 80 metres, running south-west from the boundary with RL1/2005. This area is directly along strike from the large area of frac sand south of Hogarths Creek.

A detailed program of foot traversing was carried out in the northern section of the Licence in the Shakespeare Hills area. A second area of sand was located, covering an area of 300 metres by 100 metres. Size analysis of the sand from both areas showed the bulk of the material fell within the favourable 20-40, 40-70 and 70-140 US mesh size fractions.

During 2016, a detailed programme of foot traversing was carried out to the south of Alarm River to locate any further frac sand deposits. No new bodies were located.

Four 8kg samples were taken in 2016 - three from Alarm River and one from Shakespeare Hills – and submitted to Stim-Lab for size analysis and crush testing. The report is included as Appendix 1.

Access tracks to the Alarm River site are being cleared and resource drilling of the area will be carried out in 2017.

2.0 GEOLOGY

Resources of high-grade quartzite have been reported in various government publications as occurring within the Proterozoic rocks of north- west Tasmania. The better quartzite occurred within the Detention Quartzite and Jacob Quartzite sub-groups and rocks of these sub-groups underlie most of the licence area.

Gee (1971) described the Proterozoic sequence within the Rocky Cape Group from youngest to oldest as – the Jacob Quartzite (1130m in thickness), the Irby Siltstone (760m) and the Detention Quartzite (1400m). Gee suggested the Detention Quartzite contained about 10% siltstone in beds from a few metres to more than 80 metres in thickness, while the Jacob Quartzite is a pure quartz sandstone and is the coarser grained of the two. The Rocky Cape Group, in turn, overlies the Cowrie Siltstone which was at least 2,400m in thickness.

Structurally the Detention Quartzite and the Jacob Quartzite are folded into a tight series of anticlines and synclines with north-east trending and dipping axes with folds becoming overturned in the east, resulting in north-west dipping beds at 45 degrees or above.

Gee (1971) described the quartzites as uniformly fine grained orthoquartzites with 99% quartz grains and a granular to glassy texture, depending on the degree of cementation by silica. Turner (1989), on the other hand, preferred to refer to the mature quartzose sandy sediments as quartz arenites and attributed their variable physical character as mostly due to variable silicification and occasionally to metamorphism.

Along with the quartzites are areas of loose silica sand which appear to be areas of uncemented quartzite. The sands are high purity silica sand and are suitable for use in coal bed methane extraction.

3.0 CURRENT EXPLORATION

The Shakespeare Hills area was extensively traversed on foot by prospector, Mr Kevin Pinner, and much of the area was better exposed after recent bushfires, giving a much better look at the geology. Roads and tracks are very rare in this area and traversing on foot is the only available method of exploration.

The sand body in this area is approximately 300 metres by 100 metres but recent exploration has not been able to increase the size of the resource.

Three hand auger samples were taken for size and roundness analysis and reports were detailed in the 2014 Annual Report. The yield of the important -20+40 and -40+70 size fractions was very good and the roundness of the grains was also acceptable. (As a note of correction, the samples were reported as SH1 to SH3 in the 2014 Annual Report but as Shakespeare Hills 3, 4 and 5 by the ALS Burnie size analysis report. The SH1 to SH3 sample designations are correct and the ALS Burnie report should be read: Shakespeare Hills 3 = SH1, Shakespeare Hills 4 = SH2 and Shakespeare Hills 5 = SH3.)

Eight samples were also taken in the Alarm River area, which is a south-west continuation of the Hogarth Creek frac sand deposit. An attempt was made to hand auger across the width of the sand area but the auger could only penetrate to about 1 to 1½ metres and a power auger will be necessary to evaluate the deposit at depth.

Details of the roundness and size fraction testing on all eight samples have been reported previously: samples AR1 to AR4 in the Amdel report of 2013 and AR5 to AR8 in the ALS Burnie report of 2014. The sample referred to as AR5 in the Amdel report was actually taken from Pokes Road, near Meunna, and has been renamed to sample M1 to reflect this.

The coordinates for samples AR1 to AR8 were estimated in our 2014 report. They have now been more accurately measured and the corrected positions are listed below, in Table 1.

Sample	Easting	Northing
A1	370 576	5 461 450
A2	370 760	5 461 600
A3	371 088	5 461 728
A4	371 175	5 461 834
A5	370 493	5 461 391
A6	370 775	5 461 574
A7	371 100	5 461 696
A8	371 102	5 461 660

TABLE 1: Alarm River Sample Locations

The roundness of the Alarm River sand is good and, although somewhat more variable than the deposit in RL1/2005, the 20/40 and 40/70 fractions still make up a major part of the sand. The zone is at least 80 metres in width and up to 800 metres in length.

After size, the roundness, sphericity and the K-value or crush resistance are the next most important features of a frac sand. Roundness and sphericity are measured on the Krumbein scale. To determine the K-value, each of the 20/40, 40/70 and 70/140 fractions are crushed at a pressure of 1,000 pounds per square inch (psi) and the amount of fines (crushed grains) measured. The pressure is increased in 1,000 psi increments until the total amount of fines is greater than or equal to 10% of the sample. That point is known as the K-value. A 3K (3,000 psi) frac sand is suitable for holes to a depth of 950 metres, a 4K sand is suitable to a depth of 1,300 metres and a 5K sand is suitable to a depth of 1,600 metres.

ISO 13503-2:2006/API RP19C:2008 tests by the industry accepted labs (i.e. Stim-Lab and PropTester – both located in the US) are extremely expensive, with Stim-Lab charging around US$5,000 per sample submitted. Additionally, it can take several months to receive the results when there is high demand for their services. As Bureau Veritas in South Australia suggested they could conduct the same tests for about A$1,000 per sample, with a faster turnaround, MHA believed we could use Bureau Veritas for initial test work and if an area proved suitable then some check samples would be sent to Stim-Lab for verification.

Six 8kg trial samples were sent to Bureau Veritas from Hogarth Creek, along with five samples from Alarm River and two samples from Shakespeare Hills. Unfortunately, the sample preparation method used by Bureau Veritas proved to be unsatisfactory and therefore the results they provided were meaningless.

As a result, the samples sent to Bureau Veritas from Alarm River and Shakespeare Hills were dumped and new samples were collected and sent to Stim-Lab in Oklahoma, USA. Three 8kg samples were collected from Alarm River (at sites A3, A7 & A8) and one 8kg sample was collected from the Shakespeare Hills deposit.

The results, which are very encouraging, are summarised below and the full report is included as Appendix 1.

	SAMPLE			
	Alarm River 3	**Alarm River 7**	**Alarm River 8**	**Shakespeare Hills 2**
SIZE RANGE (US MESH)	**(Weight %)**	**(Weight %)**	**(Weight %)**	**(Weight %)**
12/20	0.9	1.5	1.1	0.0
16/30	11.3	15.2	13.7	1.8
20/40	27.7	31.9	37.4	18.8
30/50	36.5	37.3	45.4	48.4
40/70	39.2	38.4	35.4	60.5
70/140	26.3	24.0	20.5	18.5
20/140 Total	93.2	94.3	93.3	97.8

TABLE 2: ***Dip Range Sand Samples - Sieve Analysis (Stim-Lab – Feb 2016)***

PROPERTY	**SAMPLE**											
	AR3			**AR7**			**AR8**			**SH2**		
	20/40	40/70	70/140	20/40	40/70	70/140	20/40	40/70	70/140	20/40	40/70	70/140
Sphericity	0.8	0.7	0.6	0.8	0.7	0.7	0.8	0.8	0.7	0.8	0.8	0.7
Roundness	0.7	0.6	0.6	0.7	0.6	0.7	0.7	0.7	0.6	0.7	0.6	0.6
Density (g/cm^3)	1.43	1.38	1.36	1.40	1.31	1.31	1.42	1.36	1.34	1.42	1.40	1.36
K-Value	3K	4K	5K	3K	4K	5K	4K	5K	6K	3K	6K	6K

TABLE 3: ***Dip Range Sand Samples - Sphericity, Roundness, Bulk Density & Crush Resistance (Stim-Lab – Feb 2016)***

4.0 FUTURE EXPLORATION

An old, overgrown access track to the Alarm River site will be cleared to allow a tractor mounted power auger to access the site. Five lines of auger holes, 200 metres apart, with five holes on each line spaced 20 metres apart are proposed as an initial test of the Alarm River site.

5.0 CONCLUSION

Several new sources of potential frac sand material have been identified and evaluation of the sand is continuing.

6.0 REFERENCES

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Gee, R.D, 1971. Table Cape, Tasmania. Tasmanian Geological Atlas 1 Mile Series Expl. Rep., Sheet 22 (8016S).

