May 26, 2021
Email: *b.piuze@olimag.com*

Mr. Benoit Piuze
Business Development Director
Olimag Sands, Inc.
2899 Boul. Frontenac Est
Thetford Mines - Québec
G6G 6P6, Canada
418.338.3562

SUBJECT: Results of SSPC-AB 1 Testing of Abrasive Material;
KTA-Tator, Inc. Project No. 410113-R2

Dear Mr. Piuze:

In accordance with KTA-Tator, Inc. (KTA) Proposal Number PN2112283-R1, a signed copy of the Authorization to Proceed (ATP) form received on February 25, 2021, and payment in full via wire transfer received on March 24, 2021, KTA has performed testing on one abrasive material (30-60) in accordance with qualification sections of SSPC-AB 1, "Mineral and Slag Abrasives" (January 12, 2015 with Editorial Revision May 6, 2019). Two additional abrasive sizes (32B4 and 35-70) from the same product batch were tested for surface profile and particle size distribution. This report describes the testing procedures employed and contains the results of the testing.

SAMPLES

The abrasive materials listed in Table 1, "Samples" were received from Olimag Sands, Inc. on dates listed below. It should be noted that at no time did KTA personnel witness the manufacturing or packaging of the abrasive media.

Table 1 – Samples

KTA ID	Olimag Sands, Inc. ID	Description	Dates Received
410113-1	JETMAG® 30-60	One (1) 50lb. bucket of abrasive blasting media	March 2, 2021
410113-2	JETMAG® 32B4	One (1) 50lb. bucket of abrasive blasting media	March 2, 2021
410113-3	JETMAG® 35-70	One (1) 50lb. bucket of abrasive blasting media	March 2, 2021
		One (1) 50lb. bucket of abrasive blasting media	May 21, 2021

LABORATORY INVESTIGATION

The laboratory investigation consisted of testing one abrasive for specific gravity, hardness, weight change on ignition, conductivity (water soluble contaminants), moisture content, oil content, crystalline silica content, surface profile, particle size distribution, leachate test (TCLP), soluble and total metals, and radioactivity in accordance with the qualification test requirements of SSPC-AB 1 Section 4.1, Appendix B Sections B.4.1, and B.4.2 (January 12, 2015 with Editorial Revision May 6, 2019). Two additional abrasive sizes from the same product batch were tested for surface profile and particle size distribution. All other abrasive testing data for 30-60 is representative of all three sizes.

Specific Gravity

Specific gravity was determined in accordance with Section 4.1.1 of SSPC-AB 1 and ASTM C128-15, "Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate." Briefly, a pycnometer was used to determine the volume of abrasive and displaced water via the Gravimetric Procedure.

SSPC-AB 1 Requirement: *Specific gravity of 2.5 for mineral or slag abrasives, minimum*

Sample Performance: 410113-1: *Specific gravity of 2.9; Sample met the requirement*

Hardness

Hardness testing was performed in accordance with Section 4.1.2 of SSPC-AB 1. Briefly, to obtain a representative test sample, five grams of the submitted abrasive sample was examined using a microscope at 10X magnification. A few grains representing each color and shape were chosen and placed on a glass slide. A second glass slide was then placed on top of the selected abrasive. Moderate pressure was used to push and move the second slide over the abrasive for 10 seconds. The glass slides were then examined for scratches. If at least 75% of the grains are found to scratch the glass slides, then the abrasive is rated as having a minimum hardness of 6 on the Mohs scale.

SSPC-AB 1 Requirement: *75% of grains scratch glass*

Sample Performance: 410113-1: *100% of grains scratched; Sample met the requirement*

Weight Change on Ignition

Weight change on ignition testing was performed in accordance with Section 4.1.3 of SSPC-AB 1. A representative sample of each abrasive was dried in an oven for one hour at 105 ± 5°C. One gram of the dried abrasive was placed into a crucible. The crucible containing the abrasive sample was placed into a muffle furnace at 750 ± 50°C for approximately 30 minutes, allowed to cool to room temperature and then reweighed. The percent weight change was then calculated.

SSPC-AB 1 Requirement: *1.0% loss, maximum, 5.0% gain, maximum*

Sample Performance: 410113-1: *0.081% loss; Sample met the requirement*

Conductivity (Water Soluble Contaminants)

Conductivity testing was performed in accordance with Section 4.1.4 of SSPC-AB 1, and a modified version of ASTM D4940-15e1, "Standard Test Method for Conductimetric Analysis of Water-Soluble Ionic Contamination of Blasting Abrasives." A slurry of the sample was prepared with 300 mL of distilled water and 300 mL of sample material, which was then stirred for one minute. The slurry was allowed to settle for eight minutes and was stirred again, then filtered. The supernatant liquid removed from the slurry was then tested using an Oakton® COND 6+ conductivity meter.