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Dickson, T.W., 2014. Annual Report on Exploration to August 2014, Exploration Licence 47/2011 Dip Range NW Tasmania. Mineral Holdings Australia Pty. Ltd.

Dickson, T.W., 2015. Annual Report on Exploration to August 2015, Exploration Licence 47/2011 Dip Range NW Tasmania. Mineral Holdings Australia Pty. Ltd.

7.0 KEYWORDS

Dip Range, Thomas Mountain, Detention Subgroup, Jacob Quartzite, Rocky Cape Group, Frac Sand, Quartzite, Silica Resources.

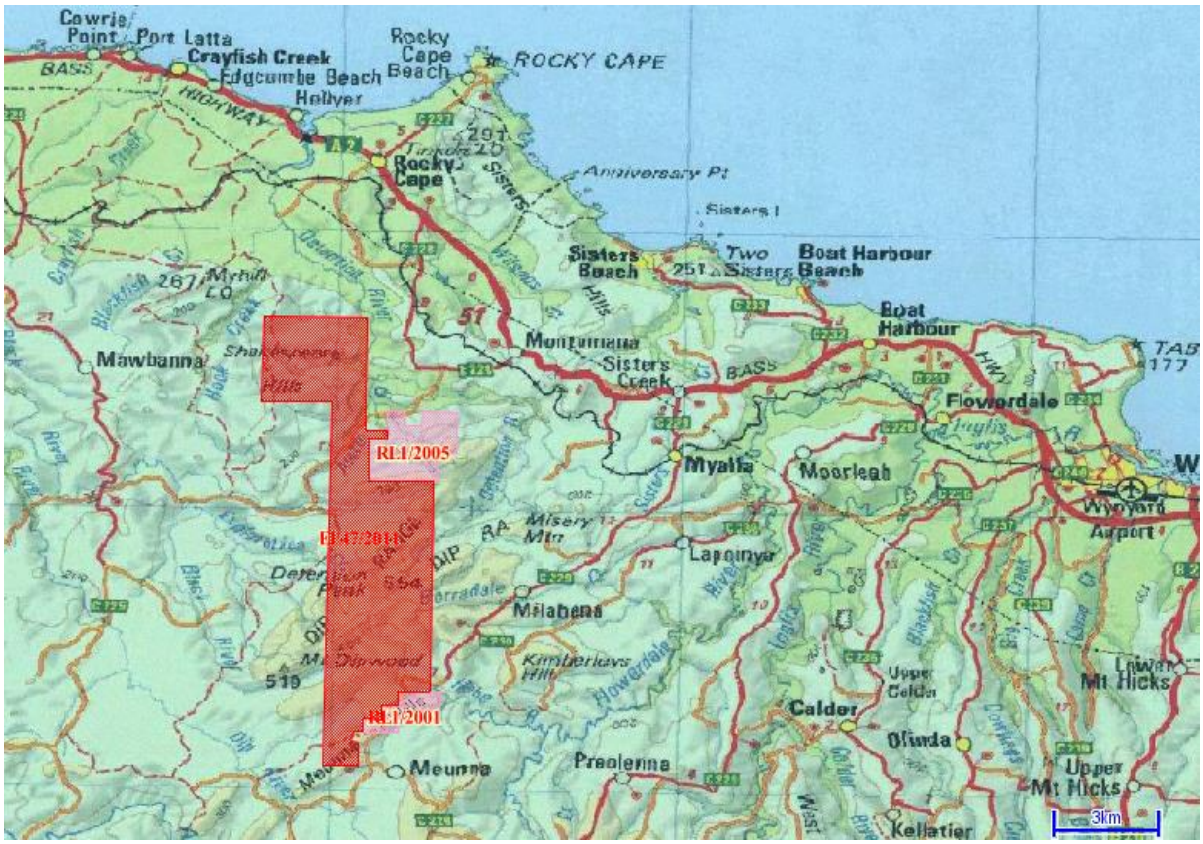


FIGURE 1: Location Diagram - EL47/2011 Dip Range

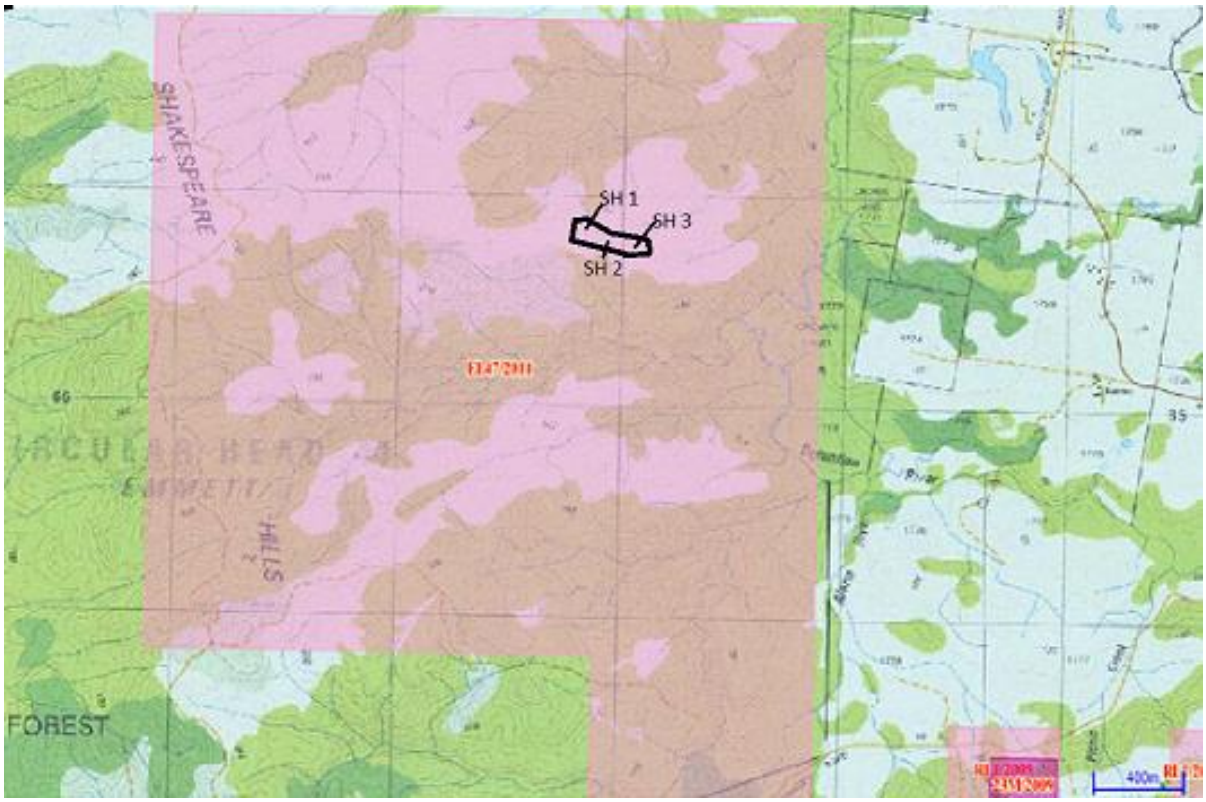


FIGURE 2: Shakespeare Hills Sand Deposit - Location & Sample Sites

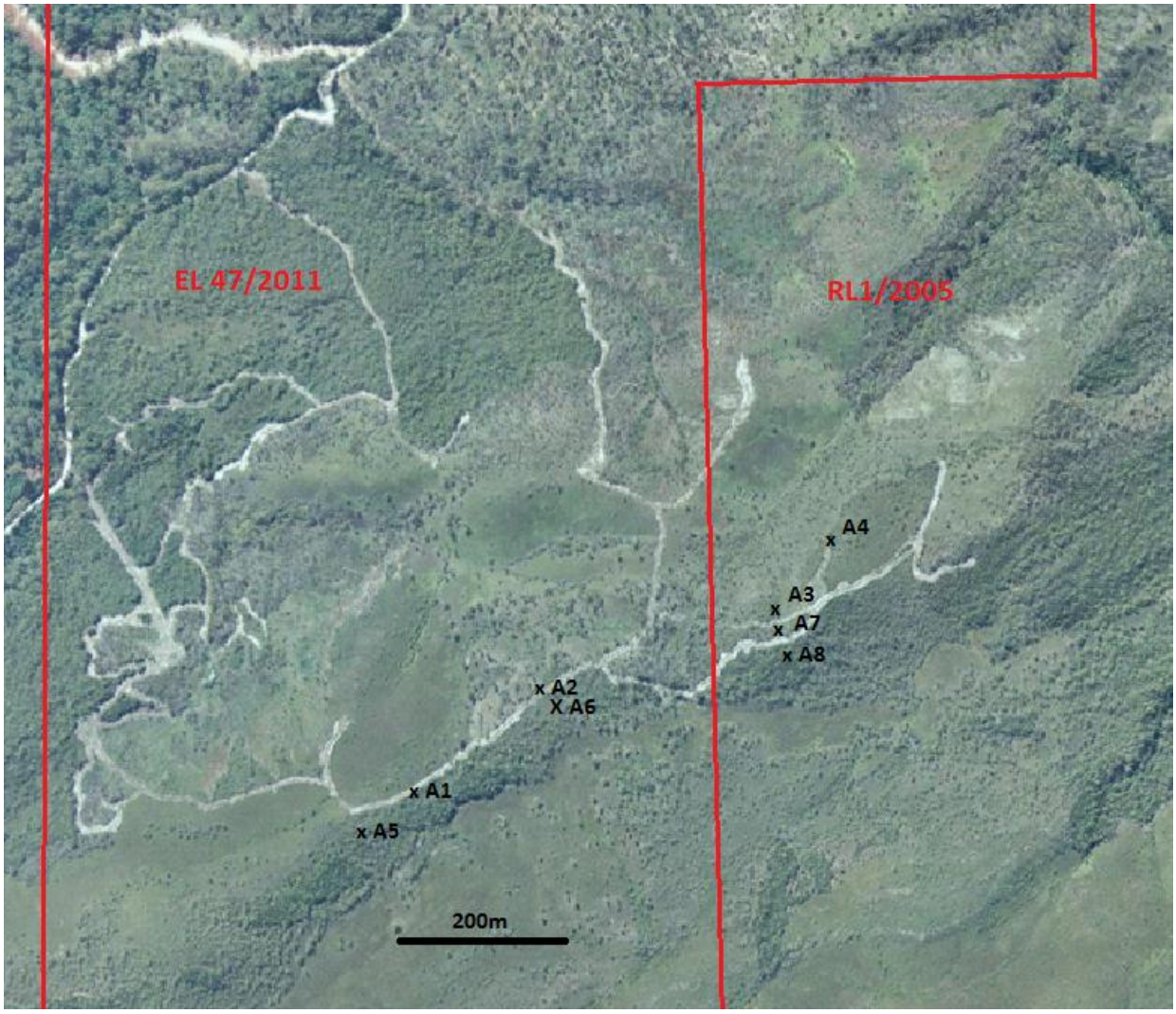


FIGURE 3: Alarm River Sand Deposit - Sample Sites

APPENDIX 1

EVALUATION OF DIP RANGE SAND SAMPLES

STIM-LAB REPORT
SL11977 – FEBRUARY 2016

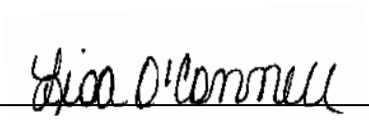
"Measurement of Properties for Proppants Used In Hydraulic Fracturing and Gravel-Packing Operations" Evaluations on Four Sand Samples Labeled Alarm River 3, Alarm River 7, Alarm River 8, and Shakespeare Hills 2 For Mineral Holdings Australia Pty Ltd, Submitted 2/4/16

Prepared For:

Neil Thomas
Mineral Holdings Australia Pty Ltd
11 Kent Court
Toorak VIC 3142, Australia
+61 3 9822 0077

Prepared By:

Stim-Lab, Inc.
7118 North Highway 81
Duncan, Ok. 73533-8719
(580) 252-4309



Lisa O'Connell, Laboratory Supervisor

P.O. Number: API2016-0204-019

File Number: SL11977

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STIM-LAB, Inc.
7118 North Highway 81
Duncan, Ok. 73533-8719
Phone: 580-252-4309
Fax: 580-252-6979
www.stimlab.com

February 29, 2016

Neil Thomas
Mineral Holdings Australia Pty Ltd
11 Kent Court
Toorak VIC 3142, Australia

Dear Mr. Thomas:

Stim-lab, Inc. has completed the ISO 13503-2:2006/API RP19C:2008 evaluations requested on the submitted sand samples labeled Alarm River 3, Alarm River 7, Alarm River 8, and Shakespeare Hills 2. The samples were received at Stim-Lab, Inc. on February 4, 2016.

Upon arrival, the samples were inventoried and dried. The samples were then weighed and washed through a 200 mesh sieve. The sample retained on the sieve was then dried and reweighed. The percent loss was calculated from the material that washed through the sieve. The "Pre" and "Post" wash weights as well as the calculated loss for each sample are provided in Table 1.

The Composite Sieve Analysis results for the samples labeled Alarm River 3, Alarm River 7, Alarm River 8, and Shakespeare Hills 2 are provided in Table 2. The sphericity and roundness (Krumbein Shape Factor), bulk density, and crush with K-Value results for the samples are provided in Tables 3 through 14. Pictures of the samples are provided following Table 14 for you to review. The procedures followed are as stated in ISO 13503-2:2006/API RP19C:2008.