SSPC-AB 1 Requirement: *1000 µS/cm, maximum*

Sample Performance: 410113-1: 268.0 *µS/cm; Sample met the requirement.*

Moisture Content

The moisture content was determined in accordance with Section 4.1.5 of SSPC-AB 1 and ASTM C566-19, "Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying." Approximately 250 grams of the abrasive was weighed and dried in an oven set at 105 ± 5°C until a constant weight was achieved. The percent moisture content was then calculated.

SSPC-AB 1 Requirement: *0.5%, maximum*

Sample Performance: 410113-1: *0.030%; Sample met the requirement*

Oil Content

Oil content testing was conducted in accordance with SSPC-AB 1, Section 4.1.6, and ASTM D7393-16, "Standard Practice for Indicating Oil in Abrasives." For this testing, a slurry composed of 100 ml of abrasive material and the required amount of deionized water was prepared using a 250-ml sealed flask and shaken vigorously for one minute. The slurry was allowed to settle for five minutes and then examined for oil sheen, oil droplets, and oil as an emulsion.

SSPC-AB 1 Requirement:	*Slurry surface will show no oil on the surface of the water or as an emulsion*
Sample Performance:	*No oil sheen, oil droplets or oil as an emulsion observed; Sample met the requirement*

Crystalline Silica Content

The crystalline silica content was subcontracted to Clark Testing of Jefferson Hills, Pennsylvania for determination of crystalline silica content according to NIOSH Method 7500. The Clark Testing report containing the results of testing is provided in Appendix 1.

SSPC-AB 1 Requirement:	*Class A (Less than 1.0% crystalline silica), Class B (Less than 5.0% crystalline silica), Class C - Unrestricted crystalline silica*
Sample Performance:	410113-1: *<0.1% Cristobalite, 0.2% Quartz; <0.1% Tridymite; Designated as Class A (see Appendix 1)*

Surface Profile

The surface profile was determined in accordance with SSPC-AB 1, Section 4.1.8. A 2' x 2' x $^1/_4$"steel plate (with intact mill scale) with an average Rockwell hardness of 71 HRBW was blasted at 95 ± 5 psi with a #4 Venturi nozzle. The surface profile depth was measured in three areas in accordance with ASTM D4417-19, "Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel," Method C (replica tape). Surface profile measurements were obtained using Testex™ X-Coarse (1.5 – 4.5 mils) replica tape. Each area was measured in duplicate. The average surface profile is listed below.

SPPC-AB 1 Requirement:	***None***
Classifications:	***Grade 1 (0.5 – 1.5 mils), Grade 2 (1.0 – 2.5 mils), Grade 3 (2.0 – 3.5 mils), Grade 4 (3.0 – 5.0 mils), Grade 5 (4.0 – 6.0 mils)***
Sample Performance:	410113-1: ***Average of 3.7 mils; Grade 4***
	410113-2: ***Average of 3.1 mils; Grade 3 and 4***
	410113-3: ***Average of 2.4 mils; Grade 2 and 3***

Particle Size Determination (Sieve Analysis)

A sieve analysis was performed in accordance with SSPC-AB 1, Section 4.1.9.1, and ASTM C136-14, "Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates." A 150-gram sample of the abrasive was collected and was tamped through a series of sieves (screen numbers 6, 10, 16, 20, 30, 40, 50, 60, 70, 80, 100, 140, 200, and a pan at the bottom) for seven minutes using an automated tamper. The abrasive collected on each screen was emptied into numbered and tarred sample cups. The underside of each screen was cleaned with a brass brush to loosen any trapped particles, which were also collected into the appropriate sample cups. The contents of each sample cup were weighed and documented. The test was performed in duplicate. The raw data for the sieve analysis is provided in Appendix 2, "KTA Sieve Analysis Data Forms."

SSPC-AB 1 Requirement:	**None**
Sample Performance:	410113-1: ***0.76mm Average Particle Size***
	410113-2: ***0.52mm Average Particle Size***
	410113-3: ***0.31mm Average Particle Size***

Leachate Test (TCLP)

The leachate test (TCLP) was subcontracted to Schneider Laboratories Global, Inc. of Richmond, Virginia, for metals analysis. The Schneider Laboratories Global, Inc. report containing the results of testing is provided in Appendix 3, "Schneider Laboratory Global, Inc. Report."

Soluble and Total Metals Content

Soluble and total metals contents were analyzed in accordance with SSPC-AB1, Appendix B, Section B.4.1 and MIL-A-22262B(SH), Section 3.4.12.1 by Schneider Laboratories, Inc. of Richmond, Virginia. The test report is contained in Appendix 3, "Schneider Laboratories

Global, Inc. Report." A summary table of results versus limits required can be found in Table 2, "Soluble and Total Metals Testing."