Thank you for choosing Stim-Lab, Inc. to perform these analyses. We hope you will consider us for your future testing needs. If you have any questions regarding the testing or results, please do not hesitate to give me a call.

Sincerely,

Lisa O'Connell

Lisa O'Connell
Laboratory Supervisor
Conductivity Laboratory

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Table 1				
Mineral Holdings Australia Pty Ltd **February 4, 2016**				
Loss From Washing				
Sample ID	**Dry Prewash Wt (g)**	**Dry Postwash Wt(g)**	**Grams Lost**	**% Loss**
Alarm River 3	**2493.75**	**2242.41**	**251.34**	**10.08**
Alarm River 7	**2180.49**	**1930.04**	**250.45**	**11.49**
Alarm River 8	**2527.89**	**2362.68**	**165.21**	**6.54**
Shakespeare Hills 2	**2103.98**	**2053.70**	**50.28**	**2.39**

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Table 2

Sieve Analysis of Submitted Proppant Samples
Mineral Holdings Australia Pty Ltd

ISO 13503-2:2006/API RP19C:2008, Section 6, "Sieve Analysis"

Sample I.D.	**Alarm River 3**		**Alarm River 7**		**Alarm River 8**		**Shakespeare Hills 2**	
US Standard	Weight %		Weight %		Weight %		Weight %	
Sieve No.	Retained	Cumulative	Retained	Cumulative	Retained	Cumulative	Retained	Cumulative
6	-	0.0	-	0.0	-	0.0	-	0.0
8	-	0.0	-	0.0	-	0.0	-	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.1	0.1	0.2	0.2	0.2	0.2	0.0	0.0
20	0.8	0.9	1.3	1.5	0.9	1.1	0.0	0.0
25	3.3	4.2	5.2	6.7	3.8	4.9	0.2	0.2
30	7.1	11.3	8.5	15.2	8.9	13.8	1.6	1.8
35	8.0	19.3	8.4	23.6	11.0	24.8	5.3	7.1
40	9.3	28.6	9.8	33.4	13.7	38.5	11.8	18.8
45	10.3	38.9	10.2	43.7	11.9	50.4	16.1	35.0
50	8.9	47.8	8.9	52.5	8.7	59.2	15.2	50.2
60	11.0	58.8	10.5	63.0	8.4	67.5	17.4	67.6
70	9.0	67.8	8.8	71.8	6.4	74.0	11.8	79.4
80	8.6	76.4	8.3	80.1	6.3	80.3	8.4	87.8
100	7.7	84.1	7.2	87.3	6.0	86.2	5.2	93.0
120	6.5	90.6	5.8	93.1	5.3	91.5	3.4	96.4
140	3.5	94.1	2.7	95.8	2.9	94.4	1.5	97.9
170	2.4	96.5	1.8	97.6	2.3	96.8	0.9	98.8
200	1.5	98.0	1.0	98.6	1.4	98.1	0.5	99.2
230	0.8	98.8	0.5	99.1	0.7	98.8	0.3	99.5
pan	1.2	100.0	0.8	100.0	1.1	100.0	0.5	100.0
total	100.0		100.0		100.0		100.0	
in-size	0.9	= as 12/20	1.5	= as 12/20	1.1	= as 12/20	0.0	= as 12/20
in-size	11.3	= as 16/30	15.2	= as 16/30	13.7	= as 16/30	1.8	= as 16/30
in-size	27.7	= as 20/40	31.9	= as 20/40	37.4	= as 20/40	18.8	= as 20/40
in-size	36.5	= as 30/50	37.3	= as 30/50	45.4	= as 30/50	48.4	= as 30/50
in-size	39.2	= as 40/70	38.4	= as 40/70	35.4	= as 40/70	60.5	= as 40/70
in-size	26.3	= as 70/140	24.0	= as 70/140	20.5	= as 70/140	18.5	= as 70/140
ISO Mean Dia. (mm)	0.335		0.363		0.373		0.317	
Median Dia. (mm)	0.280		0.304		0.313		0.289	