Table 2 - Soluble and Total Metals Testing

Compound(s)	Soluble Metals (STLC)		Total Metals (TTLC)	
	Maximum Limit (mg/l)	Results (mg/l)	Maximum Limit (mg/kg)	Results (mg/kg)
Antimony	5	<0.0800	500	<3.92
Arsenic	5.0	<0.0800	500	<3.92
Barium (excluding barite)	100	<0.0800	10,000	<3.92
Beryllium	0.75	<0.0800	75	<3.92
Cadmium	1.0	<0.0800	100	<3.92
Chromium (VI)	5	<0.0200	500	<0.800
Chromium	25	0.644	2,500	124
Cobalt	80	0.327	8,000	37.2
Copper	25	<0.200	2,500	<9.79
Fluoride Salts	180	<10.0	18,000	<19.9
Lead	1.0	<0.0800	1,000	<3.92
Mercury	0.2	<0.0005	20	<0.0839
Molybdenum	35	<0.0800	3,500	<3.92
Nickel	10	4.33	2,000	755
Selenium	1.0	<0.0800	100	<3.92
Silver	5	<0.0800	500	<3.92
Thallium	7.0	<0.0800	700	<3.92
Vanadium	24	0.0918	2,400	4.36
Zinc	50	0.223	5,000	<9.79

SSPC-AB 1 Requirement: ***No greater than Table I and Table II maximum concentrations***

Sample Performance: ***All analytes were below the maximum thresholds; the abrasive sample met the requirement.***

Radioactivity

Radioactivity testing was subcontracted to Hazen Research, Inc. of Golden, Colorado, for determination in accordance with SSPC-AB1, Appendix B, Section B.4.2. The Hazen Research, Inc. report containing the test results is provided in Appendix 4, "Hazen Research, Inc. Radioactivity Report."

SSPC-AB 1 Requirement: *No greater than 20.0 pCi/g, maximum*

Sample Performance: 410113-1: *<0.2 (± 0.2) pCi/g; the abrasive sample met the requirement.*

If you have any questions concerning the testing or this report, please contact me by telephone at 412.788.1300 extension 299 or by email me at cquatman@kta.com.

Sincerely,

KTA-TATOR, INC.

Chad S. Quatman
Project Manager/Coatings Application Specialist

R2 – A revision was issued to retest 410113-3 surface profile and to update the results accordingly.

Appendices:

1 – Clark Testing Report
2 – KTA Sieve Analysis Data Forms
3 – Schneider Laboratory Global, Inc. Report
4 – Hazen Research, Inc. Radioactivity Report

CSQ/JAG:edg.lmb.edg

Appendix 1

KTA - CHEM
Contact: Kaley Stanczyk
Address: KTA-Tator
145 Enterprise Dr
Pittsburgh, PA 15275
Ph: 412-788-1300 ext 182 Fax:
Email: kstanczyk@kta.com

FINAL REPORT
This report and the data within has completed QA/QC review

Fuels & Lubrication Lab
1801 Route 51 South
Building 9
Jefferson Hills, PA 15025
Ph: 412-387-1001
Fax: 412-387-1028

Primary Contact	Kaley Stanczyk
PO#	21PO-153
Tracking #	415138-1
Client Sample #	410113-1 Abrasive Blasting 30/60
Sample Date	03/11/2021
Received Date	03/11/2021

General Diagnostic Notes

Additional detail may be available if requested, at standard Clark consulting rates.

Sample Prep-Raw Materials

Test Code: P1110 / Method:

Result Date	03/13/2021

Crystalline, Silica, XRD

Test Code: N3905 / Method: NIOSH 7500

Result Date	03/13/2021
Cristobalite	<0.1 wt. %
Quartz	0.2 wt. %
Tridymite	<0.1 wt. %

Authorized Signature

Analyst: Michelle Peliotti Date: 03/18/2021
Michelle

Results relate only to items tested.

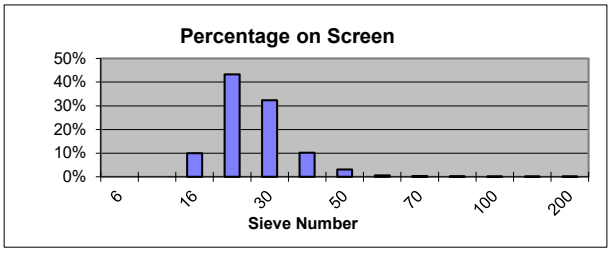
Appendix 2

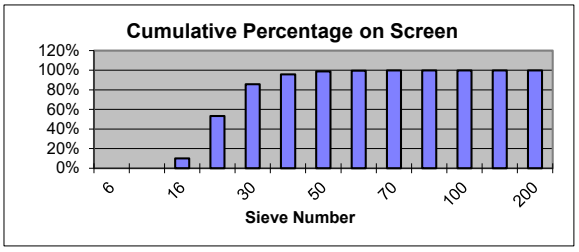
KTA-Tator, Inc. Sieve Analysis Data Form

Sample ID No.:	410113-1	Initial	Date:	3/17/2021
Sample Description:	Olimag Sands	Run 1A	Technician:	CSQ
Initial Sample Mass (g):	150.62	30/60		