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Table 3

Sample ID: Alarm River 3 20/40
Mineral Holdings Australia Pty Ltd
February 4, 2016

Measurement of Properties of Proppants Used In Hydraulic Fracturing and Gravel-Packing Operations

ISO 13503-2:2006/API RP19C:2008, Section 7, "Proppant Sphericity and Roundness"

* mean of a 28 count

Sphericity =	**0.8**
Roundness =	**0.7**
Clusters =	**None Observed in Field of Count**

Recommended Sphericity and Roundness for proppants = 0.6 or greater (ISO/DIS 13503-2/Amd.1:2009)

ISO 13503-2:2006/API RP19C:2008, Section 10, "Procedures for Determining Proppant Bulk Density"

Bulk Density =	**1.43**	**g/cm^3**
Bulk Density =	**89.2**	**lb/ft^3**

ISO 13503-2:2006/API RP19C:2008, Section 11, "Proppant Crush-Resistance Test"

Stresses Tested (psi)	*% Fines -20+40 crush prep*
3000	**7.8%**
4000	**14.4%**
K-Value =	**3K**

The highest stress level which proppant generates no more than 10% crushed material, rounded down to the nearest 1000psi = K-Value

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Table 4

Sample ID: Alarm River 3 40/70
Mineral Holdings Australia Pty Ltd
February 4, 2016

Measurement of Properties of Proppants Used In Hydraulic Fracturing and Gravel-Packing Operations

ISO 13503-2:2006/API RP19C:2008, Section 7, "Proppant Sphericity and Roundness"

* mean of a 29 count

Sphericity =	**0.7**
Roundness =	**0.6**
Clusters =	**None Observed in Field of Count**

Recommended Sphericity and Roundness for proppants = 0.6 or greater (ISO/DIS 13503-2/Amd.1:2009)

ISO 13503-2:2006/API RP19C:2008, Section 10, "Procedures for Determining Proppant Bulk Density"

Bulk Density =	**1.38**	**g/cm^3**
Bulk Density =	**86.1**	**lb/ft^3**

ISO 13503-2:2006/API RP19C:2008, Section 11, "Proppant Crush-Resistance Test"

Stresses Tested (psi)	*% Fines -40+70 crush prep*
4000	**7.1%**
5000	**11.1%**
K-Value =	**4K**

The highest stress level which proppant generates no more than 10% crushed material, rounded down to the nearest 1000psi = K-Value

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Table 5

Sample ID: Alarm River 3 70/140
Mineral Holdings Australia Pty Ltd
February 4, 2016

Measurement of Properties of Proppants Used In Hydraulic Fracturing and Gravel-Packing Operations

ISO 13503-2:2006/API RP19C:2008, Section 7, "Proppant Sphericity and Roundness"

* mean of a 36 count

Sphericity =	**0.6**
Roundness =	**0.6**
Clusters =	**None Observed in Field of Count**

Recommended Sphericity and Roundness for proppants = 0.6 or greater (ISO/DIS 13503-2/Amd.1:2009)

ISO 13503-2:2006/API RP19C:2008, Section 10, "Procedures for Determining Proppant Bulk Density"

Bulk Density =	**1.36**	**g/cm^3**
Bulk Density =	**84.9**	**lb/ft^3**

ISO 13503-2:2006/API RP19C:2008, Section 11, "Proppant Crush-Resistance Test"

Stresses Tested (psi)	*% Fines -70+140 crush prep*
5000	**7.2%**
6000	**10.4%**
K-Value =	**5K**

The highest stress level which proppant generates no more than 10% crushed material, rounded down to the nearest 1000psi = K-Value

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Table 6

Sample ID: Alarm River 7 20/40
Mineral Holdings Australia Pty Ltd
February 4, 2016

Measurement of Properties of Proppants Used In Hydraulic Fracturing and Gravel-Packing Operations

ISO 13503-2:2006/API RP19C:2008, Section 7, "Proppant Sphericity and Roundness"

* mean of a 21 count

Sphericity =	**0.8**
Roundness =	**0.7**
Clusters =	**None Observed in Field of Count**

Recommended Sphericity and Roundness for proppants = 0.6 or greater (ISO/DIS 13503-2/Amd.1:2009)

ISO 13503-2:2006/API RP19C:2008, Section 10, "Procedures for Determining Proppant Bulk Density"

Bulk Density =	**1.40**	**g/cm^3**
Bulk Density =	**87.4**	**lb/ft^3**

ISO 13503-2:2006/API RP19C:2008, Section 11, "Proppant Crush-Resistance Test"

Stresses Tested (psi)	***% Fines -20+40 crush prep***
3000	**6.8%**
4000	**12.5%**
K-Value =	**3K**

The highest stress level which proppant generates no more than 10% crushed material, rounded down to the nearest 1000psi = K-Value

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Table 7

Sample ID: Alarm River 7 40/70
Mineral Holdings Australia Pty Ltd
February 4, 2016

Measurement of Properties of Proppants Used In Hydraulic Fracturing and Gravel-Packing Operations

ISO 13503-2:2006/API RP19C:2008, Section 7, "Proppant Sphericity and Roundness"

* mean of a 25 count

Sphericity =	**0.7**
Roundness =	**0.6**
Clusters =	**None Observed in Field of Count**

Recommended Sphericity and Roundness for proppants = 0.6 or greater (ISO/DIS 13503-2/Amd.1:2009)

ISO 13503-2:2006/API RP19C:2008, Section 10, "Procedures for Determining Proppant Bulk Density"

Bulk Density =	**1.31**	**g/cm^3**
Bulk Density =	**81.7**	**lb/ft^3**

ISO 13503-2:2006/API RP19C:2008, Section 11, "Proppant Crush-Resistance Test"

Stresses Tested (psi)	*% Fines -40+70 crush prep*
4000	**9.5%**
5000	**14.2%**
K-Value =	**4K**

The highest stress level which proppant generates no more than 10% crushed material, rounded down to the nearest 1000psi = K-Value

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Table 8

Sample ID: Alarm River 7 70/140
Mineral Holdings Australia Pty Ltd
February 4, 2016

Measurement of Properties of Proppants Used In Hydraulic Fracturing and Gravel-Packing Operations

ISO 13503-2:2006/API RP19C:2008, Section 7, "Proppant Sphericity and Roundness"

* mean of a 36 count

Sphericity =	**0.7**
Roundness =	**0.6**
Clusters =	**None Observed in Field of Count**

Recommended Sphericity and Roundness for proppants = 0.6 or greater (ISO/DIS 13503-2/Amd.1:2009)

ISO 13503-2:2006/API RP19C:2008, Section 10, "Procedures for Determining Proppant Bulk Density"

Bulk Density =	**1.31**	**g/cm^3**
Bulk Density =	**81.7**	**lb/ft^3**

ISO 13503-2:2006/API RP19C:2008, Section 11, "Proppant Crush-Resistance Test"

Stresses Tested (psi)	*% Fines -70+140 crush prep*
5000	**9.0%**
6000	**12.5%**
K-Value =	**5K**

The highest stress level which proppant generates no more than 10% crushed material, rounded down to the nearest 1000psi = K-Value

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Table 9

Sample ID: Alarm River 8 20/40
Mineral Holdings Australia Pty Ltd
February 4, 2016

Measurement of Properties of Proppants Used In Hydraulic Fracturing and Gravel-Packing Operations

ISO 13503-2:2006/API RP19C:2008, Section 7, "Proppant Sphericity and Roundness"

* mean of a 23 count

Sphericity =	**0.8**
Roundness =	**0.7**
Clusters =	**Approx. 1 of Every 100 Grains Contained Clusters**

Recommended Sphericity and Roundness for proppants = 0.6 or greater (ISO/DIS 13503-2/Amd.1:2009)

ISO 13503-2:2006/API RP19C:2008, Section 10, "Procedures for Determining Proppant Bulk Density"

Bulk Density =	**1.42**	**g/cm^3**
Bulk Density =	**88.6**	**lb/ft^3**

ISO 13503-2:2006/API RP19C:2008, Section 11, "Proppant Crush-Resistance Test"

Stresses Tested (psi)	***% Fines -20+40 crush prep***
4000	**9.5%**
5000	**16.0%**
K-Value =	**4K**

The highest stress level which proppant generates no more than 10% crushed material, rounded down to the nearest 1000psi = K-Value

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Table 10

Sample ID: Alarm River 8 40/70
Mineral Holdings Australia Pty Ltd
February 4, 2016

Measurement of Properties of Proppants Used In Hydraulic Fracturing and Gravel-Packing Operations

ISO 13503-2:2006/API RP19C:2008, Section 7, "Proppant Sphericity and Roundness"

* mean of a 25 count

Sphericity =	**0.8**
Roundness =	**0.7**
Clusters =	**None Observed in Field of Count**

Recommended Sphericity and Roundness for proppants = 0.6 or greater (ISO/DIS 13503-2/Amd.1:2009)

ISO 13503-2:2006/API RP19C:2008, Section 10, "Procedures for Determining Proppant Bulk Density"

Bulk Density =	**1.36**	**g/cm^3**
Bulk Density =	**84.9**	**lb/ft^3**

ISO 13503-2:2006/API RP19C:2008, Section 11, "Proppant Crush-Resistance Test"

Stresses Tested (psi)	*% Fines -40+70 crush prep*
5000	**9.1%**
6000	**12.7%**
K-Value =	**5K**

The highest stress level which proppant generates no more than 10% crushed material, rounded down to the nearest 1000psi = K-Value

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Table 11

Sample ID: Alarm River 8 70/140
Mineral Holdings Australia Pty Ltd
February 4, 2016

Measurement of Properties of Proppants Used In Hydraulic Fracturing and Gravel-Packing Operations

ISO 13503-2:2006/API RP19C:2008, Section 7, "Proppant Sphericity and Roundness"

* mean of a 40 count

Sphericity =	**0.7**
Roundness =	**0.6**
Clusters =	**Approx. 1 of Every 100 Grains Contained Clusters**

Recommended Sphericity and Roundness for proppants = 0.6 or greater (ISO/DIS 13503-2/Amd.1:2009)

ISO 13503-2:2006/API RP19C:2008, Section 10, "Procedures for Determining Proppant Bulk Density"

Bulk Density =	**1.34**	**g/cm^3**
Bulk Density =	**83.6**	**lb/ft^3**

ISO 13503-2:2006/API RP19C:2008, Section 11, "Proppant Crush-Resistance Test"

Stresses Tested (psi)	*% Fines -70+140 crush prep*
5000	**6.9%**
6000	**9.3%**
7000	**12.9%**
K-Value =	**6K**

The highest stress level which proppant generates no more than 10% crushed material, rounded down to the nearest 1000psi = K-Value

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Table 12

Sample ID: Shakespeare Hills 2 20/40
Mineral Holdings Australia Pty Ltd
February 4, 2016

Measurement of Properties of Proppants Used In Hydraulic Fracturing and Gravel-Packing Operations

ISO 13503-2:2006/API RP19C:2008, Section 7, "Proppant Sphericity and Roundness"

* mean of a 23 count

Sphericity =	**0.8**
Roundness =	**0.7**
Clusters =	**Approx. 1 of Every 100 Grains Contained Clusters**

Recommended Sphericity and Roundness for proppants = 0.6 or greater (ISO/DIS 13503-2/Amd.1:2009)

ISO 13503-2:2006/API RP19C:2008, Section 10, "Procedures for Determining Proppant Bulk Density"

Bulk Density =	**1.42**	**g/cm^3**
Bulk Density =	**88.6**	**lb/ft^3**

ISO 13503-2:2006/API RP19C:2008, Section 11, "Proppant Crush-Resistance Test"

Stresses Tested (psi)	***% Fines -20+40 crush prep***
3000	**6.8%**
4000	**13.3%**
K-Value =	**3K**

The highest stress level which proppant generates no more than 10% crushed material, rounded down to the nearest 1000psi = K-Value

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Table 13

Sample ID: Shakespeare Hills 2 40/70
Mineral Holdings Australia Pty Ltd
February 4, 2016

Measurement of Properties of Proppants Used In Hydraulic Fracturing and Gravel-Packing Operations

ISO 13503-2:2006/API RP19C:2008, Section 7, "Proppant Sphericity and Roundness"

* mean of a 22 count

Sphericity =	**0.8**
Roundness =	**0.6**
Clusters =	**None Observed in Field of Count**

Recommended Sphericity and Roundness for proppants = 0.6 or greater (ISO/DIS 13503-2/Amd.1:2009)

ISO 13503-2:2006/API RP19C:2008, Section 10, "Procedures for Determining Proppant Bulk Density"

Bulk Density =	**1.40**	**g/cm^3**
Bulk Density =	**87.4**	**lb/ft^3**

ISO 13503-2:2006/API RP19C:2008, Section 11, "Proppant Crush-Resistance Test"

Stresses Tested (psi)	*% Fines -40+70 crush prep*
5000	6.4%
6000	9.6%
7000	13.7%
K-Value =	6K

The highest stress level which proppant generates no more than 10% crushed material, rounded down to the nearest 1000psi = K-Value

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Table 14

Sample ID: Shakespeare Hills 2 70/140
Mineral Holdings Australia Pty Ltd
February 4, 2016

Measurement of Properties of Proppants Used In Hydraulic Fracturing and Gravel-Packing Operations

ISO 13503-2:2006/API RP19C:2008, Section 7, "Proppant Sphericity and Roundness"

* mean of a 31 count

Sphericity =	**0.7**
Roundness =	**0.6**
Clusters =	**None Observed in Field of Count**

Recommended Sphericity and Roundness for proppants = 0.6 or greater (ISO/DIS 13503-2/Amd.1:2009)

ISO 13503-2:2006/API RP19C:2008, Section 10, "Procedures for Determining Proppant Bulk Density"

Bulk Density =	**1.36**	**g/cm^3**
Bulk Density =	**84.9**	**lb/ft^3**

ISO 13503-2:2006/API RP19C:2008, Section 11, "Proppant Crush-Resistance Test"

Stresses Tested (psi)	*% Fines -70+140 crush prep*
5000	5.5%
6000	6.9%
7000	10.4%
K-Value =	6K

The highest stress level which proppant generates no more than 10% crushed material, rounded down to the nearest 1000psi = K-Value