US Standard Sieve No.	Retained Sample (g)	% of Total	Cumulative % of Total	Nominal Sieve Opening Size (mm)	Retained Sample (g) * Opening (mm)
6	0.000	0.000%	0.000%	3.350	0.000
10	0.000	0.000%	0.000%	2.000	0.000
16	15.07	10.01%	10.01%	1.180	17.78
20	65.14	43.25%	53.25%	0.850	55.37
30	48.76	32.37%	85.63%	0.600	29.26
40	15.25	10.12%	95.75%	0.425	6.481
50	4.690	3.114%	98.86%	0.300	1.407
60	0.820	0.544%	99.41%	0.250	0.205
70	0.340	0.226%	99.63%	0.212	0.072
80	0.190	0.126%	99.76%	0.180	0.034
100	0.010	0.007%	99.77%	0.150	0.002
140	0.020	0.013%	99.78%	0.106	0.002
200	0.030	0.020%	99.80%	0.075	0.002
Pan*	0.150	0.100%	99.90%	0.038	0.006
Total	150.5			Sum =	110.62

Average particle size (mm) = 0.74





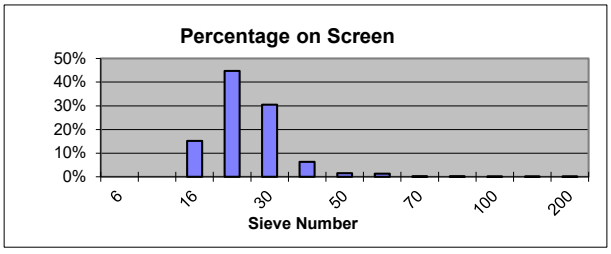
* Assumes pan particle size is equal to 0.038 mm

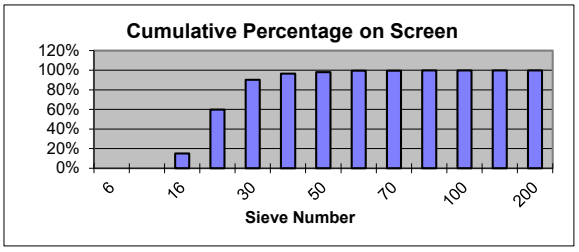
KTA-Tator, Inc. Sieve Analysis Data Form

Sample ID No.:	410113-1	Initial	Date:	3/17/2021
Sample Description:	Olimag Sands	Run 1B	Technician:	CSQ
Initial Sample Mass (g):	150.06	30/60		

US Standard Sieve No.	Retained Sample (g)	% of Total	Cumulative % of Total	Nominal Sieve Opening Size (mm)	Retained Sample (g) * Opening (mm)
6	0.000	0.000%	0.000%	3.350	0.000
10	0.000	0.000%	0.000%	2.000	0.000
16	22.71	15.13%	15.13%	1.180	26.80
20	67.07	44.70%	59.83%	0.850	57.01
30	45.72	30.47%	90.30%	0.600	27.43
40	9.420	6.277%	96.57%	0.425	4.004
50	2.220	1.479%	98.05%	0.300	0.666
60	2.030	1.353%	99.41%	0.250	0.508
70	0.220	0.147%	99.55%	0.212	0.047
80	0.180	0.120%	99.67%	0.180	0.032
100	0.070	0.047%	99.72%	0.150	0.011
140	0.030	0.020%	99.74%	0.106	0.003
200	0.030	0.020%	99.76%	0.075	0.002
Pan*	0.130	0.087%	99.85%	0.038	0.005
Total	149.8			Sum =	116.52

Average particle size (mm) = 0.78



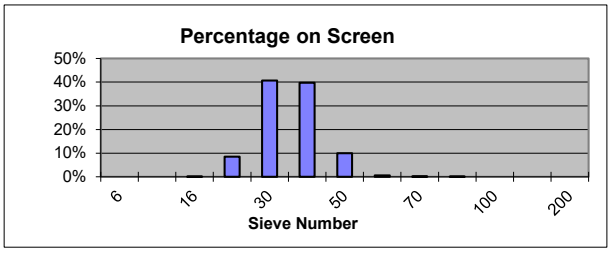


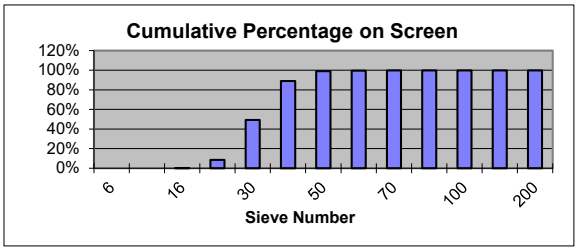
* Assumes pan particle size is equal to 0.038 mm

KTA-Tator, Inc. Sieve Analysis Data Form

Sample ID No.:	410113-2	Initial	Date:	3/17/2021
Sample Description:	Olimag Sands	Run 2A	Technician:	CSQ
Initial Sample Mass (g):	150.5	32b4		