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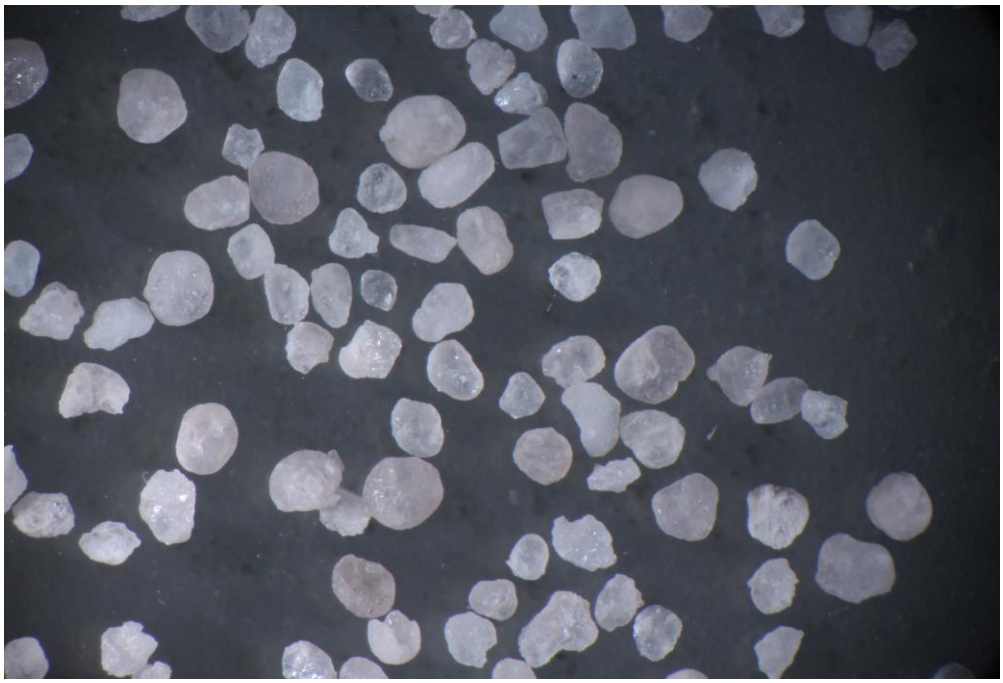
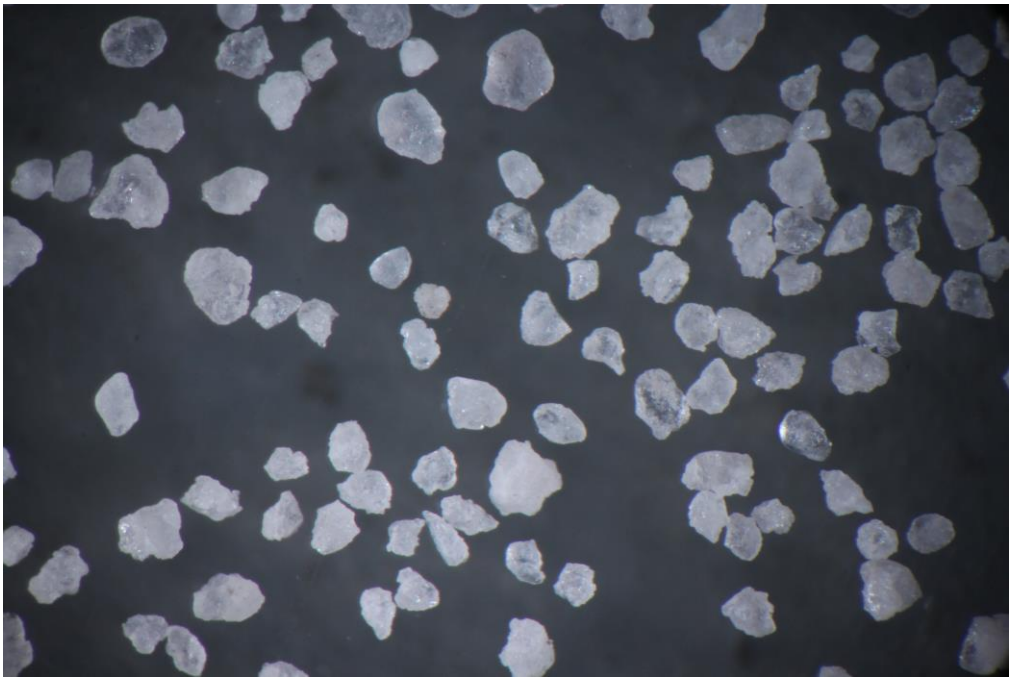
Alarm River 3 20/40



Alarm River 3 40/70



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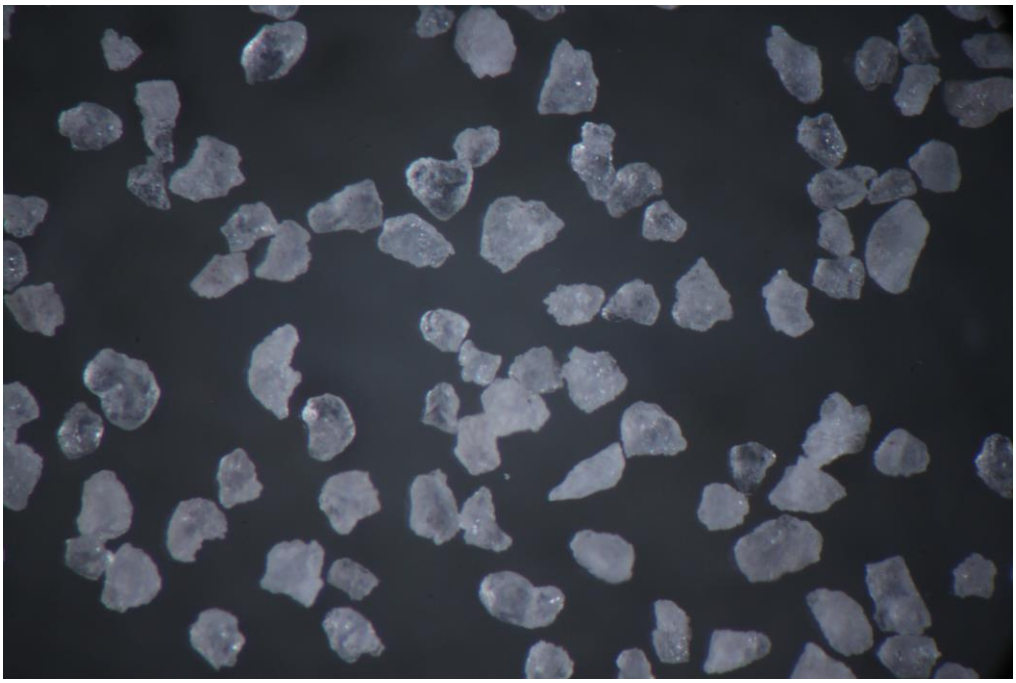
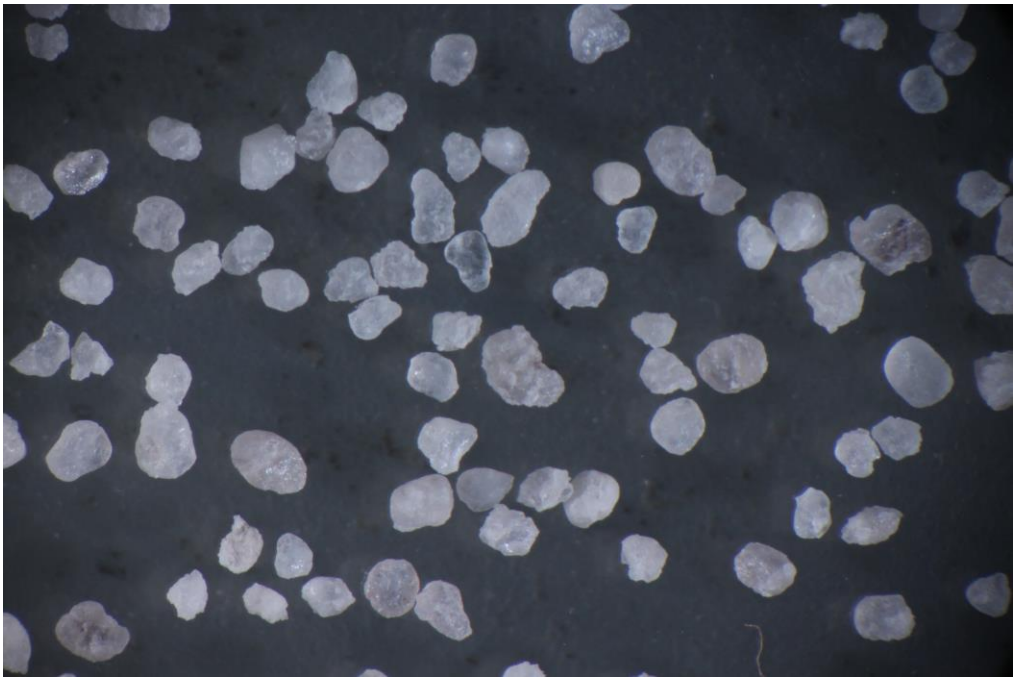
Alarm River 3 70/140