US Standard Sieve No.	Retained Sample (g)	% of Total	Cumulative % of Total	Nominal Sieve Opening Size (mm)	Retained Sample (g) * Opening (mm)
6	0.000	0.000%	0.000%	3.350	0.000
10	0.000	0.000%	0.000%	2.000	0.000
16	0.110	0.073%	0.073%	1.180	0.130
20	12.77	8.485%	8.558%	0.850	10.85
30	61.15	40.63%	49.19%	0.600	36.69
40	59.84	39.76%	88.95%	0.425	25.43
50	15.06	10.01%	98.96%	0.300	4.518
60	0.870	0.578%	99.53%	0.250	0.218
70	0.230	0.153%	99.69%	0.212	0.049
80	0.080	0.053%	99.74%	0.180	0.014
100	0.000	0.000%	99.74%	0.150	0.000
140	0.000	0.000%	99.74%	0.106	0.000
200	0.000	0.000%	99.74%	0.075	0.000
Pan*	0.140	0.093%	99.83%	0.038	0.005
Total	150.3			Sum =	77.91
				Average particle size (mm) =	0.52



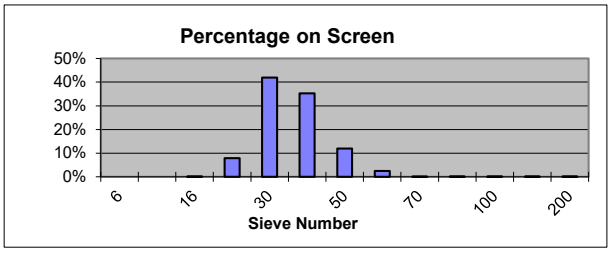


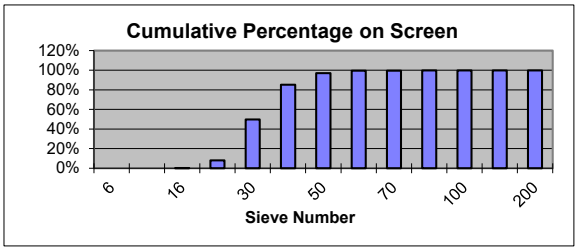
* Assumes pan particle size is equal to 0.038 mm

KTA-Tator, Inc. Sieve Analysis Data Form

Sample ID No.:	410113-2	Initial	Date:	3/17/2021
Sample Description:	Olimag Sands	Run 2B	Technician:	CSQ
Initial Sample Mass (g):	150.43	32b4		

US Standard Sieve No.	Retained Sample (g)	% of Total	Cumulative % of Total	Nominal Sieve Opening Size (mm)	Retained Sample (g) * Opening (mm)
6	0.000	0.000%	0.000%	3.350	0.000
10	0.000	0.000%	0.000%	2.000	0.000
16	0.130	0.086%	0.086%	1.180	0.153
20	11.84	7.871%	7.957%	0.850	10.06
30	63.03	41.90%	49.86%	0.600	37.82
40	53.08	35.29%	85.14%	0.425	22.56
50	17.98	11.95%	97.09%	0.300	5.394
60	3.630	2.413%	99.51%	0.250	0.908
70	0.160	0.106%	99.61%	0.212	0.034
80	0.080	0.053%	99.67%	0.180	0.014
100	0.030	0.020%	99.69%	0.150	0.005
140	0.030	0.020%	99.71%	0.106	0.003
200	0.030	0.020%	99.73%	0.075	0.002
Pan*	0.170	0.113%	99.84%	0.038	0.006
Total	150.2			Sum =	76.96
				Average particle size (mm) =	0.51



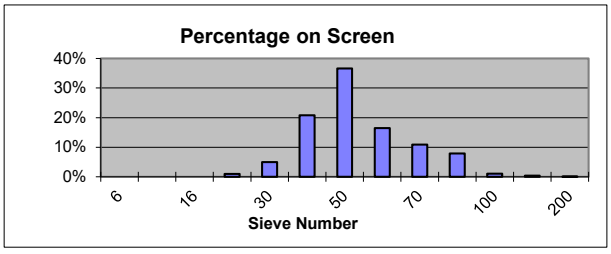


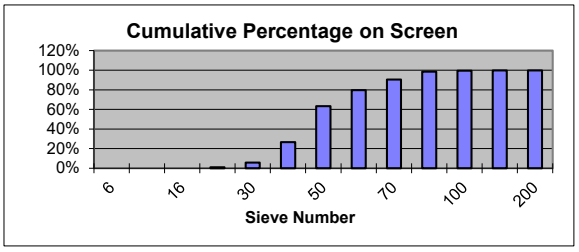
* Assumes pan particle size is equal to 0.038 mm

KTA-Tator, Inc. Sieve Analysis Data Form

Sample ID No.:	410113-3	Initial	Date:	3/17/2021
Sample Description:	Olimag Sands	Run 3A	Technician:	CSQ
Initial Sample Mass (g):	150.09	35-70		

US Standard Sieve No.	Retained Sample (g)	% of Total	Cumulative % of Total	Nominal Sieve Opening Size (mm)	Retained Sample (g) * Opening (mm)
6	0.000	0.000%	0.000%	3.350	0.000
10	0.000	0.000%	0.000%	2.000	0.000
16	0.000	0.000%	0.000%	1.180	0.000
20	1.390	0.926%	0.926%	0.850	1.182
30	7.410	4.937%	5.863%	0.600	4.446
40	31.22	20.80%	26.66%	0.425	13.27
50	54.92	36.59%	63.26%	0.300	16.48
60	24.68	16.44%	79.70%	0.250	6.170
70	16.31	10.87%	90.57%	0.212	3.458
80	11.78	7.849%	98.41%	0.180	2.120
100	1.600	1.066%	99.48%	0.150	0.240
140	0.520	0.346%	99.83%	0.106	0.055
200	0.040	0.027%	99.85%	0.075	0.003
Pan*	0.050	0.033%	99.89%	0.038	0.002
Total	149.9			Sum =	47.42
				Average particle size (mm) =	0.32



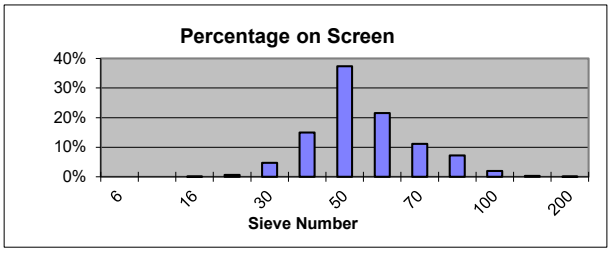


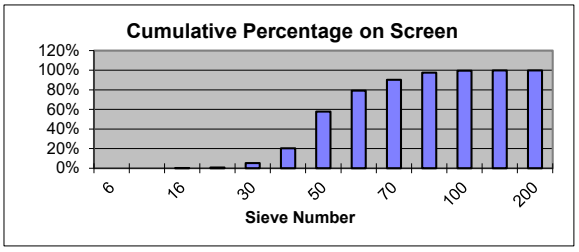
* Assumes pan particle size is equal to 0.038 mm

KTA-Tator, Inc. Sieve Analysis Data Form

Sample ID No.:	410113-3	Initial	Date:	3/17/2021
Sample Description:	Olimag Sands	Run 3B	Technician:	CSQ
Initial Sample Mass (g):	150.02	35-70		

US Standard Sieve No.	Retained Sample (g)	% of Total	Cumulative % of Total	Nominal Sieve Opening Size (mm)	Retained Sample (g) * Opening (mm)
6	0.000	0.000%	0.000%	3.350	0.000
10	0.000	0.000%	0.000%	2.000	0.000
16	0.020	0.013%	0.013%	1.180	0.024
20	1.000	0.667%	0.680%	0.850	0.850
30	7.070	4.713%	5.393%	0.600	4.242
40	22.40	14.93%	20.32%	0.425	9.520
50	56.07	37.38%	57.70%	0.300	16.82
60	32.26	21.50%	79.20%	0.250	8.065
70	16.67	11.11%	90.31%	0.212	3.534
80	10.78	7.186%	97.50%	0.180	1.940
100	2.890	1.926%	99.43%	0.150	0.434
140	0.430	0.287%	99.71%	0.106	0.046
200	0.060	0.040%	99.75%	0.075	0.005
Pan*	0.050	0.033%	99.79%	0.038	0.002
Total	149.7			Sum =	45.48
				Average particle size (mm) =	0.30





* Assumes pan particle size is equal to 0.038 mm

Appendix 3

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: KTA-Tator, Inc. (1861)
Address: 145 Enterprise Dr
Pittsburgh, PA 15275

Attn:

Project: Olimag Sands
Location: Pittsburgh
Number: 410113

Order #: 408098

Matrix Bulk, STLC
Received 03/11/21
Reported 04/07/21

PO Number: 21PO-154

Sample ID / Parameter	Cust. Sample ID	Location / Method	Result	RL*	Units	Analysis Date	Analyst
408098-001	410113-1	Abrasive Material (30/60)					
Metals Analysis							
Antimony		EPA 6010D / 3050B	**<3.92**	3.91	mg/kg	04/07/21	DLJ
Arsenic		EPA 6010D / 3050B	**<3.92**	3.91	mg/kg	04/07/21	DLJ
Barium		EPA 6010D / 3050B	**<3.92**	3.91	mg/kg	04/07/21	DLJ
Beryllium		EPA 6010D / 3050B	**<3.92**	3.91	mg/kg	04/07/21	DLJ
Cadmium		EPA 6010D / 3050B	**<3.92**	3.91	mg/kg	04/07/21	DLJ
Chromium		EPA 6010D / 3050B	**124**	9.78	mg/kg	04/07/21	DLJ
Cobalt		EPA 6010D / 3050B	**37.2**	3.91	mg/kg	04/07/21	DLJ
Copper		EPA 6010D / 3050B	**<9.79**	9.78	mg/kg	04/07/21	DLJ
Lead		EPA 6010D / 3050B	**<3.92**	3.91	mg/kg	04/07/21	DLJ
Molybdenum		EPA 6010D / 3050B	**<3.92**	3.91	mg/kg	04/07/21	DLJ
Nickel		EPA 6010D / 3050B	**755**	39.1	mg/kg	04/07/21	DLJ
Selenium		EPA 6010D / 3050B	**<3.92**	3.91	mg/kg	04/07/21	DLJ
Silver		EPA 6010D / 3050B	**<3.92**	3.91	mg/kg	04/07/21	DLJ
Thallium		EPA 6010D / 3050B	**<3.92**	3.91	mg/kg	04/07/21	DLJ
Vanadium		EPA 6010D / 3050B	**4.36**	3.91	mg/kg	04/07/21	DLJ
Zinc		EPA 6010D / 3050B	**<9.79**	9.78	mg/kg	04/07/21	DLJ
Matrix Spike failed for Ba, Be, Cr, & V due to interference. Sample results are accurate.							
Chromium (VI)		EPA 7196A / 3060	**<0.800**	0.800	mg/kg	03/18/21	SA
Matrix Spike failed due to interference. Sample results are accurate.							
Mercury		EPA 7471A	**<0.0839**	0.0839	mg/kg	03/18/21	JL
Mercury		EPA 7470A / 1311	**<0.0005**	0.0005	mg/L	03/15/21	SA
Arsenic		EPA 6010D / 1311	**<0.0800**	0.0800	mg/L	03/15/21	DLJ
Barium		EPA 6010D / 1311	**<0.0800**	0.0800	mg/L	03/15/21	DLJ
Cadmium		EPA 6010D / 1311	**<0.0800**	0.0800	mg/L	03/15/21	DLJ
Chromium		EPA 6010D / 1311	**<0.200**	0.200	mg/L	03/15/21	DLJ
Lead		EPA 6010D / 1311	**<0.0800**	0.0800	mg/L	03/15/21	DLJ
Selenium		EPA 6010D / 1311	**<0.0800**	0.0800	mg/L	03/15/21	DLJ

Report Amended. CA-17 analysis repeated and new results reported per client request.

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: KTA-Tator, Inc. (1861)
Address: 145 Enterprise Dr
Pittsburgh, PA 15275

Attn:

Project: Olimag Sands
Location: Pittsburgh
Number: 410113

Order #: 408098

Matrix Bulk, STLC
Received 03/11/21
Reported 04/07/21

PO Number: 21PO-154

Sample ID / Parameter	Cust. Sample ID	Location / Method	Result	RL*	Units	Analysis Date	Analyst
408098-001	410113-1	Abrasive Material (30/60)					
Silver		EPA 6010D / 1311	**<0.0800**	0.0800	mg/L	03/15/21	DLJ
Wet Chemistry Analysis							
Fluoride		SW846 9056M	**<19.9**	19.9	mg/kg	03/17/21	BRW
MS failure due to possible matrix interference.							
Results have been blank corrected.							
408098-002	410113-1	Abrasive Material (30/60)					
Metals Analysis							
Antimony		EPA 6010D / WET Method	**<0.0800**	0.0800	mg/L	03/18/21	DLJ
Arsenic		EPA 6010D / WET Method	**<0.0800**	0.0800	mg/L	03/18/21	DLJ
Barium		EPA 6010D / WET Method	**<0.0800**	0.0800	mg/L	03/18/21	DLJ
Beryllium		EPA 6010D / WET Method	**<0.0800**	0.0800	mg/L	03/18/21	DLJ
Cadmium		EPA 6010D / WET Method	**<0.0800**	0.0800	mg/L	03/18/21	DLJ
Chromium		EPA 6010D / WET Method	**0.644**	0.200	mg/L	03/18/21	DLJ
Cobalt		EPA 6010D / WET Method	**0.327**	0.0800	mg/L	03/18/21	DLJ
Copper		EPA 6010D / WET Method	**<0.200**	0.200	mg/L	03/18/21	DLJ
Lead		EPA 6010D / WET Method	**<0.0800**	0.0800	mg/L	03/18/21	DLJ
Molybdenum		EPA 6010D / WET Method	**<0.0800**	0.0800	mg/L	03/18/21	DLJ
Nickel		EPA 6010D / WET Method	**4.33**	0.0800	mg/L	03/18/21	DLJ
Selenium		EPA 6010D / WET Method	**<0.0800**	0.0800	mg/L	03/18/21	DLJ
Silver		EPA 6010D / WET Method	**<0.0800**	0.0800	mg/L	03/18/21	DLJ
Thallium		EPA 6010D / WET Method	**<0.0800**	0.0800	mg/L	03/18/21	DLJ
Vanadium		EPA 6010D / WET Method	**0.0918**	0.0800	mg/L	03/18/21	DLJ
Zinc		EPA 6010D / WET Method	**0.223**	0.200	mg/L	03/18/21	DLJ
Duplicate failed for Zn due to interference and the Matrix Spike failed for Ni due to high concentration of analyte found in the sample. Sample results are accurate.							
Chromium (VI)		EPA 7196A / WET Method	**<0.0200**	0.0200	mg/L	03/18/21	SA
Mercury		EPA 7470A / 3005	**<0.0005**	0.0005	mg/L	03/18/21	JL
Wet Chemistry Analysis							
Fluoride		EPA 300.0 Rev 2.1	**<10.0**	10.0	mg/L	03/17/21	BRW
Results have been blank corrected.							