Alarm River 7 20/40



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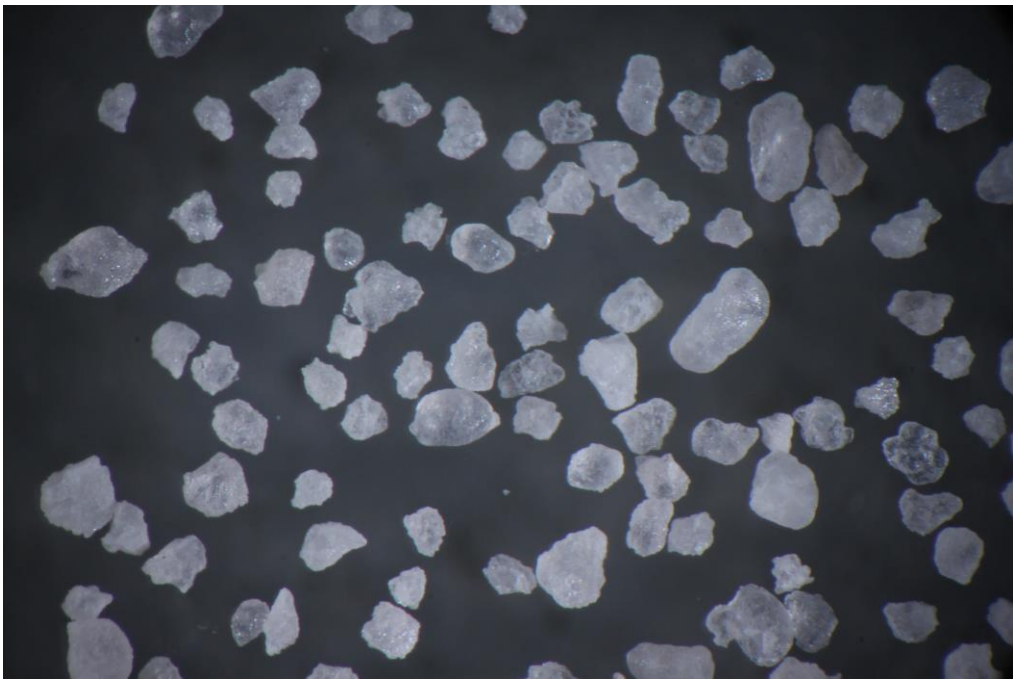
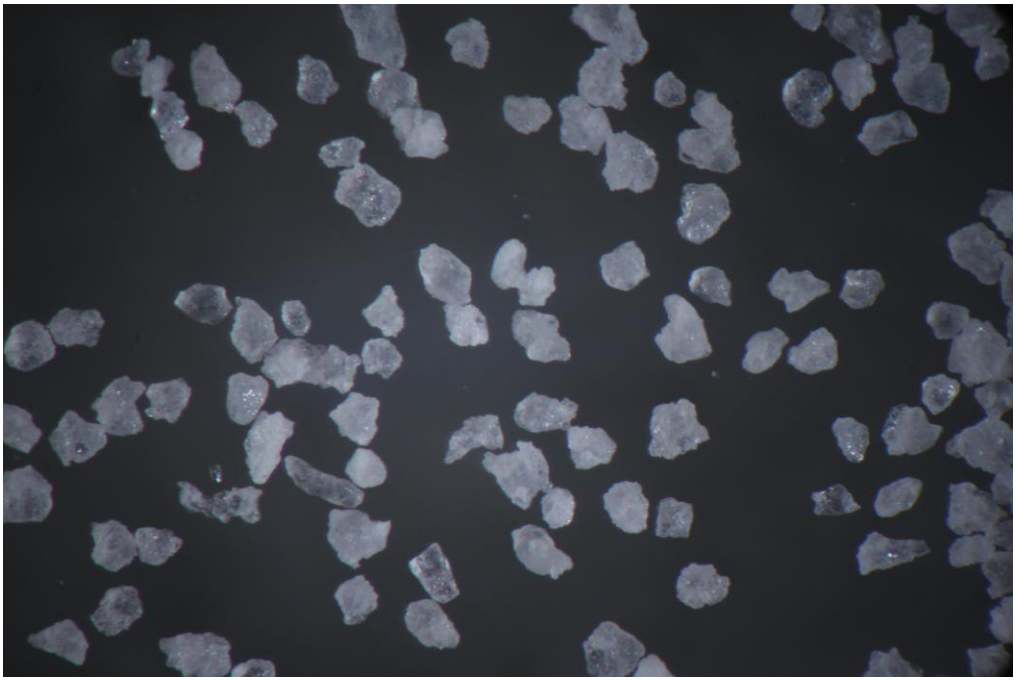
Alarm River 7 40/70



Alarm River 7 70/140



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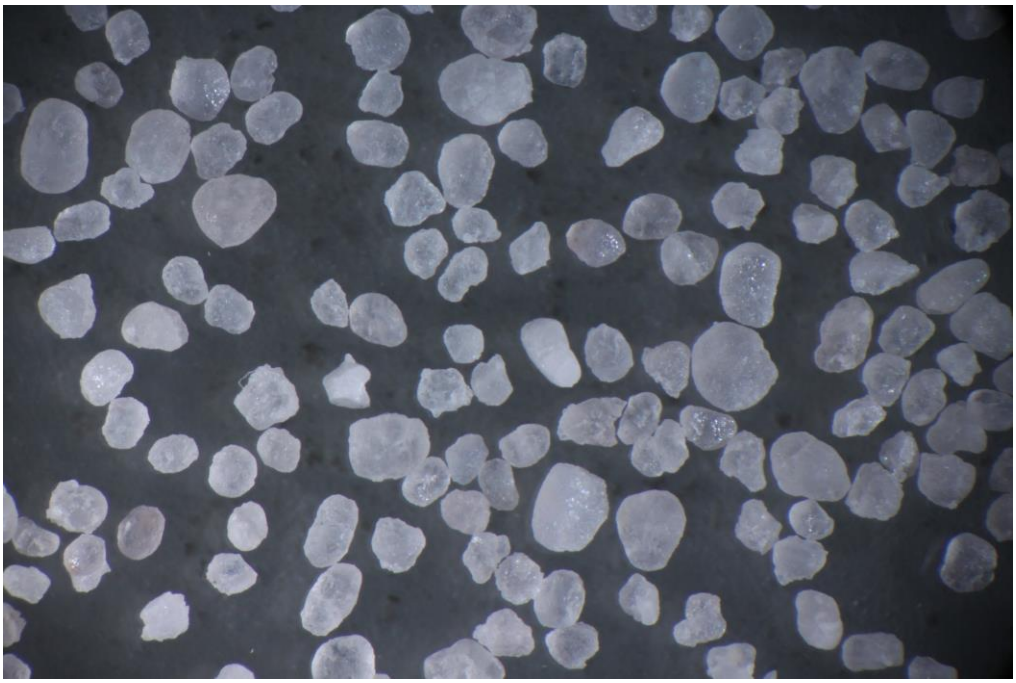
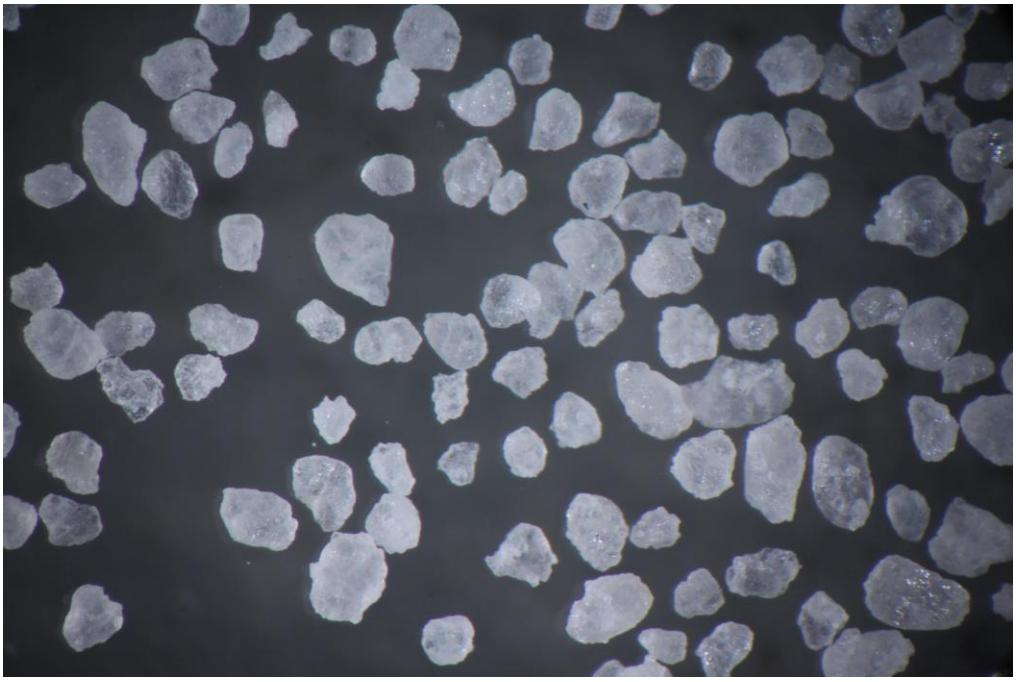
Alarm River 8 20/40