Report Amended. CA-17 analysis repeated and new results reported per client request.

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

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Pittsburgh, PA 15275

Attn:

Project: Olimag Sands
Location: Pittsburgh
Number: 410113

Order #: 408098

Matrix Bulk, STLC
Received 03/11/21
Reported 04/07/21

PO Number: 21PO-154

Sample ID / Parameter	Cust. Sample ID / Method	Result	RL*	Units	Analysis Date	Analyst
408098-04/07/21 05:47 PM						

Reviewed By: **Irma Faszewski**
QAQC Director

EPA TCLP Regulatory Limits

Parameter	Reg. Limit	Unit
Arsenic	5.00	mg/L
Barium	100	mg/L
Cadmium	1.00	mg/L
Chromium	5.00	mg/L
Lead	5.00	mg/L
Mercury	0.200	mg/L
Selenium	1.00	mg/L
Silver	5.00	mg/L

Report Amended. CA-17 analysis repeated and new results reported per client request.

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: KTA-Tator, Inc. (1861)
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Attn:

Project: Olimag Sands
Location: Pittsburgh
Number: 410113

Order #: 408098

Matrix Bulk, STLC
Received 03/11/21
Reported 04/07/21

PO Number: 21PO-154

Sample ID	Cust. Sample ID	Location					
Parameter		Method	Result	RL*	Units	Analysis Date	Analyst

State Certifications

Method	Parameter	Pennsylvania	Virginia
EPA 300.0 Rev 2.1	Fluoride	Not Certified	VELAP Certified
EPA 6010D	Antimony	ELAP Certified	VELAP Certified
EPA 6010D	Arsenic	ELAP Certified	VELAP Certified
EPA 6010D	Barium	ELAP Certified	VELAP Certified
EPA 6010D	Beryllium	Not Certified	VELAP Certified
EPA 6010D	Cadmium	ELAP Certified	VELAP Certified
EPA 6010D	Chromium	ELAP Certified	VELAP Certified
EPA 6010D	Cobalt	Not Certified	VELAP Certified
EPA 6010D	Copper	Not Certified	VELAP Certified
EPA 6010D	Lead	ELAP Certified	VELAP Certified
EPA 6010D	Molybdenum	Not Certified	VELAP Certified
EPA 6010D	Nickel	ELAP Certified	VELAP Certified
EPA 6010D	Selenium	ELAP Certified	VELAP Certified
EPA 6010D	Silver	ELAP Certified	VELAP Certified
EPA 6010D	Thallium	Not Certified	VELAP Certified
EPA 6010D	Vanadium	Not Certified	VELAP Certified
EPA 6010D	Zinc	Not Certified	VELAP Certified
EPA 7196A	Chromium (VI)	Not Certified	VELAP Certified
EPA 7470A	Mercury	ELAP Certified	VELAP Certified
EPA 7471A	Mercury	ELAP Certified	VELAP Certified
SW846 9056M	Fluoride	Not Certified	Not Certified

State	Certificate Number
Pennsylvania	ELAP 014
Virginia	VELAP 11204
Virginia	VELAP 11212

Report Amended. CA-17 analysis repeated and new results reported per client request.

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Appendix 4

Hazen Research, Inc.
4601 Indiana Street
Golden, CO 80403 USA
Tel: (303) 279-4501
Fax: (303) 278-1528

Lab Control ID: 21M01528
Received: Mar 24, 2021
Reported: Mar 30, 2021
Purchase Order No.
21PO-175

Customer ID: 03713Z
Account ID: Z05120

Chad Quatman
KTA-Tator, Inc.
115 Technology Drive
Pittsburgh, PA 15275

ANALYTICAL REPORT

By:_____
Jessica Axen
Analytical Laboratories Director

Hazen Research, Inc.
4601 Indiana Street
Golden, CO 80403 USA
Tel: (303) 279-4501
Fax: (303) 278-1528

Lab Control ID: 21M01528
Received: Mar 24, 2021
Reported: Mar 30, 2021
Purchase Order No.
21PO-175

Customer ID: 03713Z
Account ID: Z05120

ANALYTICAL REPORT

Chad Quatman
KTA-Tator, Inc.

Lab Sample ID			21M01528-001					
Customer Sample ID			**410113-1 "30-60"** sampled on 03/16/21 @ 0000 by Chad Quatman					
Parameter	**Units**	**Code**	Result	Precision* +/-	Detection Limit	Method	Analysis Date / Time	Analyst
Gross Gamma	**pCi/g**	**-**	<0.2	0.2	0.2	MIL-A-22262B (SH)	3/25/21 @ 1000	AS

*Variability of the radioactive decay process (counting error) at the 95% confidence level, 1.96 sigma.

Codes: (T) = Total (D) = Dissolved (S) = Suspended (R) = Total Residual (AR) = As Received < = Less Than