Alarm River 8 40/70



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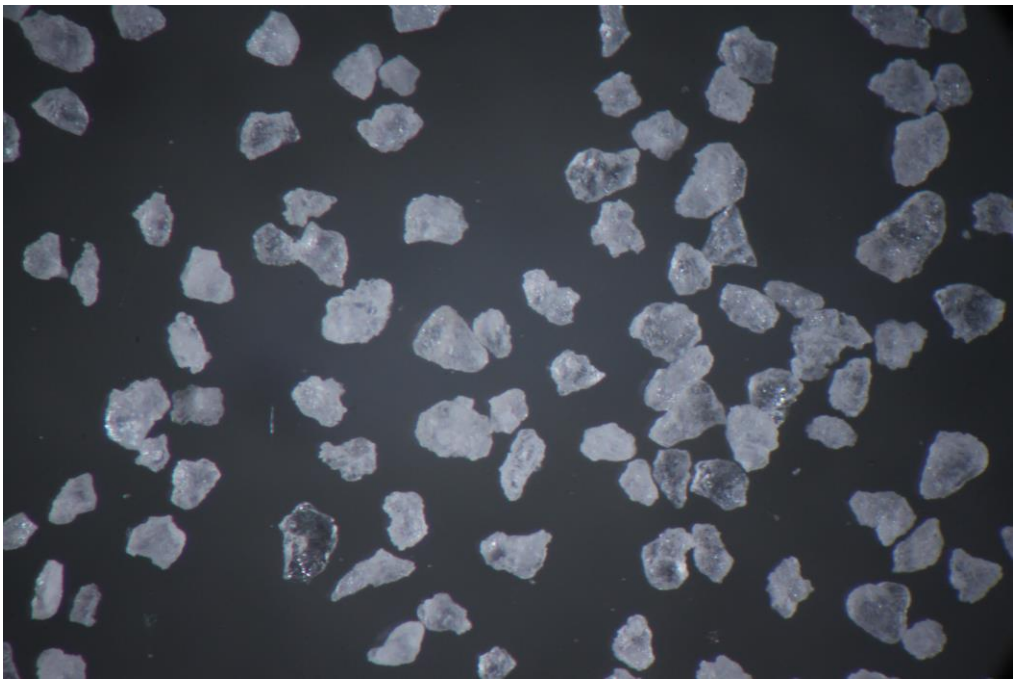
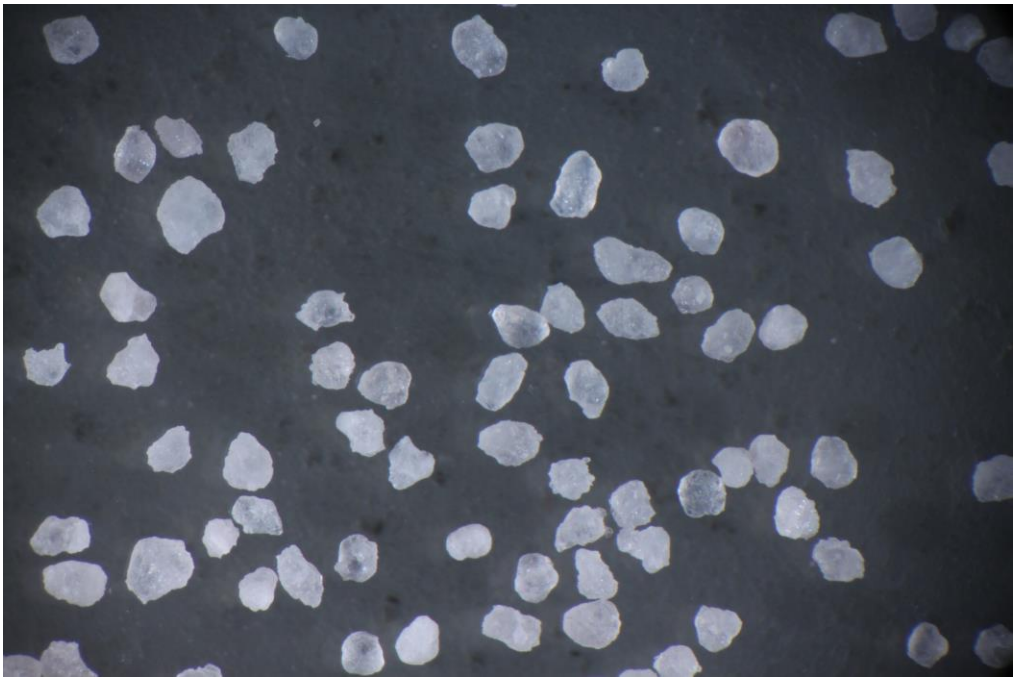
Alarm River 8 70/140



Shakespeare Hills 2 20/40



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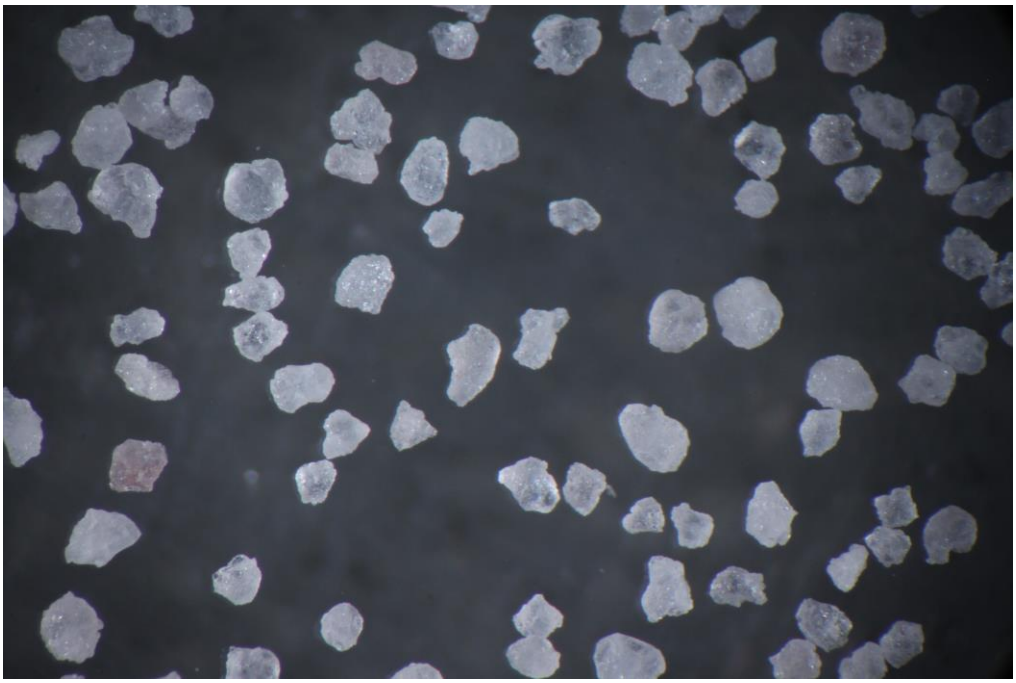
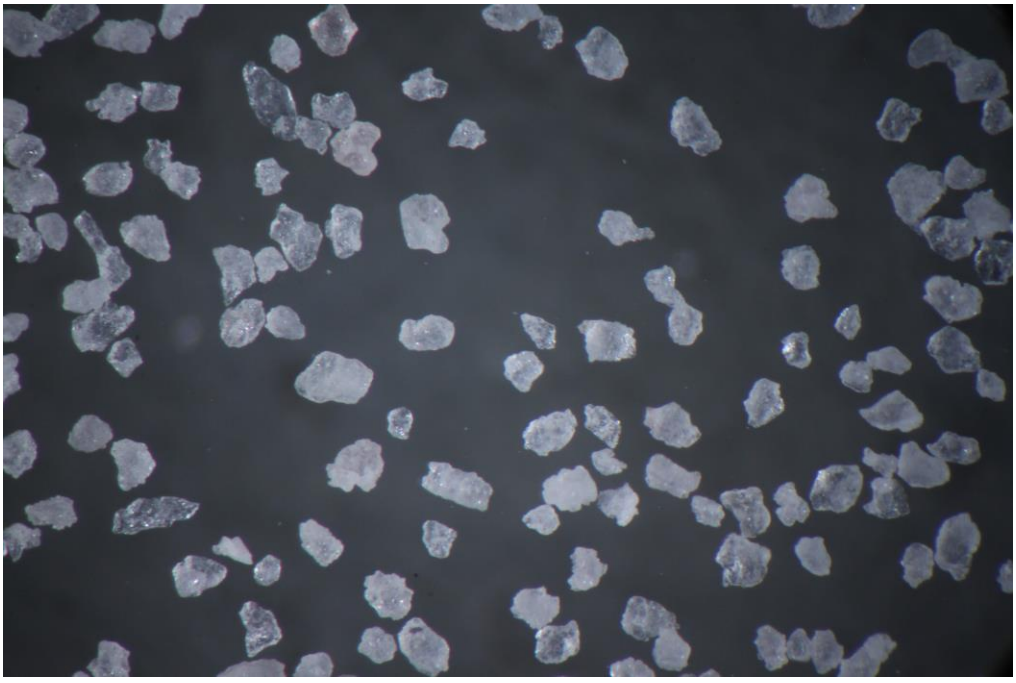
Shakespeare Hills 2 40/70



Shakespeare Hills 2 70/140



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